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

Report on Hungary

Authors:
Mihály GARAMVÖLGYI, Dr Pál GÁSPÁR, Anita HALÁSZ, Renáta Anna JAKSA
International Center for Economic Growth
European Center

November 2004

Technical Report EUR 21408 EN

European Commission

Joint Research Centre (DG JRC)

Institute for Prospective Technological Studies

http://www.jrc.es

Legal notices

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of the following information.

Neither ICEG EC nor any person acting on behalf of it is responsible for the use which might be made of the following information.

Technical Report EUR 21408 EN

Printed in Spain

PREFACE

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

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

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

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

The contract was awarded by: Institute for Prospective Technological Studies (IPTS) of the Directorate General Joint Research Centre, European Commission
Contractor: International Center for Economic Growth, European Center (ICEG EC), 14 Korompai Str., Budapest, Hungary H-1124. Tel: +36 1 248 1160. Fax: +36 1 248 1161.
E-mail: icegec@axelero.hu Webpage: www.icegec.org
Contract name: Factors and Impacts in the Information Society: a Prospective Analysis in the Candidate Countries
Contract number: N 20089-2002-11 F1ED SEV HU

TABLE OF CONTENTS

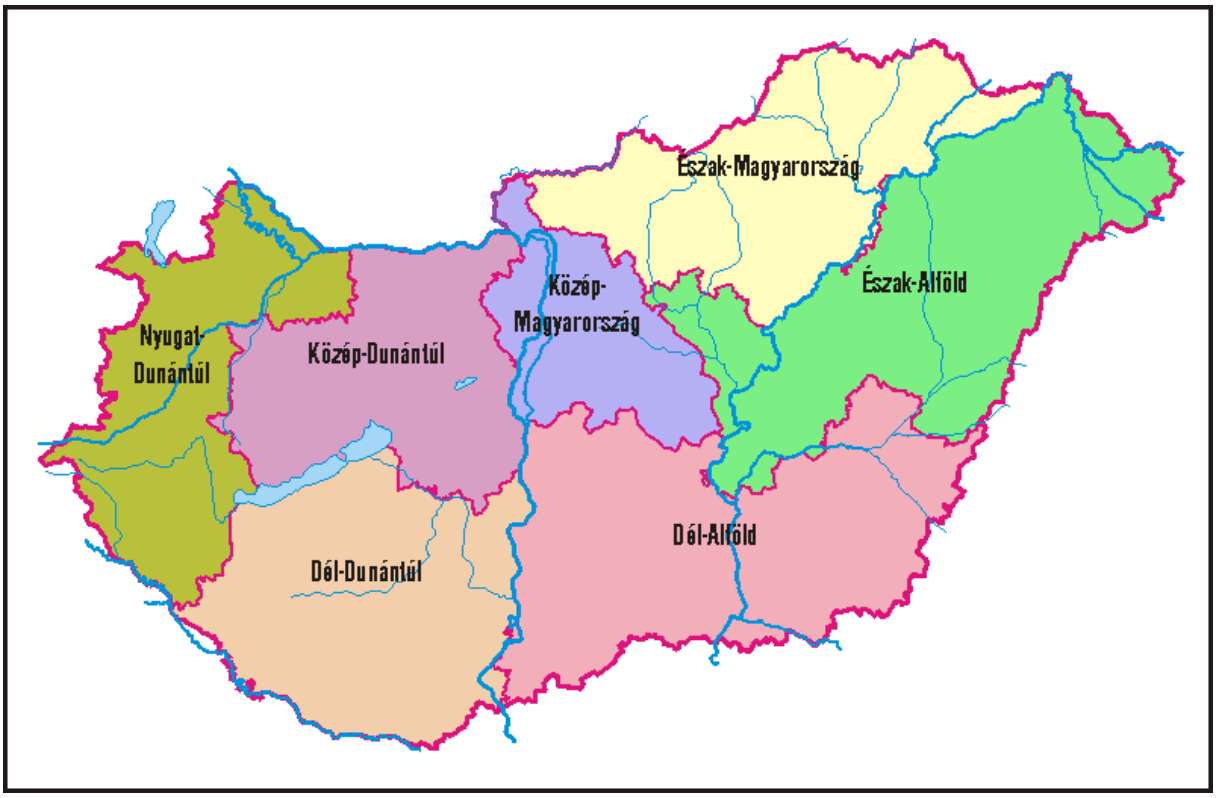
List of abbreviations used

ADSL	Asymmetric Digital Subscriber Line
B2B	Business-to-Business
BABS	Bachelor of Arts in Business Studies
BKAE	Budapest University of Economics
BMGE	Budapest Technical and Economic University
CEE	Central and Eastern European (countries)
CMEA	Council of Mutual Economic Assistance
CPI	Consumer Price Index
CT	Communication Technologies
DT	Deutsche Telecom
EC	European Commission
ECDL	European Computer Driving License
EU	European Union
EU15	The present 15 member states of the European Union
EUR	Euro (currency)
FDI	Foreign direct investment
FDC	Fully Distributed Costs
FRIACO	Flat Rate Interconnection Scheme
GDP	Gross Domestic Product
GKI	GKI Economic Research Co.
GSM	Global System for Mobile communications
HAC	Hungarian Accreditaion Committee
HP	Hewlett Packard
HCSO	Hungarian Central Statistical Office
HTML	Hypertext Markup Language
HUF	Hungarian Forint
ICT	Information and Communication Technology
IP	Internet Protocol
IS	Information Society
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
IST	Information System Technology
ISTRI	Information Society Research Institute
IT	Information Technology
KFKI	Central Physical Research Institue
KSH	National Statistical Office
LLU	Local Loop Unbundling
LRIC	Long Run Incremental Costs
MTA	Hungarian Academy of Sciences
Mbps	Megabits (million) per Second

MMS	Mobile Multimedia Messaging
NGO	Non-Governmental Organization
NIID	National Information Infrastructure Development Programme
NIOK	Nonprofit Information and Education Center
OECD	Organization for Economic Co-operation and Development
PC	Personal Computer
PPI	Producers Price Index
PPP	Purchasing Power Parity
PPS	Purchasing Power Standards
R&D	Research and Development
RIO	Reference Interconnection Offer
CD-ROM	Compact Disc Read Only Memory
RUO	Reference Unbundling Offer
SME	Small and Medium-sized Enterprise
SMP	Significant Market Power
SMS	Short Message Service
TDMC	Telecommunications Decision Making Committe
TIP	Technology and Innovation Project
UK	United Kingdom
UMTS	Universal Mobile Telecommunication System
UNESCO	United Nations Educational, Scientific and Cultural Organization
USA	United States of America
USO	Universal Service Obligation
WAP	Wireless Application Protocol
WIP	World Internet Project
WWW	World Wide Web

A. National and Regional Economy

Basic data



Territory: 93.000 square km.
Population: 10,1 million
GDP per capita (at current exchange rates): 6000 €
GDP per capita (at PPP exchange rate): 13000 €
The country is comprised of 7 NUTS-II regions:

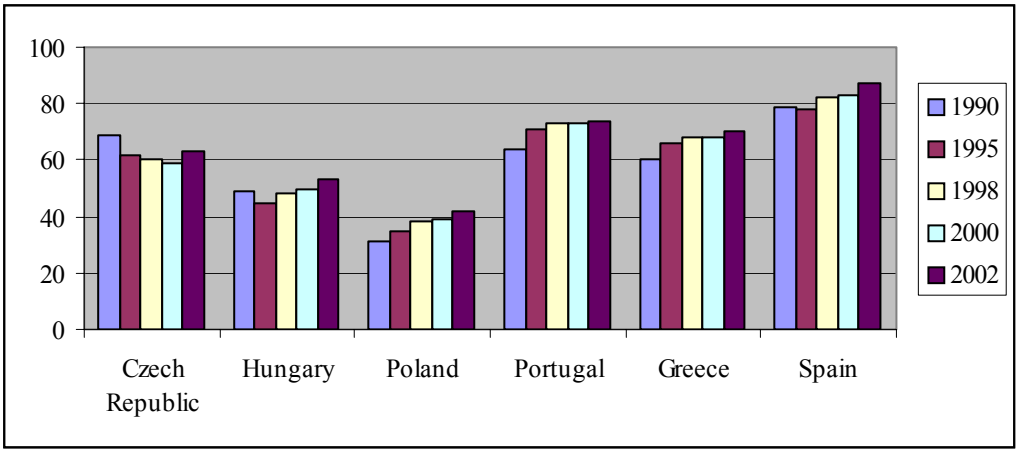
a) Central Hungarian region (Közép-Magyarország),
b) Central Transdanubian region (Közép-Dunántúl),
c) Western Transdanubian region (Nyugat-Dunántúl),
d) South Transdanubian region (Dél-Dunántúl),
e) North Hungarian region (Észak-Magyarország),
f) Northern Plain region (Észak-Alföld),
g) Southern Plain region (Dél-Alföld),

A.1. Background on the national economy

Hungary is a small medium income economy, which represents 2.8% of the total territory, 2.5% of total population and 0.7% of total income produced by the current Member States of the EU-15[1]. Per capita GDP in Hungary measured in purchasing power standards (PPS) was in 2002 EUR 12620, which was by more than 20% higher than the average per capita GDP in the accession countries and represented 53% of the average per capita GDP of the EU-15.

In the early 1990s per capita GDP measured by PPS was slightly below 50%: initially the gap between Hungary and the EU-15 average increased (1995: 45%) due to the significant decline of GDP in the first years of economic transition but then it was followed by swift economic growth reducing the gap significantly in the next 5-6 years. Compared to other central European accession economies, Hungary was able to close slightly faster the development gap, but its level of development is still below the less developed cohesion countries of the EU.

Graph A.1. GDP/capita at PPS in percentage of the EU-average



Source: Eurostat

Concerning the main structural features of the economy, Hungary is a very open economy in real and financial terms. Total foreign trade (the sum of exports and imports) represents almost 130% of GDP, the share of exports in GDP is almost double of the EU-15 average and exceeds the levels of most accession economies, except the very small and open Baltic countries and Slovenia. Real openness grew constantly in the last decade because of the strong outward orientation of the economy, expansion of exports and trade in general.

The structure of the Hungarian economy is very similar to other Central European economies. Less than 4% of the GDP is produced by agriculture and quarter by industry within that mainly by manufacturing. The share of manufacturing in output is higher than the average of the European Union, but lower than in Czech Republic, which has traditionally had a stronger industrial base. The structural changes have been driven by the nature of economic transition

[1] The 10 accession countries altogether produced 4% of the GDP of the EU-15 in volume. The share of population of the new entrant countries over the total EU-15 population is however much higher around 20%.

and the reliance on foreign direct investments, which have been penetrating the economy initially in the manufacturing and banking sectors2.

Contrary to many accession countries the share of industry in GDP increased during the 1990s, since the major source of economic growth was the expansion of the output of the strongly outward oriented manufacturing sector. The tertiary sector makes up for the remaining 70% of GDP, a level which is very close to those observed in advanced economies.

Table A.1. Hungary: basic data in regional comparison

	Land area (thousand square km.)	Average population (million)	GDP/cap. (PPS) EUR	Unemployment (%)	Export/ GDP (%)	Inflation (%)	Agric. In value added (%)
Czech Republic	78.8	10.2	13 700	7.3	71	1.4	4.2
Greece	131.5	10.5	15 020	10.3	23	2.3	7
Spain	505.4	40.2	19 510	11.4	30	3.1	3.4
Poland	312.5	38.4	9 410	20	28	1.9	3.8
Portugal	91.2	10,2	16 059	5	31	3.7	3.6
Hungary	93.1	10,2	12 620	5.6	61	5.2	4.3
EU-15	3 234.4	377.7	23 210	7.5	36	2.1	2.1
Accession Countries	738.5	74.8	10 700	15.1	47	4.5	4.1

Source: Eurostat, 2003 WIIW

A.2. Economic growth in the last decade

Looking back at the last 13 years, the development of the Hungarian economy can be divided to four clearly discernible periods. These periods are the following:

a) The transition- driven output collapse: 1990-1992,
b) The increasing macroeconomic tensions and muddling-through: 1993-early 1995,
c) The drastic macroeconomic adjustment followed by long period of sustainable and rapid growth: 1995-2000,
d) The relaxed macroeconomic policies with increasing negative effects of global slowdown. 2001-2003.

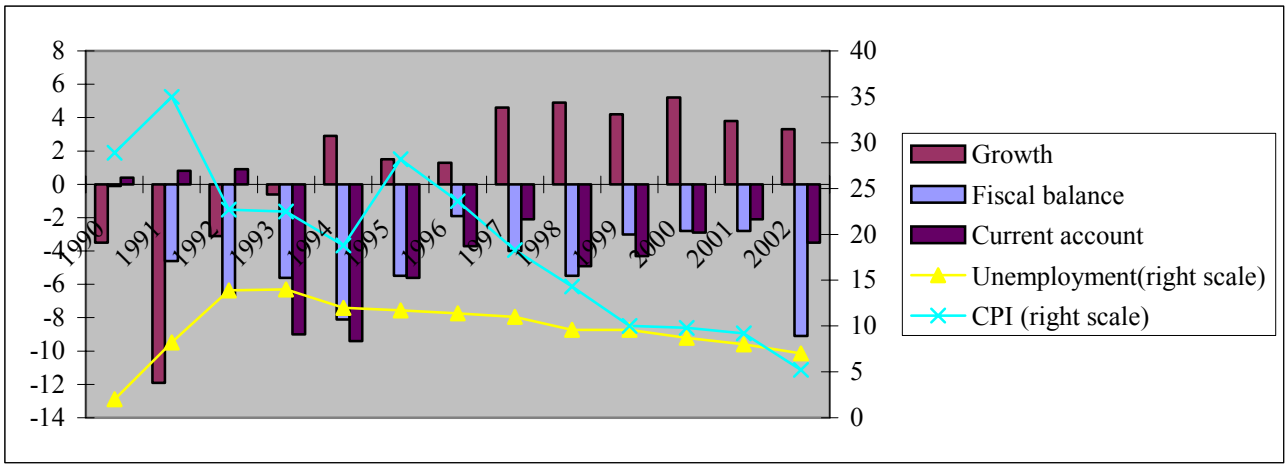
Transition began in Hungary with the same output decline observed in other Central and Eastern European economies. The cumulative decline of GDP between 1990 and 1993 was almost 20% after its stagnation between 1985 and 1990. This decline, which was around the average of all transition economies, was mainly caused by supply side and institutional factors: amidst increased openness and competition the sheltered producers had to exit the market in a relatively short period of time.

[2] It is still an open question whether the Hungarian economy will be a manufacturing or service sector driven in the future. The share of services has been on rise, and strong manufacturing base is related mainly to the presence of foreign investors in certain key manufacturing branches.

Besides GDP decline, the economy experienced all features typical for early transition economies: increase in unemployment and associated decline in employment rate, temporary burst of inflation, increase of public sector imbalances and rapid structural changes on the supply side of the GDP.

After this initial collapse the economy started to recover from 1993, but this recovery was associated and partly driven by unsustainable macroeconomic policies. Wage growth exceeding by far advances in productivity at that time in still dominant public sector, increasing fiscal expenditures and deficits resulted in 1994 in the emergence of a huge twin deficit: both fiscal and current account deficits exceeded 8% of GDP. While macroeconomic pressures built up, at the corporate sector level Hungary proceeded well with restructuring and adjustment of its state-owned companies and banks.

Graph A.2. Evolution of major macroeconomic indicators between 1990 and 2002



Source: KSH (National Statistical Office), 2002

The Mexican crisis was the last drop in the glass as it showed the possible consequences of currency crisis driven by unsustainable macroeconomic policies. In 1995 policy makers implemented a drastic stabilisation program driven by fiscal adjustment and tight incomes policies accompanied by significant devaluation of the currency and introduction of a crawling peg regime. On the other hand structural reforms were accelerated: privatisation in the corporate sector (including among public utilities (electric energy and gas supply)) proceeded rapidly, the inflow of foreign direct investments, the opening of financial sector and the liberalisation of the capital account accelerated.

The outcome of macroeconomic tightening and structural reforms was a simultaneous increase in GDP growth and sizeable improvement in macroeconomic indicators. Disinflation was smooth with low sacrifice ratio, unemployment declined rapidly and economic growth has been accompanied by increasing employment, fiscal and current account balances improved thanks to increasing revenues from higher income and export growth.

Real GDP growth was driven mainly by the increase of manufacturing sector and its exports to the EU market, and both price and cost competitiveness improved significantly. The success of growth strategy hinged on the sustainability of macroeconomic policies and on the cyclical position of the European Union.

Starting from 2000 these two preconditions have seen a dramatic reversal. The cyclical position of the European Union started to weaken, import demand grew less than earlier and within this negative shock the major export market (the German economy) suffered the greatest setback. The unfavourable shift in external demand coincided with loosening macroeconomic (fiscal and incomes) policies aimed at counterbalancing the negative cyclical demand effects.

As a result, general government deficit increased in 2002 to almost 9% of GDP, while real wage growth exceeded increase in labour productivity by more than 10 percentage points both in 2001 and 2002. In 2002 and early 2003 both macroeconomic instability and slower economic growth became obvious and demanded policy adjustments. These were gradually done in 2004 when incomes and fiscal policies were tightened and the Central Bank pursued a conservaticve monetary policy. At the time of writing this review it is still unclear how successful the tioghtening will be in reversing macroeconomic imbalances.

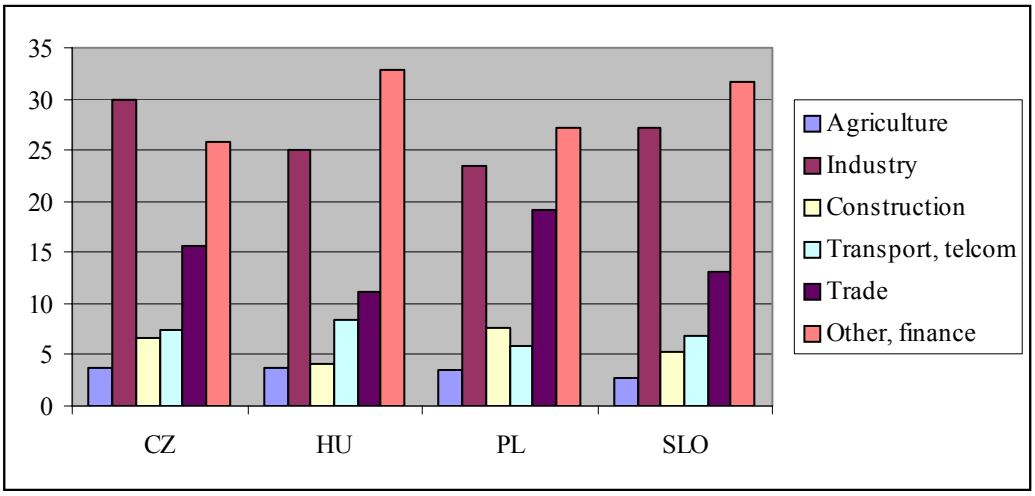
A.3. GDP by sectors: supply side composition of gross domestic product

While the rates of economic growth varied in the aforementioned four periods, the economy experienced significant changes in supply and demand side factors of economic growth. There were certain sectors, which had a negative contribution to GDP growth including agriculture, mining and financial services, while others, notably manufacturing (except in 1996), construction and in recent years real estate have grown well above the average expansion of GDP.

The above the average increase of manufacturing between 1994 and 2000 shows that it was the main factor of GDP growth driven mainly by the increasing international competitiveness of multinational producers. The co-movement and synchronisation of business cycles between Hungary and the EU increased significantly: when import demand grew sizeably in the EU, the growth of manufacturing was above the average, when the demand declined growth rates were reduced too.

Construction – while small in terms of GDP – was the other sector that in recent years contributed significantly to the growth of GDP : its expansion was stimulated both by the increase of public and private investments. Construction sector has also been completely privatised with relatively easy market entry and this has led to sizeable competitiveness gains. Finally, in recent years the real estate sector has contributed to the growth of GDP reflecting increasing demand for office space of local and multinational corporations and since 1999 the increasing demand for housing in the household sector.

Graph A.3. The composition of GDP in comparison with some other accession countries



Source: KSH, 2002, WIIW, 2003

Three sectors have continuously had negative rates of growth. The most sizeable and protracted declines were experienced in agriculture, where output in the last 10 years increased only in 3 years. The collapse of output was caused by terms of trade losses, ill designed privatisation leading to an uncompetitive and dispersed land ownership structure, changes in domestic demand (increasing incomes were accompanied by substitution effect driving demand away from agricultural products) and increased import penetration in agriculture and food products (relatively rapid market opening and increase of FDI in food industry, linked partly to the purchase of local markets).

Similarly to agriculture decline was experienced in mining and electricity sectors: in case of the former it reflected the withdrawal of production subsidies, increase of import supply, in case of electricity the increased efficiency of energy utilisation among household and industrial consumers.

Table A.2. The changes in the structure of GDP between 1991-2000 (%)

	1991	1995	1996	1997	1998	1999	2000
Gross value added	100	100	100	100	100	100	100
Agriculture	7,8	5,9	5,8	5,2	4,9	4,2	3,7
Industry total	26,7	23,2	23,1	24,9	24,8	24,2	25,1
mining	3,3	0,4	0,4	0,3	0,2	0,2	0,2
manufacturing	19,8	19,8	19,7	21,1	21,2	20,5	21,7
electricity	3,6	2,9	3	3,3	3,4	3,4	3,2
construction	4,9	4,1	3,8	4,1	4	4,1	4,1
Wholesale trade	12,3	9,9	9,9	10,1	10,2	9,6	9,6
Transport	8,4	7,6	7,9	8,1	8,6	8,7	8,9
Financial services	4,1	4,6	4,5	4	3,6	3,5	3,5
Real estate	9,4	12,6	14	12,9	13,1	14,1	14,7
Public administration	5,9	6,3	6	6,2	6,3	6,3	6,2
education	4,4	4,5	4	4,1	4,1	4,2	4,1
health	3,8	4,1	4	4	3,9	3,9	4

Source: KSH (2003)

As a result of the mentioned developments in 2002 the composition of GDP differed considerably from the picture the country showed at the beginning of the 1990s. First, the relative share of agriculture declined below half of the 1990 value and in 2001 it produced less than 4% of GDP. The share of industry remained around quarter of GDP, but manufacturing increased its contribution and as it will be shown in part 3 its composition changed significantly.

Third, the relative share of services increased during the last decade, especially of business ones, while public services kept their relative role at levels similar to the early 1990s. The main gainers in the expansion of services have been the real estate and the transport sectors.

The trends observed in the structural composition of the economy reflect the shift towards structures prevailing in European Union. The composition of GDP in Hungary shows some similarities with Portugal, not incidentally due to the similarities in the size and other economic indicators.

A.4. GDP by kind of expenditures

The first look at the data showing the composition of GDP by the kind of major expenditure items does not reveal any significant changes during the last 10 years. If the structure of GDP in 1990 and 2001 is compared one can find very similar shares for the major aggregates: household final consumption made up 50,1% of GDP in 1990 and 52.1% in 2001, gross capital formation 25.4% and 27.3% respectively, and government final consumption was 21.9% and 20.8% (2000). While the major aggregates do not show significant shift in the composition of GDP, the annual changes were sizeable and the structure of major GDP items (household and government consumption, private capital formation) changed considerably.

Gross capital formation took the dominant share in the initial collapse of GDP as it declined on average by 21.5% in 1991 and 1992 bringing down its share in GDP from 25% to 16%. Afterwards capital formation grew modestly until 1995, when it started to increase rapidly, reflecting the increasing inflow of foreign direct investments, the improving macroeconomic stability and growth expectations of private sector. In 1998-2000 capital formation grew on average by almost 10% annually leading to gross investment rates approaching 30% of GDP, which is a high level in Hungarian standards[3]. Afterwards in 2001-2002 capital formation in the private sector was weaker due to the adverse effect of world-wide recession, while public (in infrastructure) and household (in housing) investments increased significantly.

The evolution of household consumption was just the reverse: the initial collapse of GDP was driven not by household consumption as nominal wage rigidity prevented nominal wages to adjust to changes in output. Therefore more than 10% decline of real GDP between 1990 and 1992 was accompanied by less than 3% decline in real wages, moderating the decline in household consumption.

The inevitable adjustment occurred in 1994-1996 when real wages declined by around 10% bringing down the share of household consumption in GDP from its 58.1% high in 1993 to its 49.2% low in 1997. Afterwards household consumption increased slightly above than nominal GDP, except 2001 and 2002, when sizeable real wage increases, upgrading of financial services

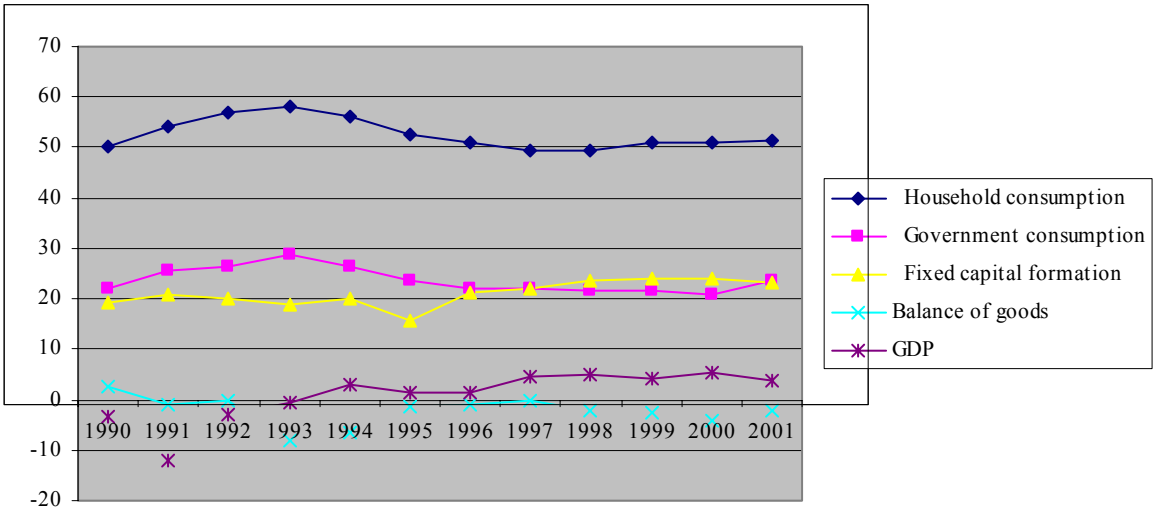
[3] The investment rate in Hungary is on average high compared with other economies at similar level of economic development. Among the Central and Eastern European economies Czech Republic and Slovakia have higher investment rates, but in other cases the figures are below the Hungarian level. Also in broader international comparison Hungary has a relatively high investment rate compared with other upper-middle income countries.

(growing mortgage lending, increased attractiveness of household lending for the banking sector, etc.) resulted in significant rise of household consumption.

In case of government consumption the development is very similar to the household one, as its decline was far below the decrease of GDP in 1990-1993 increasing its relative share from 21.6% to the unsustainable level of 28.6% of GDP, which was followed by the stabilisation policy reducing gradually its share below 21% in 2000. The drastic cuts in 1995-1997 were followed by small increase of government consumption between 1998 and 2000, which remained below real GDP growth. Since 2001 there was a sizeable increase of government consumption driven partly by the expansion of public sector employment and partly by increased government purchases.

The only item on the expenditure side of GDP which shows significant changes in the last decade is the share and net contribution of exports and imports. First, real openness more than doubled in this period as exports and imports jointly increased their share in GDP from 60% in 1990 to above 122% in 2001. Between 1990 and 1994 the share of exports in GDP declined as exports were negatively affected by supply side shocks (bankruptcy and exit of many exporters in 1992-1994) and worsening price and labour competitiveness of tradable sector.

Graph A.4. Changes on the expenditure side of the GDP (%).



Source: KSH, 2002

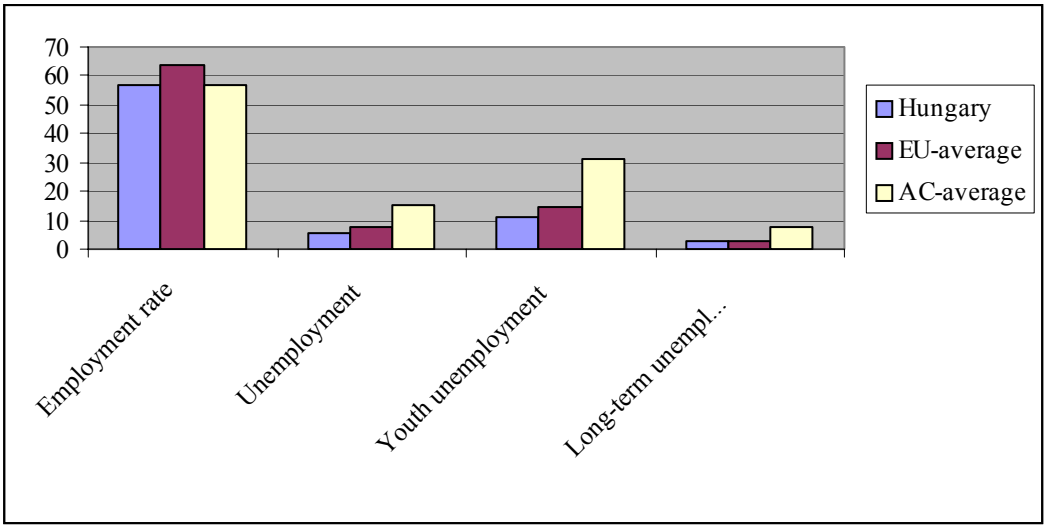
At the same time imports increased reflecting the growth of private and public sector consumption, which reduced the positive net contribution of foreign trade (+2.6% in 1990) to a huge deficit (-8.2% in 1993). Following the drastic stabilisation package of 1995, the devaluation of national currency restored price, while the decline of real wages and increase of labour productivity cost competitiveness of exporters and structural reforms increased significantly export growth.

As a result, the huge imbalances were corrected by 1997, when the foreign sector's net contribution to GDP was neutral. Since then exports and imports increased in tandem with a slightly more rapid acceleration of imports, which resulted in a continuous negative net contribution of the foreign sector to GDP. The average growth rate both for exports and imports in GDP was 17.5% between 1997 and 2001.

A.5. Employment, unemployment and labour productivity

Employment ratio declined continuously in Hungary since the beginning of transition: while in early 1990s it was relatively high even among the former socialist economies, it declined to 56.5% of the population in 2001. This employment ratio is just the average of accession countries, equal to the levels characteristic for Spain and Greece and is by almost 7 percentage points lower than the corresponding average value of the European Union. Among the Central European accession economies Czech Republic has a much higher employment rate, while the rate of other countries is close to Hungary.

Graph A.5. Labour market figures for Hungary in comparison with EU and accession economies average in 2002



Source: KSH, 2002

There are various reasons for the almost continuous decline and low employment ratio in Hungary. First, in the first half of 1990s it was more beneficial for both employers and employees to exit the labour market via early or disability retirement, which reduced the number of employees significantly following the structural change sin the corporate sector. Second, employment generation capacity of the economy has been low as growth was driven capital substituting for labour producing higher productivity growth without increasing the demand for labour.

Besides increased capital deepening low employment ratio is also explained by social and labour market rigidities: one of the major hindering factors for higher employment generation is the low mobility of the labour force (due to poor housing conditions, limited possibility to rent real estate, etc.). The structural distortions on the labour market, education and training system resulted in huge mismatch between skills demanded and supplied[4]. The low level of employment generation capacity is reflected in the fact that the growth of employment turned to be positive only from 1998, and in 1999-2001 it averaged only 1.5% annually.

While the employment rate figures are discouraging for Hungary, unemployment figures are much better, even in international comparison: unemployment rate declined between 1993 and 2001 from 14% to 5.6%, which represents one of the lowest levels in Europe. Besides its low

[4] There are regions with unemployment well below the natural rate and close to 3-4%, while in others it may still be above 15-18%

level, unemployment has favourable structural features, reflected among others in relatively low level of long-term and youth unemployment. In case of both figures the Hungarian data are below the EU average and by far less than the average of accession economies. In case of youth unemployment the Hungarian value of 10% is below the third of all accession countries and the quite similar relationship exists for the long term unemployment too.

The decline of unemployment rate is partly explained by the increased absorptive capacity and labour demand of the economy, driven by expanding output[5]. Finally, labour market policies aimed at reducing unemployment rate by active labour market measures resulted in some absorption of more qualified unemployed.

But one should also look at the other side of the low unemployment rate. First, low participation rate helped in reducing unemployment rate as most of the unemployed left the labour markets and remaien dunregistered Therefore there is a close link between low unemployment and participation rate. Second, unemployment rate was also reduced with the help of regulatory changes as registration and unemployment regulation have become tighter over the recent years, reducing the number of registered unemployed.

Third, behind the low average unemployment rate there is a significant variation in the unemployment rates in various regions and professions: regional differences generally reflect the regional income disparities, but one may find regions with high unemployment rate in the more advanced parts of the country. Fourth, recent developments reflected the vulnerability of unemployment to strong exogenous shocks: in various regions with a sole larg employer the closure of factories led to sudden increase in unemployment rate, the management of which remained costly and time consuming problem.

While employment has altogether considerably declined in Hungary, the decline affected unequally the various sectors. The main loser in terms of employment and skills was agriculture, where employment declined continuously over the last decade. Industrial employment stagnated after 1995, when it reached its lowest levels followed by very moderate increase of employed and shifts in employment between the regions and sectors.

This moderate increase mainly stemmed from the growth of manufacturing employment, while both electricity and mining sectors have almost continuously lost their employment levels. Two sectors were the major gainers in employment over the last decade: construction and real estate ones. On the other hand public sector employment did not change significantly, and remained at relatively high levels.

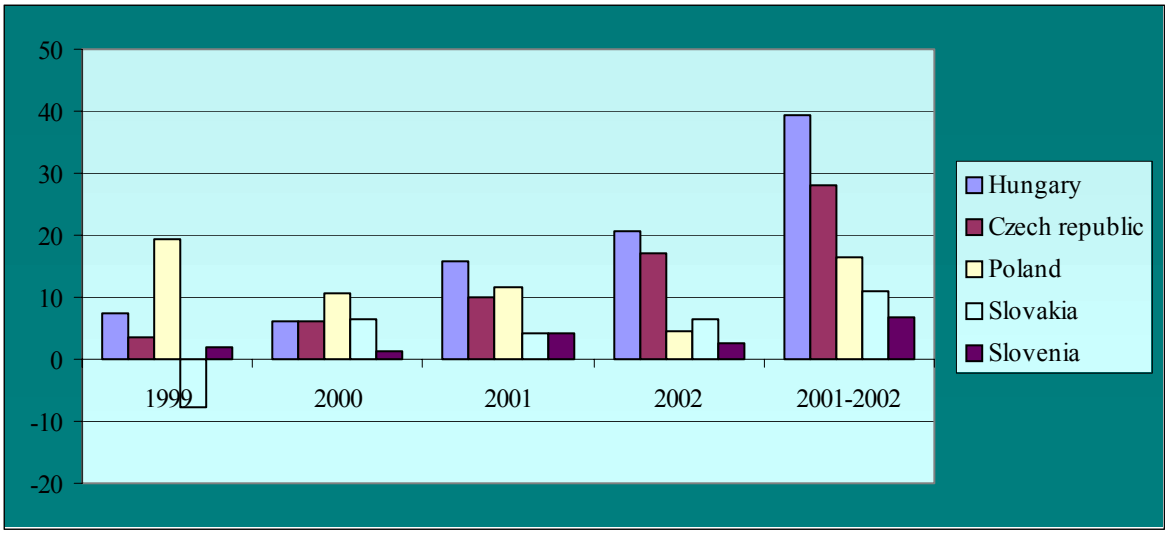
As a result of these changes the share of agricultural employment declined from above 11% to around 6% and industrial employment has also witnessed decline from 30% to 27%. On the other hand trade, construction and real estate sectors were the major gainers alongside the stability of public sector employment.

[5] This was sufficient to absorb the unemployed who were dismissed in the early 1990s, but failed to create additional jobs in the economy, leading to low levels of employment.

A.6. Price and cost competitiveness of the economy

The evolution of price and cost competitiveness has been always a key concern for policy makers. As the country inherited in the early 1990s huge foreign debt and unsustainable current account position, the evolution of the current account balance and competitiveness of tradable sectors have been a key policy concern for fiscal and monetary authorities. On the other hand the inflow of foreign direct investments and the key contribution of foreign companies to employment, output and exports required tight policies to maintain competitive advantages against other middle income economies with similar income and wage levels.

Graph A.6. Percentage change in unit labour costs calculated in EUR in regional comparison



Source: Eurostat, ICEG European Center, 2003

The priority given to price competitiveness was reflected in the chosen exchange rate regime, especially between 1995 and 2001, when crawling peg regime was aimed at simultaneously maintaining price competitiveness and reducing inflation expectations and the costs of disinflation. But as the exchange rate passthrough was high, and the inflation sticky, this resulted in loosing price competitiveness both measured with consumer and producer price indices. Real exchange rate appreciation according to the PPI index was between 3 and 5 % annually, while according to CPI it varied between 4 and 8%.

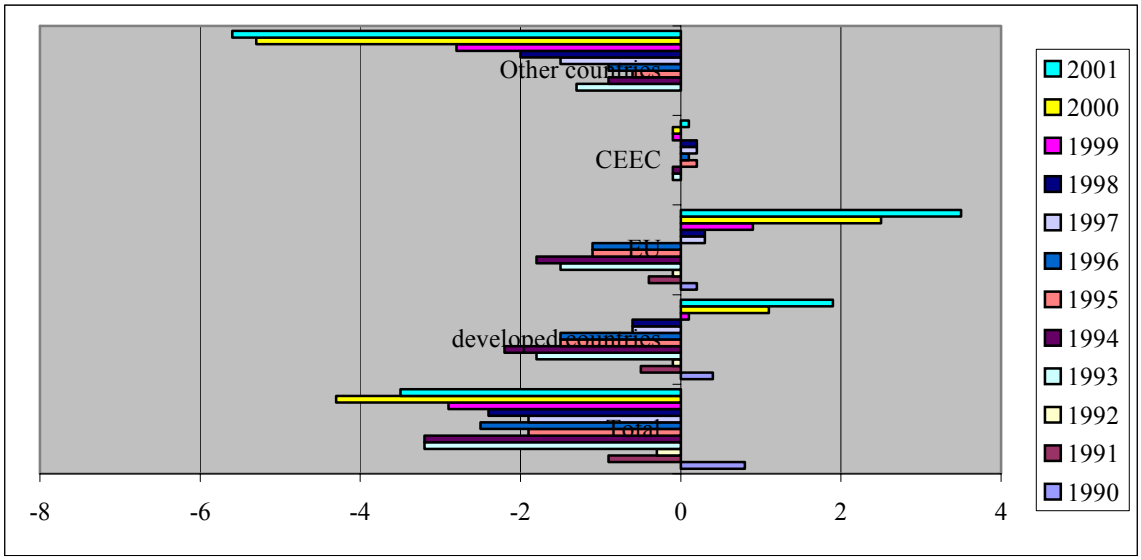
In recent years Hungary also lost its wage based competitiveness advantages over other Central European economies. Between 2001 and 2004 there was a huge and unmatched by productivity increase growth in nominal and real wages, which resulted in sizeable increase in unit labour cist and weakening of cost competitiveness. Simultaneously with expanding wages, labour productivity growth moderated mainly due to the slowdown in private sector capital formation, lower inflow of foreign direct investments ad weaker effect of “creative destruction “ on investments and productivity increases. The worsening cost competitiveness - reflected among others in slowdown of export, geographical reallocation of certain cost sensitive industrial production to other lower income countries, the increase of trade and current account imbalances – has been partly reversed since late 2003, but the stock position is much worse than in was 3-4 years ago.

A.7. Trade: export and import shares, openness and commodity composition.

As mentioned, Hungary is a very open economy in real terms: exports and imports make almost 125% of its GDP, bringing the country to one of the most open economies among the accession ones after the smaller Estonia and Slovenia. Between 1995 and 2002 there was a rapid increase of both export and import volumes as in 1995 both were less than one third of their value in 2002.

Between 1995 and 2002 exports and imports grew with double digit rate annually, and in certain years the growth was exceptionally high (above 30% in 1997 and in 2000). The simultaneous increase of export and imports led to slight worsening of trade balance as imports grew slightly faster than exports and in 2002 to significant widening due to different speed of slowdown in export and import growth.

Graph A.7. Evolution of trade balance by country groups



Source: KSH, 2002

Another remarkable feature of the Hungarian foreign trade is the composition of trade balance between different types of economies. Thanks to increase in manufacturing exports and the value added of total exports, Hungary has been able to run a trade surplus with EU since 1996, with all developed countries since 1997. In 2001 the surplus in trade with the EU just equalled the deficit in the overall trade balance.

The trade deficit was created by the negative balance in trade with Russia and other developing economies owing to high dependency of Hungary on imported oil and other extracting industry products. Whenever the terms of trade worsens due to increase in oil and/or gas prices, this increases the oil bill and leads to worsening trade balance with developing economies (reflected in “other countries” in the graph) and in general.

Table A.3. The trade with different regions in bn. of Euro

	1990	1995	2001
Exports			
Total	7,5	9,9	34,1
developed countries	4	6,9	28
EU	3,2	6,3	25,3
CEEC		1,1	3,1
Other countries		1,9	2,9
Imports			
Total	6,7	11,9	37,6
developed countries	3,6	8,3	26,2
EU	2,9	7,3	21,7
CEEC		0,9	2,9
Other countries		2,6	8,5

Source: KSH (2003)

Looking at the commodity composition of exports and imports, one may observe the effect of described changes in economic structures on foreign trade. Looking at the SITC composition of exports the most remarkable change is the tremendous increase in the share of machinery and transport equipment exports. While in 1990 (and also still in 1995) its contribution was 25.5%, its share increased to 58-60% by 2000-2002. The growth of machinery exports reflects its attractiveness to foreign direct investment, the increased output and export of free trade zones and the increasing price and cost competitiveness of exporters.

In case of machinery exports not only their volume, but their value added increased during these years resulting in high level of machinery and transport equipment products. While their high share shows a relatively developed picture of Hungarian exports, it has also become the major source of uncertainty and vulnerability to growth: export and overall economic growth depend on the export performance of certain key industries and producers, on EU and especially German import demand and any negative exogenous shock to them results in slowdown of export growth.

Table A.4. The commodity composition of exports, 1990, 1995 and 2001

	1990	1995	2001
Food and live animals	19,8	17,9	7,1
Beverages and tobacco	1,3	2,4	0,4
Crude materials	4,7	4,8	1,8
Mineral fuels	3,1	3,2	1,9
Animal and vegetable oils	1,2	0,7	0,2
Chemicals	12,4	11,8	6,6
Manufactured goods	18,5	17,4	10,6
Machinery and transport equipment	25,6	25,6	57,6
Miscallenous manufactured articles	10,7	16,2	12,8
Not classified	2,6	0,1	0

Source: KSH (2003)

The other significant change in the commodity composition of exports was the decline in the contribution of traditional export sectors in overall exports. While in 1990 food and live animals made almost 20% of exports, in 2001 their share was around 7%, the share of chemicals and related products declined in the same period from 12.5% to 6%.

While in value these sales increased too, their relative share declined significantly due to the extraordinary expansion of machinery and transport equipment products. The machinery industry was the main winner of structural changes; the losers were more numerous including the textiles and footwear, the chemical industry and agriculture due to the rapid decline of live animal and animal products.

Table A.5. The commodity composition of imports, 1990, 1995 and 2001

	1990	1995	2001
Food and live animals	6,3	4,7	2,7
Beverages and tobacco	0,8	0,5	0,3
Crude materials	5,3	3,7	1,8
Mineral fuels	14,2	11,8	8,2
Animal and vegetable oils	0,1	0,3	0,2
Chemicals	14,9	14,2	9
Manufactured goods	15,5	23	16,3
Machinery and transport equipment	34,6	30,8	51,6
Miscallenous manufactured articles	7,8	10,6	9,5
Not classified	0,4	0	0

Source: KSH (2003)

The changes in the structure of imports were quite similar to exports with the notable exception stemming from the high energy and raw material import demand of Hungary. The main change in imports was the increase of the relative share of machinery and transport equipment products, but with lower speed than in case of exports. Its share increased from 35% in 1990 (and in 1994) to 52% in 2001. The growth of machinery and transport equipment imports reflected the growing domestic demand for these commodities and the high import content of machinery and transport equipment exports.

The growth of machinery and transport equipment imports was so robust that it led to the decline in the share of such important products as mineral fuels, and chemicals. Their import increased in dollar or EUR value, but their relative contribution to total imports declined: in case of former from 14% to 8%, while in latter from 15% to 9%.

The third major item in Hungarian imports is manufactured products, which kept their share constant around 16% of total imports. While in case of import shares the machinery industry was the main winner, the chemical and textiles industries lost their significance they had at the beginning of 1990s.

A.8. Regional developments, trends and differences

The regional differences inside the country are significant both in terms of income, employment and living standard indicators. The country is divided to 7 NUTS-2 regions, shown which the following are:

h) Central Hungarian region (Közép-Magyarország), which includes Budapest and the county around the capital,
i) Central Transdanubian region (Közép-Dunántúl), which comprises three counties on the north-western part of Hungary,
j) Western Transdanubian region (Nyugat-Dunántúl), including three counties on the border with Austria,
k) South Transdanubian region (Dél-Dunántúl), containing three countries on the borders with Croatia south-western part of Hungary
l) North Hungarian region (Észak-Magyarország), including three countries on the north-eastern part of the country,
m) Northern Plain region (Észak-Alföld), comprising of three regions on the Eastern part of the country
n) Southern Plain region (Dél-Alföld), including three countries on the south-eastern part of the country

Among the regions the Western Hungarian and the Central Hungarian NUTS-2 ones are regarded the most developed ones, but in the latter case the dominant impact of Budapest on the average should be taken to consideration. While in 2001 the national GDP per capita measured by purchasing power standards was EUR 12 268, the same figures for the Central region were EUR 19 389 (in Budapest EUR 25 060) and for the Western Transdanubian region EUR 12 779.

On the other edge of the line we have the Eastern Regions where per capita GDP was below EUR 9 000 with the North Hungarian region recording the lowest level slightly exceeding EUR 8000. While in per capita GDP terms Hungary made 53% of the EU average GDP per capita level, Budapest was the only place where it exceeded the average (107%), and it varied between 34% of the North Hungarian region and 83% of the Central Hungarian region with the Western Hungarian region standing at 55% of the EU –average per capita GDP.

Table A.6. Certain major characteristics of NUTS-II regions in Hungary, 1995 and 2001

	Per capita GDP	Per capita GDP	Gross income/ capita	Gross income/ capita	FDI/capita	FDI/capita	Companies /1000 inhabitants	Companies /1000 inhabitants
	1995	2001	1995	2001	1995	2001	1995	2001
Central Hungary	145,6	152,3	120,7	116,3	241,2	243,3	136,5	166,3
Central Transdanubia	86,7	100,5	97,7	104,7	73,5	85	96,9	94
West Transdanubia	100,7	113,9	92,1	99,6	83,87	76,2	93,8	100
South Transdanubia	84	74,8	89,6	90,8	35,3	17,9	112,5	91,6
North Hungary	69,6	64,6	89,7	86,7	32,4	48,2	63,5	69,9
Northern Plain	73,9	63,4	87,4	88,1	20,6	22,8	68,8	72,3
Southern Plain	83,3	71,9	87,9	95,4	33,8	29,3	90,6	85,5

Source: KSH (2003)

Not only the relative values of level of economic development varied between the individual countries, but also the contribution of the NUTS-II regions to the national GDP has been very different. Central Hungarian region contributed 43% of the total Hungarian GDP in 2001, but within that Budapest alone made 35% of the national GDP leaving only 14% to other part of this region Western Transdanubian, Central Transdanubian regions as well as the Northern Plain region contributed the same 10,2% share. On the other hand the less developed three other regions contributed between 7.5-9.5% of the national GDP.

The production is characterised by significant regional concentration and differences. First, Central Hungarian region stands out with its high level of development: its share in services output in 2001 was 51% and in construction 43% from the national one. Second, the Central, Central Transdanubian and Western Transdanubian regions produced together 60% of the industrial production reflecting that industry is heavily concentrated in the north- north-western part of the country. Finally, the share of the two least developed Eastern regions in agricultural output was almost 50% showing that these regions are the traditional homes of agricultural production in Hungary.

On the other hand the individual regions also differ in terms of the relative role of the major sectors compared with the national average. While in 2001 64% of the GDP was produced in the services sector, 26% in the industry, 5% in construction and the remaining 4% in the agriculture, the structure of output in the individual NUTS-II regions differed from the national average.

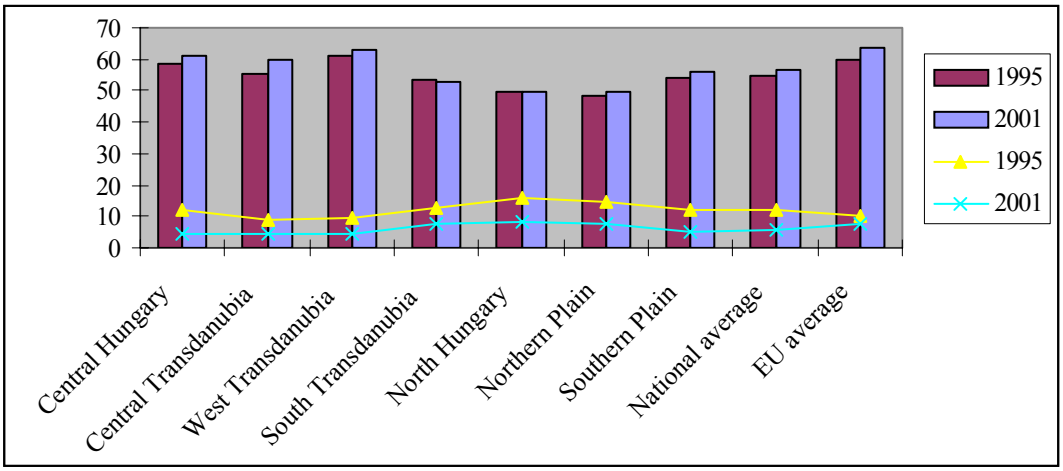
First, the share of industry was well above the average in the Central Western and Western NUTS-II regions (higher by more than 60% the national average) reflecting the fact that most of FDI and domestic investments were committed to these regions due to the advanced level of development of infrastructure and relative proxity of certain markets. In Northern Hungarian region the share of industry was above the national average mainly because some traditional industrial units can be found in this region and also because other sectors (notably the services) still lag considerably behind the national average.

Second, the share of services in the Central Hungarian NUTS-II region was well above the national and other regional averages (and correspondingly industrial share much below) reflecting long-term consequences of the de-industrialisation and collapse of socialist industries in the early 1990s as well as the concentration of service producing firms in the central part of the country and around the capital.

Finally, as expected the regions with lower level of development had higher contribution of agriculture in their GDP. This is especially true for the two Eastern regions, the Northern and Southern Plain regions.

The differences between the regions are also significant in terms of the composition of GDP as will be shown later, and in the case of employment and unemployment figures. Unemployment rates were much higher in the eastern regions reaching 8-9%, while the national unemployment rate stood at 5.6% in 2002. On the other hand the average unemployment level in the Western Hungarian NUTS-II region was below the national average, though there were still significant differences between the smaller sub-regions within the NUTS-II region.

Graph A.8. Employment (bar) and unemployment (line) rates in the NUTS-2 regions



Source: KSH, 2002

While the recent data indicate that the gap between the most and least developed regions increased in recent years, other economic, social and infrastructure differences are evident too. These are most noticeable between the capital and the rest of the country, between individual regions, and also among micro regions and towns and villages.

A.8.1. The differences between the capital city and the rest of the country in terms of development

Compared with the rest of the country, the development of Budapest is striking. 17% of the Hungarian population lives in Budapest, while it contributes 35% (2000) to the gross national product. Its advantages result from high population density, its function as a centre for business and financial services and as an innovation transfer centre (gateway function). It has large high value added sectors, mainly business services, research and development and tourism. 28% of the companies are operating in Budapest; over half of the firms with foreign interests and 53% of subscribed capital are concentrated here.

The concentration of human capital is reflected by the high ratio (41%) of university/college students and the high ratio of the funds spent on research and development (65%). The significant role of Budapest is further increased by its central geographic location and the hub role in the transport network.

However, the large economic and social potential of Budapest has effect mainly in the agglomeration and less in the more remote regions of the country.

A.8.2. Differences among regions- the division between the west and the east

Considering the level of economic development, household incomes and unemployment in the regions, apart from the favourable indicators of Budapest, the gap between the east and the west is large. The restructuring of the West Transdanubian and Central Hungarian parts of the country has been successful, when compared to the slower catch up of the remainder of the country. The current dynamics of the north-western regions comes primarily from the geographical position of these regions, and from their proximity to western markets.

Particularly, the neighbourhood to Austrian provinces has been an important factor in economic restructuring[6].

In Central Hungary, Western and Central Transdanubia the well-trained labour force, its low cost compared with the average of the European Union, and the favourable transport network helped the inflow of foreign capital and the establishment of innovative and export- oriented industries (car manufacturing, electronics). 85% of the total volume of foreign capital invested in Hungary was realised in these three regions. As a consequence, unemployment rate is lowest in these areas, and average income levels are also above the national average.

The table below demonstrates that economic performance of the rest of the regions lags far behind the three most advanced regions. The reasons for that were the inherited industrial structure with low efficiency and its low income generating capacity. These areas were dominated by mining, heavy industries, the agro-business, and the losses from the collapse of earlier trade links had a dramatic impact on them.

The industrial restructuring of the 1990's had the most adverse effect on North Hungary, turning the region into a depressed area. However, areas along the motorway leading to the Eastern border and the western parts of this region have already shown signs of economic development. The peripheral areas along the country's northern border continue to suffer from high unemployment rate. Agriculture and food industry concentrate on the regions on the Plain and South Transdanubia. Due to the low income generating capacity of agriculture, the share of these regions lags significantly behind other ones.

In these regions the relatively low level of human resources and the high rate of the inactive population limit economic restructuring. Distance from the western markets and the slow development of the transport infrastructure weakened their catch up possibilities. As a consequence, foreign investments are confined to the western regions and Budapest and grow slower elsewhere except the emerging transport belt of the large regions and in the neighbourhood of cities. With all current difficulties and underdevelopment, there is a significant economic potential in the eastern and southern parts of the country. The higher involvement of domestic and foreign investors in the Eastern regions is supported by higher education and R&D capacities in the large towns of the regions (Debrecen, Szeged, Pécs, Miskolc, Kecskemét), lower wage costs and shifting importance of public investments in this part of the country.

A.8.3. Differences at the levels of micro regions and settlements

At the level of micro regions the economic development structure is more mosaic-like. There are dynamically developing regions in the eastern part of the country, coexisting with underdeveloped micro regions. At the same time, one finds poor areas in the advanced regions of Transdanubia.

In the 1990's the regions with good geographical position enjoyed large benefits from their geographical position; similarly to areas along the western border, large city centres and

[6] There were various channels through which geographical proximity played an important and positive role in economic restructuring. First, the north-western and central parts of the country received the highest share of FDI inflows, where Austrian investors played an important role. Second, the geographical location of investments reflects their proximity to main infrastructure facilities, mainly highways, other road and train connections, and is quality and quantity has been better in the north-western region. Finally, the proximity of developed markets was also a factor supporting the restructuring and investments in north-western region.

dynamic axes along the motorways grew rapidly. In these rapidly developing regions the share of foreign capital and entrepreneurial activity is high, the employment rate is above national average and unemployment rate is lower.

The dynamic axes of the western part of the country are obvious: the Budapest – Győr – Mosonmagyaróvár – Sopron (Bratislava – Vienna) line and the Budapest – Székesfehérvár – Balaton axis, where both the larger towns and smaller centres are in a favourable position. The driving force is the closeness of the South German, North Italian and Austrian regions. These regions are near and possess a large economic influence. At the same time it is true for the less developed eastern and northern parts of the country that in each area there are large towns that stand out as dynamic centres.

These regional centres attract trade, financial and economic services. They have a self-propelled development, but also drive the development of their neighbourhood. They can achieve that by building on their organising role in the respective regions, and on their traditionally strong potential in higher education and on their geographical position, which will gain in importance after the EU accession.

The inflow of capital and the appearance of companies in the stagnating regions put them on the path of growth. Among these catching-up areas, the industrial crisis areas form a special group, some of which are being revitalised and structurally transformed (such as Miskolc, Tiszaújváros). Most of the micro regions[7] of the northern and eastern regions are underdeveloped. In these micro regions unemployment rate is above, income level is below the national average, the share of foreign capital and entrepreneurial activity is low.

The reasons for this are low entrepreneurial capacity, limited infrastructure, and the geographical position, the close geographical location to the country or regional border, and the lack of a dominant regional centre. It is important to develop these micro regional centres and to improve their role in increasing employment. Most of these areas have small villages and public and other services are not efficient, which makes the co-operation between settlements and the common development of transport within the area vital for them.

However, there are depressed areas in Transdanubia too due to agricultural character and industrial areas which have by now sunk into depression. The region in the most critical position in Transdanubia is the border area in the south, which was especially adversely influenced during the war in Yugoslavia, which blocked economic activities. In the poor regions, in addition to lower income of the population, the problems include higher proportion of the permanently unemployed, lower qualification standards and higher ratio of the Roma population compared with the national average.

Most of these regions are rich in natural and cultural resources (national parks, protected natural areas) and this may offer opportunities for tourism. The bottlenecks of development include the poor infrastructure of the towns and villages, the higher than average ratio of poverty ridden residential areas and the low standard of community services and public utilities.

[7] The 7 NUTS-II regions are divided to smaller units, the micro regions: currently there are 161 micro regions formed generally by several local governments.

A. 9. SWOT analysis on the Hungarian macroeconomic conditions

Strengths	Weaknesses
1. Openness and symmetry with EU shocks 2. Strong manufacturing base 3. Rapid convergence 4. Geographical location	1. Signs of dual economy, 2. Macroeconomic instability 3. Lack of public finance reform 4. Significant regional disparities
Opportunities	**Threats**
1. Growth and catch-up effects of EU Accession 2. Central geographical location in the region 3. Good quality of human capital	1. Inability to utilise the structural funds 2. Declining competitiveness and attractiveness for FDI 3. Short term macroeconomic and structural adjustment needs

Strengths

The Hungarian economy has several features, which show its strength even in regional comparison. One of them is the high openness of the economy and high share of foreign trade: real **openness** is above 130% of GDP and exports make 62% of GDP. This exposes the economy to global competition forcing it to maintain the pace of productivity and output increase, while allows economies of scale to materialise. Moreover, **high foreign trade with the EU** increases the synchronisation of business cycles and reduces the likelihood of asymmetric shocks in Hungary.

The second and related strength of the economy is the rapid development of manufacturing and establishment of **strong manufacturing basis** during the last 10 years. While Hungary was not characterised as a heavily industrialised country before 1990, during the years of transition significant up-to-date manufacturing capacities have been established based on the synergy between foreign physical and managerial and domestic human capital. Besides machinery, chemical and electrical equipment industry the ICT sector also belongs to the list of those industries where Hungary has improved its competitiveness and has been in a strong outward oriented growth path. These strengths are expected to remain in the future, while other non manufacturing sectors (tourism, logistics) also have good competitive position at least in a regional comparison.

Related to the strength of the economy is the **high share of intra-industry trade**, which has been above the average of the other Central European economies, and shows both the presence of FDI and relatively sophisticated industrial structure.

The third strengths so far has been the ability to **reduce the still significant income gap** with the European Union. Convergence has been swift in the last 4-6 years, and while it may slow down due to exogenous shocks and endogenous policy problems in the short-term we may expect in the medium-term it returns to recently seen levels.

Weaknesses

One weakness of the economy is related to **its dual character**: the highly developed, export oriented and up-to-date export-oriented, mainly foreign owned companies and production facilities are surrounded by less developed, labour intensive domestic subcontractors. While the upgrading of the latter has been rapid, the economy still has a dual nature in several areas. Domestic small and medium sized companies find it difficult to become suppliers in the chains of multinational companies: these include machinery industry, electrical equipment and other higher value added sectors. In the services sector and in labour intensive branches the presence of Hungarian small and medium sized companies has been much stronger.

Second, the country has traditionally been characterised by **low respect of macroeconomic constraints and prudence**. Macroeconomic stability and prudent macroeconomic policies have not been the key macroeconomic priority, therefore the country has been exposed to periodical shocks and currently on the eve of EU accession it faces significant macroeconomic difficulties.

Third weakness is the **slow progress with public finance reform**, especially in the areas of pension, health care and education systems. This puts a constant and increasing pressure on the sustainability of public finances, maintains high shares of public expenditures and revenue to GDP ratio and draws funds away from private investments.

Opportunities

One of the major opportunities for Hungary is linked to the EU accession as this process will improve market access, will increase the **pool of available funds**. EU accession will allow utilising the benefits of the proximity of the Bavarian-Austrian-North Italian region, which has one of the best growth potentials in Europe and to which the country, at least its western part may closely integrate.

Another opportunity for Hungary lies in its **geographical location**, as it is in the central part of Europe and neighbours several countries to which the future expansion of the EU is likely to occur. The proximity to major markets, especially the crucial Bayern-Lombardia-Austria triangle neighbours the country (and especially its western part) with one of the most dynamic and prosperous part of Europe. On the other hand the direct links to South-Eastern Europe allow the country to play a certain “bridge” role between the EU and the Balkans.

Finally, its central location stimulate the development of key industries as tourism, logistics, transport, which can generate significant value added. While in certain areas location poses risks (migration and the Schengen borders), altogether it will have positive effect for trade, tourism flows and infrastructure developments. Several industries (tourism, transport sector) have already utilised this opportunity, others (real estate, logistics, wholesale trade) have recently started to feel the benefits.

The final opportunity for Hungary lies in the availability of **human capital,** which is weaker than assumed earlier, but is still good in international and especially in regional comparison. While wages are expected to increase and labour charges to decline only gradually keeping the rise of wage costs high, the increase of high quality labour may be one of the major supply side growth factors in the forthcoming years. The reform of education system, the increase of employment rate and increasing immigration to Hungary will be the main sources of increasing the quality labour force.

Threats

One of the threats is that the country will not be able to **utilise properly the incoming structural funds**. While in the initial years of their membership even the cohesion countries could absorb only 30-50% of the funds allocated to them due to the lack of appropriately managed projects, the delays in Hungary in the preparation and implementation point to significant problems and threats in that respect. This may endanger the Hungarian net recipient position, a problem shared by many other entrant countries.

The second threat is a short–term one: the country has significantly lost its attractiveness for **foreign direct investments**. This has been partly reflected in increased outflow of foreign investors from labour intensive sectors (textile and apparel, machinery industry) to countries with lower wage level.

This is a natural and hardly avoidable process, but on the other hand recent increases in labour costs accompanied by decline in productivity resulted in decline of FDI inflows threatening the competitiveness of the economy. The issue is to find the niche of increasing production costs and growing productivity, value added in manufacturing and in the whole economy.

Third threat is the uncertainty concerning the **speed of structural and macroeconomic adjustment** the country faces in the short–term. The recent macroeconomic imbalances and the structural weaknesses revealed by the decline of gross and net capital inflows, increasing problems in pension, education and health care systems require rapid adjustment, which is currently not visible.

B. National and regional information society policies

B.1. Brief description of national and sub national institutional setting, their influence on IS policies

B.1.1. General description

Among the transition countries Hungary has been the first to implement serious institutional reforms. But policy- and decision-making are significantly influenced by an important feature of the institutional set up. Hungary has a population of 10 million and more than 20% of them live in the capital and in its surrounding suburban area. In the communist regime Budapest was the centre of decision-making and the regionalism and the influence of regions remained very underdeveloped. As a consequence decision-making in Hungary has traditionally been focused either at the national government or the local, municipal governments. The middle, regional level of decision-making does not function: therefore the key regional players as the Regional Development Agencies and Corporations try to cope with more basic problems of regional development than the IS issues.

B.1.2. The most important institutions

In Hungary the decisive policy issue is not the existence of necessary institutions but their competencies and ability to act efficiently. The awareness of IS issues among politicians has been low, it was not among the priority policy issues for several governments. The national IS policies prepared by governments and described later show that the basic ideas, including a complete list of „areas of economy/society/public administration where IS should be applied" were known but programs were mainly missing. The MITS (Hungarian Information Society Strategy) adopted in 2002 was the first comprehensive strategy, which also established linkages to other funds, either of Community or of national origin.

The current National Development Plan prepared for the current budget cycle (2004-2006) in a hurry during 2005 does not focus on the Information Society: only a few calls in various Operational Programmes (mainly in the Economic Competitiveness and Regional Operative Programs) are eligible to support IS-related developments. But the new Development Plan for 2007-2013 period has a special, dedicated Information Society Operational Programme among its targets[8].

[8] The Second National Development Plan is under construction and the plan should be adopted by the Government in late 2005 and presented for approval in Brussels in 2006. Among the many issues under discussion the division of the plan according to regional operative programs (horizontal approach) or specific target operative program (vertical approach) is still undecided.

The current implementation of policies is based on the following major institutions:

1. Information and Telecommunication Committee of the Hungarian Parliament (a Magyar Országgyűlés Informatikai es Távközlési Bizottsága)[9]

The Committee was established on 1st January, 2001 and it consists of 11 members. Its main goal is to supervise and aid the set up of the legal framework, which determines the development of the Information Society. It creates acts and proposals which are discussed in the Parliament, evaluates and delivers opinions on other proposals affecting the evolution of the information society. Among its first jobs was to create the legal framework for electronic signature, which came into effect on 1st September, 2001. It was especially active during the harmonisation of the legal framework prior accession: e.g. its work plan for the first half of 2003 covered issues like quality- and consumer-protection in informatics, free software, overview of tasks regarding EU accession.

2. Ministry of Informatics and Communications (Informatikai es Hirkozlesi Miniszterium)[10]

The Ministry of Informatics and Communications was established after the present government was elected in May 2002. Before receiving a separate ministry, informatics belonged to the Ministry of Transport, Communication and Water, and to the Prime Minister's Office. The activity of the ministry covers various areas as it is responsible for communication regulation, supply side developments, but most of its activity is centred around Internet access and development of the use of Information Society Technologies. Out of the 61 announcements on the website of the ministry between May 2002 and May 2003, 15 were strictly on the provision of Internet access (e.g. agreement with telecom and Internet companies on lowering prices, providing Internet access and/or hardware to certain groups of recipients for free or), other 19 were about Information Society (organizing or participating at conferences on IS issues, foreign co-operation and meetings on IS, educational programs, etc), 15 were administrative announcements, and only the rest covered other, non-IS related issues.

3. Other ministries linked to IST developments

Other ministries have special programs to promote Information Society without necessarily having it in a form of a „policy". For example, the Ministry of Children, Youngsters and Sport set up a website called „Drug portal" dedicated to drug prevention. Organisations dealing with children or youngsters can get financial support for infrastructure (hardware) developments or website creation. The Ministry of Education has a very detailed and long ongoing program called Sulinet (Schoolnet), which created a portal for students.

4. Communications Authority of Hungary (Hirkozlesi Felugyelet)[11]

This is a public administrative organisation responsible for the regulation of communication. It has three divisions: one is responsible for authorisation issues (e.g. authorisation of certain technical instruments), another one is involved in handling competition and market disputes

[9] http://www.mkogy.hu/biz/infb/index.htm
[10] http://www.ihm.hu/
[11] http://www.hif.hu/

and regulating the communications market, while the third one helps the government to design laws and to analyse the market conditions.

5. Local/municipal governments

Many of the local governments have their own IS policies. Some of them are rather general, as they promote the use of Internet and provide access or hardware to those whom they see eligible (schools, teachers or the local hospitals, etc.) But there are other, special initiatives aimed at a more concrete goal: for example the city of Kaposvár is involved in setting up an e-local government system that would have broad areas of services starting from the distribution of information to online administration.[12] It is not working yet, and is part of a national pilot project co-financed by the government, and it should become a model for such developments in the future.

B. 2. Chronological description of national and regional IS policies

B. 2.1. National policies

Before transition started Information Society was not a primary issue. But the need for developing informatics infrastructure was already recognised – pressed by the academic sphere wishing to establish the hardware and network for research, education and public databases. The IIF (Informatics Infrastructure Development Program) was launched in 1986 initiated by MTA (Hungarian Science Academy) and the OMFB (National Committee for Technologies Development).[13] The program is still ongoing, now called NIIF (National Informatics Infrastructure Development Program), providing up-to-date infrastructure and network for the academic sphere, universities, and libraries. In 1987 such systems were introduced, where the users could access e-mails and file transfer services, and technological development was continuous in the following years. In 1991 Hungarnet, an integrated national network was established and connected to big international networks (TERENA, ISOC, CEENET – 1991, DANTE – 1993, DANTE/EuropaNET – 1994, TEN-34 – 1997, participation in GEANT – 2000).

1. The Antall-administration (1990-1994)

The first democratic government did not pay attention to Information Society.[14] This was understandable as the government inherited a country that was lacking basic democratic institutions, free market, functioning banking system, etc. Back then it was not even a question of "bread or broadband", computer technologies and the need for electronic modernisation was out of the perspective.

2. The Horn-administration (1994-1998)

The critics generally blame the second freely elected government for not willing to face the challenges in time and missing the chance for starting the development of the information

[12] Its tasks include the approval of welfare support, passport validity extension, construction authorisation, and other simple day-to-day tasks.
[13] http://www.niif.hu
[14] L. Z. Karvalics, http://www.ittk.hu/infinit/2002/0516/

society already from the beginning of their term.[15] While this is certainly true, towards the end of their term some major programs were started.

The first one was called Telehaz (telehouse, telecottage), aimed at providing computer infrastructure in smaller towns and villages in a room or building, where several computers with Internet-access were set up for public use. The program was planned to eliminate Digital Divide between urban and rural areas. Today the program is still ongoing, 261 telehouses or telecottages are working and 210 are under construction. NGOs can apply for this program (but the place has to be open for everyone), and a website was launched to provide help and advice for the maintenance of the telehouses.[16] The telehouses form an association (Magyar Telehaz Szovetseg, Hungarian Telecottage Association)[17] that has regional offices as well (according to NUTS II regions).

There are some constraints in the telehouse program, which are sometimes binding mainly for smaller settlements. In order to be eligible for participation a settlement needs to have first, an NGO (moreover it has to exist for longer period to prove the ability to sustain its own organisation and the telehouse) second human capital to manage the house. This requires a settlement, where both motivation and existing knowledge are given and high.

The second program of the Horn administration aimed at promoting telework or telecommuting. This program was mainly about supporting companies with a website that offered information, jobs, tips and help for those doing telework. The company (Tavmunka Kht) was partially owned by the Ministry of Labour. [18] The Tavmunka Kht. was founded in 1998 but could not function well and in April, 1999 it was liquidated.[19] Nowadays it seems that telework issues are left to the business sector.

The third (and probably most successful) program was called Sulinet (Schoolnet)[20]launched in 1996, and its details can be found under subsection *Sulinet*.

Summing up the work of the Horn-administration in IS issues, its positive side is that for the first time the question of building Information Society was raised. But the programs were launched without a clear policy: as a result a well-built overall IS policy was missing and certain gloomy political statements were made about the importance of the Information Society. Out of the three specific programs two - Sulinet and Telehaz – were aimed at priority issues for Information Society – bringing it to the youngsters and fighting against at least one aspect of Digital Divide (urban/rural). [21] Although these two programs were successful, the Horn administration still can be blamed for hesitation on this issue.[22] Moreover, as the two successful programs have been going on since then, it is difficult to determine how much of their achievements should be credited to the initial smart formulation of the programs and later actions and support.

[15] L. Z. Karvalics, http://www.ittk.hu/infinit/2002/0516/
[16] http://www.telehaz.hu
[17] http://www.telehaz.hu/hosted/page1/
[18] A. Wesselenyi, http://www.wesselenyi.com/karrier/karrier6.htm
[19] A. Wesselenyi, http://www.tavmunkainfo.hu/tavmunka-kht.htm
[20] http://www.sulinet.hu/tart/kat/n
[21] http://www.edemokracia.hu/klubanyag1.htm
[22] L. Z. Karvalics, http://www.ittk.hu/infinit/2002/0516/

3. The Orban-administration (1998-2002)

When the Orban-administration was elected, everyone expected a lot to be done on information society issues. But in the first two years not much has changed, even previous programs (Sulinet) were slowed down. It took time to realise that in order to be more effective on Information Society issues the institutional framework dedicated to this question should be established.[23] The Informatikai Kormanybiztossag (Government Commission of Informatics) – as part of the Prime Minister's Office - started to work in 2000.[24] Its main task was to formulate a clear IS policy, to design programs and control them, and finally to try to involve business stakeholders into policy formulation.

The Orban-government launched a big national program for development and reconstruction called Széchenyi Terv (Széchenyi Plan), and part of it was a plan for developing information society.

5 subprograms were defined under the IS part of the Plan:[25]

1. *Governmental Subprogram*
2. *Improving Internet Access in the Society Subprogram*
3. *Creating the Basic Framework for e-Business Subprogram*
4. *Culture of Information and Content Providing*
5. *Improving Quality of Life and Awareness*

A detailed list of the aims of certain subprograms can be found in Annex Table B1.

Taking a look at the IS part of the Széchenyi Plan, it seemed to be a very broad-range and general set of programs that tried to cover all aspects of information society developments. Altogether 43.9 billion HUF (roughly 165 million EUR at the running exchange rate) were separated for 2001 and 2002 to fulfil the objectives of the IS section of the Széchenyi Plan representing 7% of the total budget of the Plan.

Another strategy of the Orbán government was the Nemzeti Informacios Tarsadalom Strategia, NITS (National Information Society Strategy).[26] It was created by the Government Commission of Informatics. While the Széchenyi Plan was created for overall development of the country, all ministries participated in the formulation of it, and it covered more issues than just Information Society, NITS was created for ensuring that the country had a strategy with IS in its main focus.

NITS was a 3-5 year long strategy, and an action plan was prepared for the first two years, 2001 and 2002.

The goal or mission of NITS was to „…improve the quality of life in Hungary through the use of ICTs".[27]

[23] http://www.ittk.hu/infinit/2002/0516/
[24] http://www.euroastra.com/kancellaria/
[25] http://www.europa2002.hu/5th/5thm3.pdf
[26] http://teo.elte.hu/palyazat/keretprogram/inf_tars.pdf
[27] http://teo.elte.hu/palyazat/keretprogram/inf_tars.pdf

One of the main points of NITS was that funding should go to non-profit and profit-oriented organisations, not primarily to public institutions. This meant two things: first, partnership and co-financing was highlighted and expected, second, it reflected a new approach towards IS policies in Hungary, sowing that the government has its trust in civil organisations and the business sphere to take an active role in building information society. NITS consisted of seven programs that are listed in Annex Table B2.

4. The Medgyessy-administration (2002 -)

The Medgyessy-administration was elected in 2002 and it pictured itself as a main supporter of Information Society, and one of its first action was to set up a new ministry of information and communication.

There are two main documents that include IS strategies of the government. The first is the National Development Plan[28], that overtook the place and role of the already mentioned Széchenyi Plan set up by the previous government.

The NDP identifies 5 problems that hinder the evolution of the IS in Hungary (see table on the next page):

[28] http://www.nfh.hu

Problem identified by the NDP	Factor behind the problem as identified by the NDP	Solution proposed by the NDP
• The spending on IT is lower than the EU average	• Lack of finance – while prices of IT-assets are world-wide very similar and relatively high in Hungary • Lack of IT skills	• Develop skills and infrastructure
• The number of Internet users is low	• Telephone costs are very high compared to incomes	• Regulation creating stronger competition and higher investments in the telecom sector • Improve IT skills of the society
• The legal basis of the development of the IS is incomplete	• Some of the important regulatory framework is not created yet, other elements are not effective[29]	• It is necessary to complete the legislative framework
• IT skills of the Hungarian society are poor, the digital content industry is underdeveloped	• Lack of sufficient and well-trained IT teachers • Life-long learning is not yet embedded • Although the digitalisation of national heritage has started, the overall digitalisation of institutions lags behind • In the business sector the modern information systems are not used up to their potential, or are not available.	• Develop education of IT skills • Provide IT training for the disadvantaged, unemployed and SMEs • Continue digitalisation of national heritage • Modernise public administration
• The development level of the telecommunications infrastructure is regionally very different	• Density of telephone lines varies significantly • Broadband services are available mostly in the larger cities	• Regulation of telecommunication sector in order to raise competition and achieve infrastructure development

The National Development Plan was linked with the access to the incoming EU Structural Funds and therefore it set certain priority areas and activities for which these funds and the co-financing from the Hungarian government would apply. Although during the preparation of the National Development Plan experts have faced the need of focusing on IS, there has not been a special Operational Programme created for this purpose. The Operational Programmes are listed in Table Annex B3, which gives the plans and actions envisaged by NDP to meet its goals.

[29] The NDP has been finalised in March, 2003. Some of these regulations have changed since then, details can be found in section F.

IS-related developments can be funded through the existing Operational Programmes: these are calls mostly in the GVOP (Economic Competitiveness OP) that aim at IS-related investments or services. But the presence of these calls cannot balance the lack of a structural IS Development Operational Programme. The need for such an OP has been realised already, and according to expert's information, in the new Development Plan (2007-2013) there will be an IS OP run by the Ministry of Informatics and Communication.

As mentioned previously, the Orban government designed the NITS for focusing on IS while keeping accord with the Széchenyi Plan. The Medgyessy government has kept the idea (a focused policy that is in line with the NDP), but redesigned it to its own taste, and the new strategy was called MITS (Magyar Információs Társadalom Stratégia, Hungarian Information Society Strategy). As Kalman Kovacs, the current Minister of Informatics have said in an on-line forum interview[30], the main difference is that while Orban's NITS was prepared mainly with the help of academics and social scientists, the new MITS relies on the advises and opinions of business actors as well.

MITS plans for long-term (10-15 years), but its programs are designed for shorter term as the prepared programs are valid for 2004-2006. MITS builds on two main pillars: on the informatisation and modernisation of processes ("redesigning back-office") and on the modernisation and digitalisation of services ("redesigning front-office").

The sub-programmes of MITS are designed in accordance with e-Europe 2005 and the National Development Plan. The reason for it is clearly stated in the executive summary of MITS[31]: the strategy-makers strongly build on receiving funds from the Community – from IST, e-Content, and since many of the necessary investments are closely related with economic competitiveness, regional development and other issues addressed in the NDP, receiving financial support from the Structural Funds, mainly through the Economic Competitiveness Operative Programme (Gazdasági Versenyképesség Operatív Program, GVOP) of the NDP.

In Annex Table B4 the main priorities of MITS are listed together with the potential linkages, connections to European Union programmes and also to the existing operational programmes of the National Development Plan. Altogether MITS is a framework program and it was designed to provide all financial, human and physical resources needed for its implementation: these factors should come out from the daily operation of the relevant public authorities.

B.2.2. Regional IS policies

The most important institutions of regional development and policy-making are the Regional Development Agencies. There is a RDA set up for each NUTS 2 region.

The tasks of these agencies are to prepare strategies for the regional development, to inform the public (especially focusing on local governments and SMEs), to give aid to prepare proposals and projects, to play an active role in the realisation of the Operative Programmes of the NDP. They also carry out lobby activities, both related to government policies, and also towards the business sector (attracting FDI, etc.).

[30] http://www.origo.hu/techbazis/internet/20021003kovacs.html
[31] MITS, www. http://www.ihm.hu/strategia/

Although the regional development strategies do not focus on IS development, they usually mention close fields in their strategies, such as increasing research and development in the region, increasing knowledge-based production and other activities.

A classical example is the South Transdanubian Regional Development Agency.[32] The region does not have a strategy focusing on IS developments, but it has a regional innovation strategy. Among the priorities of the region innovation development (agrarian research and development, technical tertiary education development), industrial restructuring (development of clusters, development of network of industrial parks) are the leading ones.

B.3. Special IS programmes

B.3.1 The Sulinet[33] program

The Sulinet program was launched in 1996, focusing at integrating more the younger generations to the Information Society. The program is run by the Ministry of Education and was started with three main goals. The first was to provide infrastructure and access to elementary and secondary schools; the second was to provide content that catches the attention of students and by that helps them to acquire ICT skills and other knowledge; and the third was to organise events and conferences related to the program. In June 2003, a fourth goal was added to the Sulinet program under the name Sulinet Express, and it aims at equipping the students, and the households where they live, with ICT tools.

By the end of 2002, all secondary schools and 20% of primary schools received Internet access. The physical network of Sulinet was organised with regional centres (11 can be found in the country), and schools are connected directly to these regional centres.[34]

Second, Sulinet operates a portal for elementary and secondary school students, teachers and parents. It offers all types of e-learning as an additional and aiding material to the curriculum of public education (students can practice and learn with the help of it but they cannot get education exclusively from the Internet). It also offers information in all areas that can be interesting and useful for students.

Third, Sulinet Program Office regularly organises events, conferences, among which the most well-known is the exposition Educatio.

Sulinet Express has been launched at the end of June, 2003. The aim of it was to increase ICT penetration among students and teachers, who can buy ICT tools and at the same enjoy tax deductions in their personal income tax. In case of students, it was one of the parents who could deduct a certain amount from his/her income tax. The deduction equalled the price of the equipment but could not be more than HUF 60 000 (approximately EUR 228).

The project was supposed to start earlier, but the public procurement process took longer time than expected. There were very strict rules for the suppliers, the most important was that they cannot sell a certain type of ICT tool cheaper outside the Sulinet program. If they had a special sale on certain items that are also listed in their Sulinet offer, they had to apply the same smaller price in the framework of the Sulinet as well. Nevertheless, there has been a debate in

[32] http://www.ddrft.hu
[33] www.sulinet.hu
[34] www.sulinet.hu

the media on the relatively high prices in the Sulinet Express, because for many items the listed prices are higher than in usual commerce.

According to the press conference held on 9 October, 2003 by the Minister of Education, the turnover of Sulinet Express reached a value of 1 315 000 EUR since its start.[35]

By 1 July 2004 Sulinet Expressz has been re-organised with the aim of providing infrastructure for not only students and teachers, but to anyone who fits the new eligibility requirement: his/her yearly income is under 4 million HUF (approximately. EUR 16 000). A new feature of 50% self-financing is required.

Sulinet Expressz is therefore the long-waited programme aimed at taking a significant effort in order to raise access of the Hungarian society. The launch of it can be to a big extent attributed to the fact that Hungary shows very poor performance (see more in Section E) in terms of IS penetration rates not only compared to the EU 15, but to other NMS and ACC-3 countries too.

Hopefully with the help of Sulinet Expressz the question of "bread or broadband" will not be an issue as the part of the society with lower income will gain support from the state for household IT infrastructure.

The Sulinet Program together with Sulinet Expressz can be considered as a successful one. Opposed to certain other programs, like Telework, Sulinet still exists, moreover, it is developing both in its subprograms creating infrastructure (see Sulinet Express) and also in its content provided through the portal.

B.3.2. The NIIF programme

The NIIF programme (Nemzeti Információs Infrastruktúra Fejlesztési Program, National Information Infrastructure Development Programme) aims at improving the infrastructure for the educational as well as the research sector and also for public collections.

It focuses on the following areas:

- development of high speed networks
- middleware infrastructure
- infrastructure based on "supercomputers"

B.4. Other actors of IS policy-making

B.4.1 The business sphere

For the business sphere it is a very important lobby group which tries to fore the government to acknowledge the priorities of enterprises.

The IVSZ, Informatikai Vállalatok Szövetsége, Association of Informatics Companies is a strong union of such business actors. Its main aims are the representation of the interests of the sector in policy-making, and ensuring that with EU accession the ICT sector in Hungary will develop further.

[35] www.kancellaria.gov.hu

B.4.2. The civil sphere

One of the most successful NGOs is Netert (For Net)[36], which is the Society for Protecting the Interests of Internet Users. They give opinion continuously on policies, laws, regulations. They follow the market actions and try to act in case one of the big provider (fixed telephony, mobile, Internet) is abusing its market power for its own good and thus harms consumers. They have a strong cooperation with a lawyer office specialised in telecom and Internet issues and sue the companies. They have been effective in certain cases (e.g. against Vodafone) but this type of action is limited by the legal situation. They also try to convince the law-makers to give more attention to protect users (GHz 2,4 case)[37]. Nevertheless, they are not so much welcomed by the policy-makers (they are not invited to participate in the discussion but they have to push it themselves).

Another civil organisation is EITB (Association for Safety of Information Society)[38]. They organise conferences for raising awareness, and put special accent to fight against Digital Divide by promoting telework (which is a useful concept for otherwise underdeveloped regions) and through special programs that try to provide aid for the roma minority to get involved in the Information Society.

Unfortunately the idea of founding an NGO for IS is not very popular, most NGOs try to help on the Bread side, not the Broadband. The main database for NGOs for example does not register the category „Internet" or „IS"[39]. The civil sphere is very active in Hungary, and in their everyday work they use intensively ICTs. But not many of them have been specialised in IS – promotion or other IS-related activities.

B. 5. SWOT analysis on national and regional IS policies

1. Altogether there has been and still there is a sufficient awareness on the role of the IS on the economy. As a result- even with increasing attention paid on IS - there has been a very late IS policy development, which generally remains weak. As a result less than sufficient amount of funds have been devoted, limited programs and concrete plans have been drawn and a clear, well coordinated and operational strategy has been missing. Weak policies, incoherent plans and unsatisfactory actions have also led to low user penetration and significant digital divide.
2. The institutional setting for developing IS policies and acting in IS-related issues is only partly given: on the national level the main institutions exist but on the regional level decision-making is not developed enough.
3. The ability of institutions to act effectively has been questionable: in case of general institutions (Parliament, government, and local governments) the lack of awareness intensified the problems. The recent Sulinet Expressz and related programmes showed that the government seems to take an active side in promoting IS and increasing access.
4. The general framework for effective IS policies is set by EU approach as policy-makers so far have not detected any special area, where creative and unique policy could have been designed. Policies themselves point to the European Union when it comes to financing the planned activities (National Development Plan, MITS)

[36] http://www.netert.hu/
[37] http://www.origo.hu/vendegszoba/20030529netert.html
[38] http://www.tudinfo.hu/eitb
[39] http://www.nonprofit.hu/

5. There are several areas where more activities are visible: education (Schoolnet, infrastructure, network and content for the academic sphere), recognition of the threat of the Digital Divide (telehouse, telework, minority issues), and a strong emphasis on the business side.
6. The activity of the civil sector is not sufficiently effective, in most cases the voice of the business lobby is much louder than of the NGOs'.

Strengths	**Weaknesses**
• basic institutional setting is given, democratic framework • the most successful activity so far is oriented towards the right group: youngsters • Existence of an IS national plan	• awareness of importance of IS is not enough • vague IS policies without detailed programs, list of activities or time-plan • NGOs are not invited into the debates on IS issues • low level of IS-related activities at regional level
Opportunities	**Threats**
• if awareness is risen, the institutions can catch up • with Sulinet Expressz the comparatively low penetration rates could be raised	• if well-planned programs do not support policies, most of IS achievements will not be maintained • if not targeted more effectively, Digital Divide is likely to increase

C. Industrial development and competitiveness

C.1. Major changes in the structure of industrial production

The evolution of the structure of industrial production during the last decade has been influenced by transition from centrally planned, closed and sheltered economy to privatised and open one, by the inflow of foreign direct investments and by changing demand structure.

In terms of affecting the structure of manufacturing, transition had three major influences. First, opening of the economy put the industrial sector and manufacturing to a competitive environment. Liberalisation and the collapse of CMEA affected negatively the protected producers, while the withdrawal of production and consumption subsidies resulted in revenue and profit declines for producers forcing many to exit the market. Among the industries mostly affected were the food industry, chemicals and machinery industries.

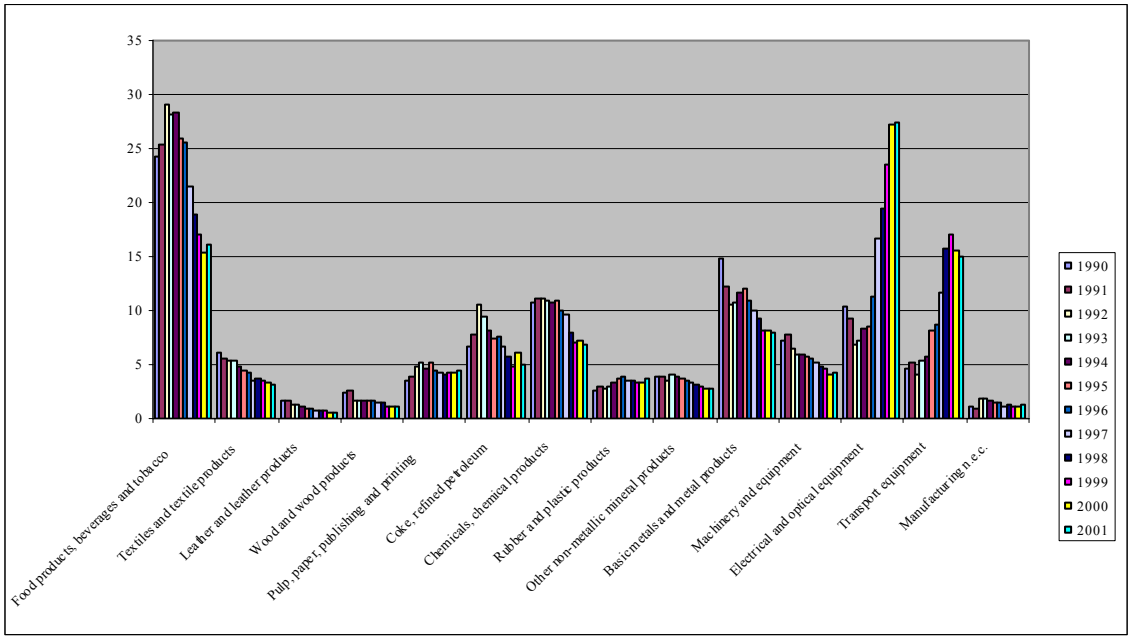
The second basic impact of economic transition on the structure of manufacturing was related to the rapid decline of incomes and demand in the early 1990s. While in Hungary the initial decline of incomes and demand remained below the average of transition economies, this has still been significant and contributed to sizeable changes in the structure of manufacturing production. The initial transition driven demand collapse has negatively affected industries with low value added and producing basic materials, and the consumption goods sectors.

The third effect of transition on industrial production has been the openness to and reliance on foreign direct investment inflows, which have strongly changed its structural and geographical composition. Foreign direct investments in the industry have been directed at sectors with high human capital supply and low wage level, and they have basically changed the structure of industry: industrial branches declining in early 1990s (machinery) started to flourish, earlier non-existing ones were established (car assembly), while other traditional industries neglected both by domestic and foreign investors gradually declined and lost their importance (textiles or wood industry among others).

C.2. Declining and rising sectors in industry

Looking at the statistical data and also at the anecdotal evidence one may determine three levels of changes in the industrial production in Hungary during the 1990s. One has occurred between the major branches shown in the next graph describing the major losers and gainers within industry. Other remarkable shift emerged within the branches at subsector level as the composition of the major industrial branches changed over time: the most remarkable examples are machinery, chemical industry. Finally, supply side changes were also reflected in the nature of producers due to market entries and exits.

Graph C.1. Structure of industry production between 1990 and 2001 (% of total)



Source: KSH, 2002

When drawing a general picture about the changes in the composition of industry in the last 10 years, the clear trend emerges that heavy and labour intensive sectors lost, while higher value added sectors gained in their share in output.

The major looser of the decade was the food industry, which had shares perhaps above level set by comparative advantages in total output before economic changes. Its loss was driven by the ailing agriculture, increasing FDI and foreign penetration and shifts in domestic and external demand for food products. The decline was especially significant until late 1990s and the industry seems to stabilise its contribution only from 2001 onwards.

The textile industry was another looser as it could not survive the impact of liberalisation, increase of wage and other production costs and which existed on international subcontracting for many years, but has been practically wiped out in the last three years due to wage increases and shift of FDI to countries with lower wage level (China, partly Romania and Ukraine).

Heavy industries had shares in early 1990s above the level revealed by the comparative advantage of the country. It was thus natural that their share declined during the last decade: this is true both for the chemical industry as well as for the basic metals and metal products.

Two industries were the clear winners in the transition process. The major winner was the electrical and optical equipment production which increased its share in industrial output from 10% to 27% between 1990 and 2001. This growth has been mainly driven by inflow of FDI, by agglomeration affects created by foreign investors in these branches and also by rapid increase of demand for these products on the major export markets.

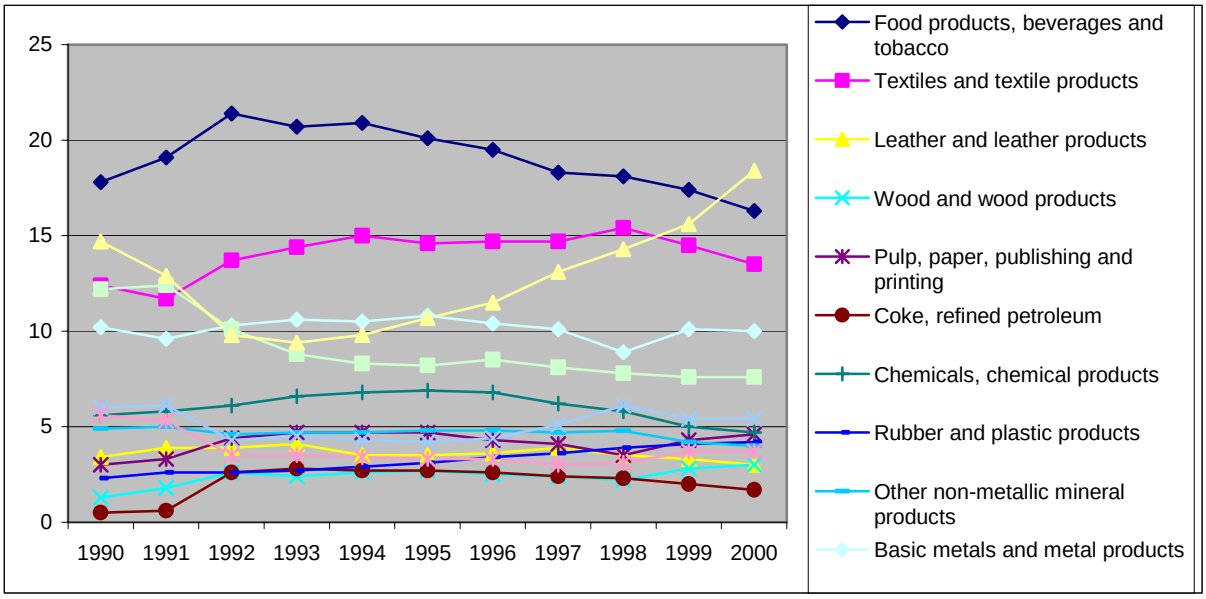
The production of transport equipment was the second winner as its share in total output increased from 4.7% (1990) to 15.7% (2001). Besides this spectacular growth the internal structure of output changed too: the earlier non-existent car production increased, while the production of buses and other transport equipment's declined significantly. Here the assembly

type production grew rapidly and replaced the domestic producers of the sector characteristic for early 1990s.

While there has been a rapid change in the production structure, less significant changes occurred in the employment structure of the industry, which as it will be seen partly explains the decline of certain branches. The most remarkable feature is that the textile industry still employs 15% of the labour force of manufacturing and notwithstanding its declining contribution to output employment share continuously increased, which resulted in declining labour productivity until 1997 followed by its increases when output started to grow faster.

Almost similar development can be seen in food industry, where stagnating production and declining contribution to output of the total manufacturing sector was accompanied by very limited decline in employment share. This partly reflects that total employment declined in the industry but the relative figures reveal that productivity developed unfavourably compared to other industries.

Graph C.2. Structure of employees in manufacturing



Source: KSH, 2002

Two other industries stand out with their changes in employment: transport equipment and electrical and optical equipment. Transport equipment has experienced a huge increase both in its total production and also in the share of its contribution within the manufacturing sector output; while at the same time the share of total employment within manufacturing did not change between 1990 and 2000.

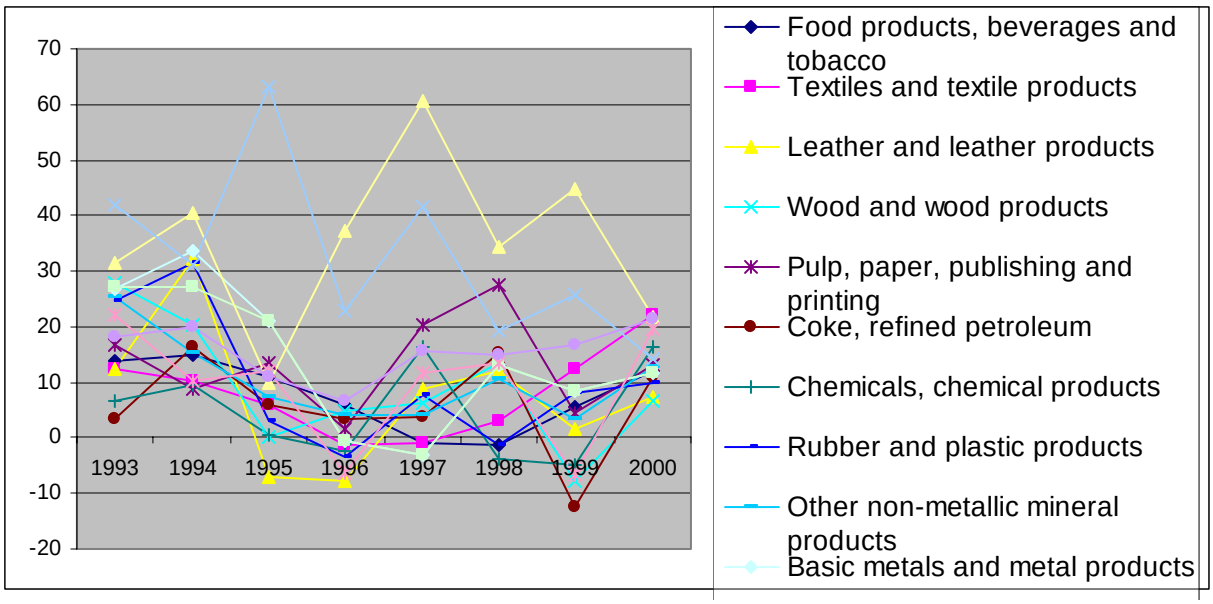
This shows the significant increase in labour productivity, mainly in the car producing sectors and the shifts in the composition of the employed labour force. In case of electrical and optical equipment industry the expansion of output has been accompanied by the increase in employment, partly because this sector has been of minor importance before transition and employment was also moderate.

These two branches have seen the biggest expansion in the share of employment within manufacturing over the last 10 years, while in the case of others either their share was already small at the beginning of 1990s or no significant changes occurred in the last decade.

The evolution of labour productivity clearly reflects the aforementioned changes in the production and employment in manufacturing. First, the growth of labour productivity in manufacturing, especially between 1995 and 2002, was well above the nation-wide, the regional average and the average levels of many emerging market economies. This was mainly the effect of sizeable reduction of employment in the sector, of increase of foreign investments and accompanied restructuring following the privatisation booms of 1993-1997 and new greenfield investments, which became the major source of capital inflows from 1997.

Second, the electrical and optical equipment as well as the transport equipment sectors stand out with their remarkable performance over the whole 1990s. Transport equipment sector recorded the highest rates of productivity increase, especially in the second half of 1990s.

Graph C.3. Changes in labour productivity in manufacturing

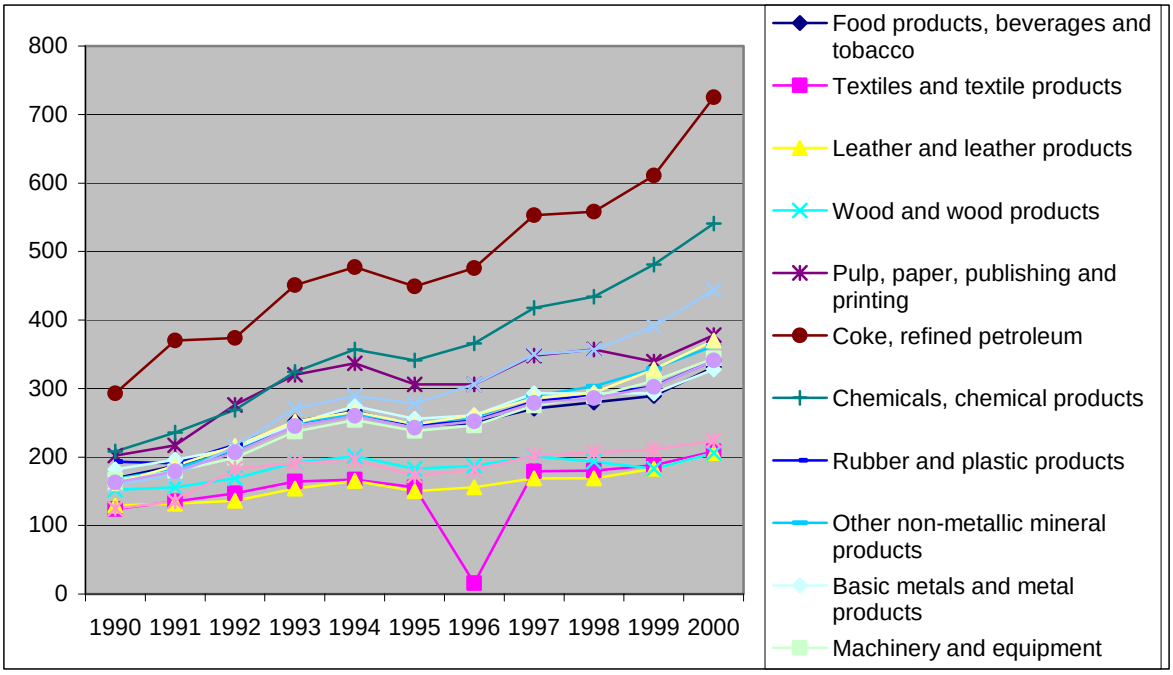


Source: KSH, 2002

Third, the machinery sector increased its productivity at level around the average of the whole manufacturing sector. On the other hand the mentioned sectors with declining output share saw a small increase of productivity: the figures for food, textiles and sometimes for chemical industries are revealing in this respect.

Employment changes have been partly linked to the evolution of wages in domestic currency and as reflected in the graph below also in EUR. First, the most rapidly growing industries did not experience the highest rates of growth in wage levels, just contrary their increase has been around the average growth of the whole manufacturing sector. Second, the relative wage levels between the individual sectors did not change too much in the last 10 years: the sector that had the highest wage level in 1990 (coke, refined petroleum and chemicals) still had wage level above others in 2000. The growth of wages in the textile industry has been below the manufacturing average.

Graph C.4. Wage levels in EUR in manufacturing

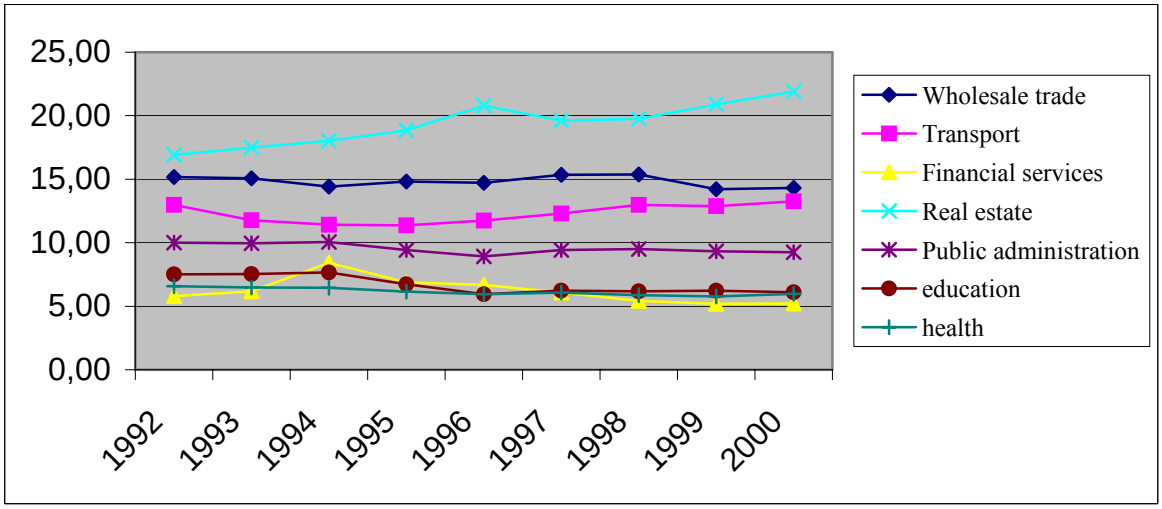


Source: KSH, 2002, WIIW,2003

C.3. The major changes in the pattern of service sector

The service sector is the major contributor both to GDP and employment in Hungary. The share of service in total output was already high at the beginning of 1990s: on the eve of economic transition it reached 60% of GDP. In the last decade its contribution increased further and exceeded two thirds of GDP mainly due to the expansion of output of certain service sectors (wholesale trade, finance and real estate) and to the decline of the contribution of agriculture. This is visible from the fact that the increase of services' contribution to GDP took place between 1992 and 1994 and afterwards it stabilised at this two third level and only the internal composition of services changed in recent years.

Graph C.5. Changes in the composition of the service sector (% of total service output)



Source: KSH, 2002

Within the service sector the contribution of business and public services to GDP and GDP growth was different in the last decade. The growth of the service sector output was mainly driven by the increase of business services, within that by the growth of wholesale and retail trade, transport and real estate sector. These sectors continuously increased their output and their share within GDP grew rapidly: currently both wholesale trade and transport account for 10 % of the GDP, real estate services for more than 14%.

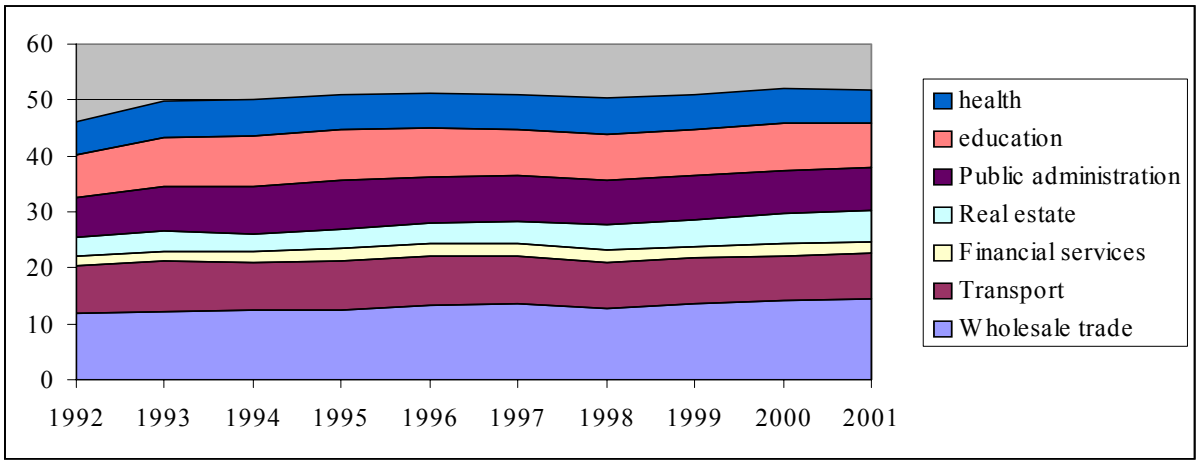
On the other hand the contribution of public services to output has virtually stagnated in the last decade: the share of health care and education services in GDP stabilised around 4-4 % while that of public administration around 6%. Within business services the growth of financial services was very volatile reflecting the shocks and restructuring of banking and other financial industries, and as a result its contribution within GDP gradually declined.

The fastest growth and increase in relative share within GDP was realised by the real estate sector. This was linked to heavy boom in household and business construction: besides real increases in output the last 10 years saw a high increase in prices of real estate which considerable increased the output of this sector.

Another sector, which experienced rapid increase of output, was the wholesale and retail trade sectors, driven mainly by the modernisation of outdated trade facilities. The logistics centres, the huge mega-stores have not only modernised these sectors, but significantly increased their contribution both tot GDP and employment. The third rapidly growing sector was the transportation, which was closely linked to the geographical situation of the country, its proximity to major markets.

The share of service is also overwhelming in employment, though there the contribution in total labour force is around 60% below its share within national output. The main reason of lower share in employment than in output is related to higher labour intensity of agriculture and construction sector: while their share in output was in 2001 3.7% and 4.1%, their share was almost the double with 6.7% and 7.2% respectively. What is also remarkable is the change of employment: while employment in real estate sector increased rapidly, in other two major service sectors (wholesale and retail trade as well as transport) the growth was moderate.

Graph C.6. The division of employees within the service sector(% of total labour force)



Source: KSH,2002

On the other hand the increase of employment in the public sector was volatile: years of fiscal austerity saw decline in employment and rationalisation, followed by periods of rapid expansion. In terms of employment it is telling that the share of public services (including public administration, health care and education sectors) reaches 22% of total labour force and contributed significantly to the over-employment in the public sector. Another service sector where the output does not fully match employment is the financial one, which saw a significant decline in its value of output accompanied by rapid increase of employment (which has been reversed during the last recent economic slowdown).

C.4. Changes in the investment patterns

The evolution of the investment rate has reflected the general macroeconomic trends. Total investments declined rapidly between 1990 and 1992 due to the strong impact of the initial transition recession. Later there was only one year, when total investments declined (1995), as austerity measures and poor growth prospects forced the private sector to weaken its demand for capital. But following 1995 investments increased on average by 7% annually.

The growth of investments in the second half of 1990s was strongly affected by the increase of foreign capital inflows and by the growing openness of the Hungarian economy accompanied by broadening export opportunities and increasing competitiveness of tradable (especially manufacturing) sectors.

At the end of the period of analysis (in 2000-2002) an additional factor, the increase of household and government capital formation gave another stimulus for capital formation, while in these years private investments slowed down as they were strongly affected by the worsening global and European growth prospects.

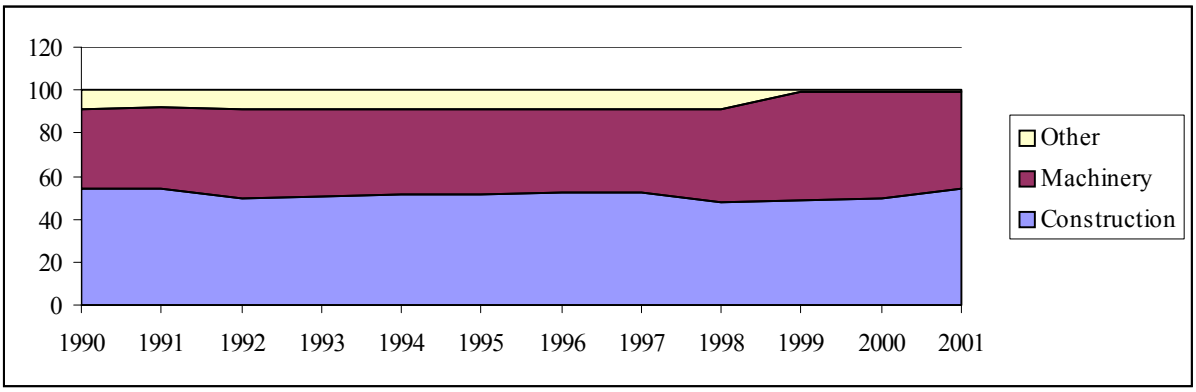
The major driving factors of the expansion in investments explain the observed structural changes in the composition of capital formation. As manufacturing was the main supply side source of economic growth, investments in manufacturing grew rapidly and reached very high levels, increasing their relative share in total capital outlays.

Other sectors increasing their investment rates have been the construction and the real estate sector. The growth of investments was mainly caused by the booms in office and private construction of real estates: the former started from 1996 onwards after the increase of FDI inflows, while the latter from 1999, when incomes growth accelerated and government support was given to household sector for real estate purchase and construction.

While these sectors increased their investment rates and their relative share in gross capital formation, in several others (like public sector investments in health care, education and public administration) investments stagnated. In two sectors the behaviour of investments was contrary to the expected one. One of them is financial intermediation, where investments declined almost continuously in the second half of 1990s notwithstanding the increasingly competitive banking environment and the sale of almost all public banks. This may reflect the increasing efficiency of investments in the banking sector, consolidation (reduction in number of banks) in the banking sector.

The second sector was the electricity and gas supply, as their privatisation of suppliers was accompanied by decline in an almost continuous decline in investments during the 1990s.

Graph C.7. The composition of investments by type



Source: KSH, 2002

Looking at the type of investments the most positive development is the increase of machinery and equipment investments in total capital formation. The share of these investments between 1990 and 2001 increased in the total amount of capital formation from 37% to almost 45% at the expense of the declining share of other investments, while construction investments kept their 54% in total investment outlays.

Many (deLong-Summers (2000) among others) regard machinery and equipment investments as the main contributor to economic growth and their increase the most beneficial contribution of investments to growth**.** In Hungary machinery and equipment investments accelerated following the 1995-1997 privatisation boom, when the increasing competitiveness of tradable sector combined with growing export market led to sizeable increase of private investments in these areas.

Concerning the division of investments according to type of activities one can observe that there is a fairly strong correlation between structural changes in GDP and investments. The cyclical evolution of investments followed closely GDP dynamics and structure: however it is surprising that there has been no major significant change in the sector breakdown of investments. Within relatively stable composition, the share of agriculture and financial sector, electricity sector and transport declined, while of real estate, construction and public administration increased in 2001 compared to 1991.

C.5. Cross border capital flows: structure of inflows and of FDI to Hungary

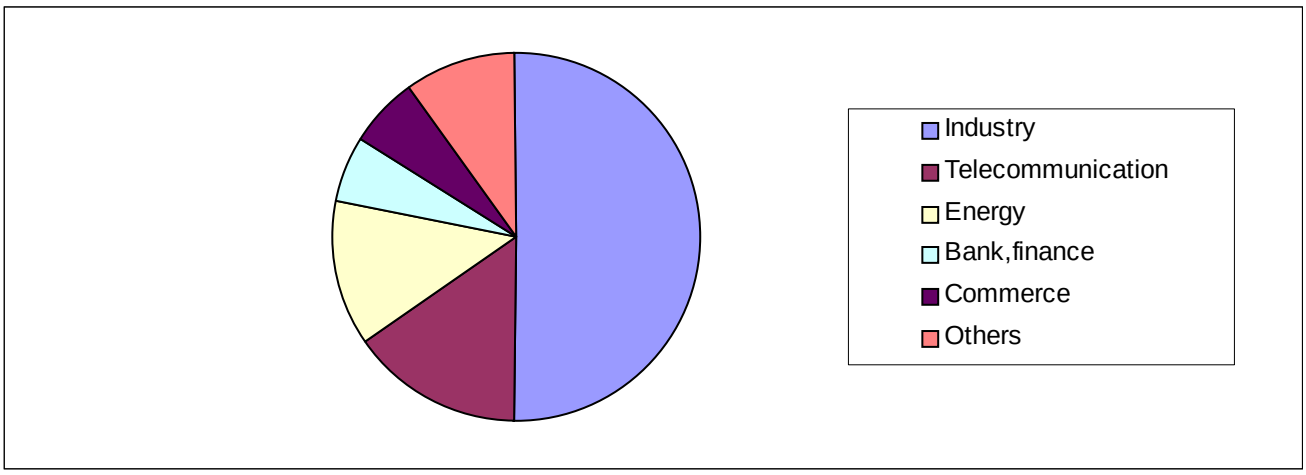
Due to the inherited huge net and gross foreign debt, all three types of capital inflows (direct investments, portfolio investments and credits) were significant in Hungary during the 1990s, while their relative importance and also contribution to the financing of ICT related sectors varied over the decade.

In foreign direct investments Hungary has been for many years stable and until 1999 the highest recipient both in gross value and in per capita amount. Since 1999 the Czech Republic and Poland have attracted much more foreign capital and currently they have higher absolute volumes of inflows, but in per capita inflows Hungary retained its good position.

Foreign direct investments have increased until 1996-1997 mainly through the outright sale of the assets of public owned enterprises to foreign investors, while after 1997 the share and importance of green-field investments became the leading contributor to FDI inflows. While

the uncertainty over the election results and the macroeconomic instability led to low inflows in 1994, the need to collect huge privatisation receipts and foreign currency earnings to service public and net foreign debt resulted in extraordinary inflows in 1995-1996. Notwithstanding this volatility, on average FDI inflow was stable, without significant swings: annual inflow was around 3-4% of GDP. The country origin was dispersed with a clear dominance of traditional business and trade partners (Austria, Germany and Italy), but other major investors (USA, UK) also play an important role.

Graph C.8. Sector composition of the stock of foreign direct investments in the Hungarian economy, 2002 in %.



Source: KSH, 2002

The sector composition of FDI is very similar to changes in GDP and exports, with a clear priority given to export oriented manufacturing industries and certain services. Altogether 46.8% of the FDI stock at the end of 2002 was invested in industry, within that 37% in manufacturing. Other significant recipients of foreign direct investments have been the telecommunication and financial sectors, reflecting the early privatisation and direct sale of these sectors to strategic foreign investors. The share of these two sectors in total FDI was 7.7% and 12.5% in 2002.

Two other sectors, which have seen significant rise in FDI have been the real estate with 15% share and wholesale and retail trade with 12.5%. The first reflects the housing boom and increase of purchasing power of households, while the second investments and modernisation in retail trade and distribution networks. Other sectors played a minor role in attracting FDI: from that point the relatively low level of FDI in agriculture is an interesting fact.

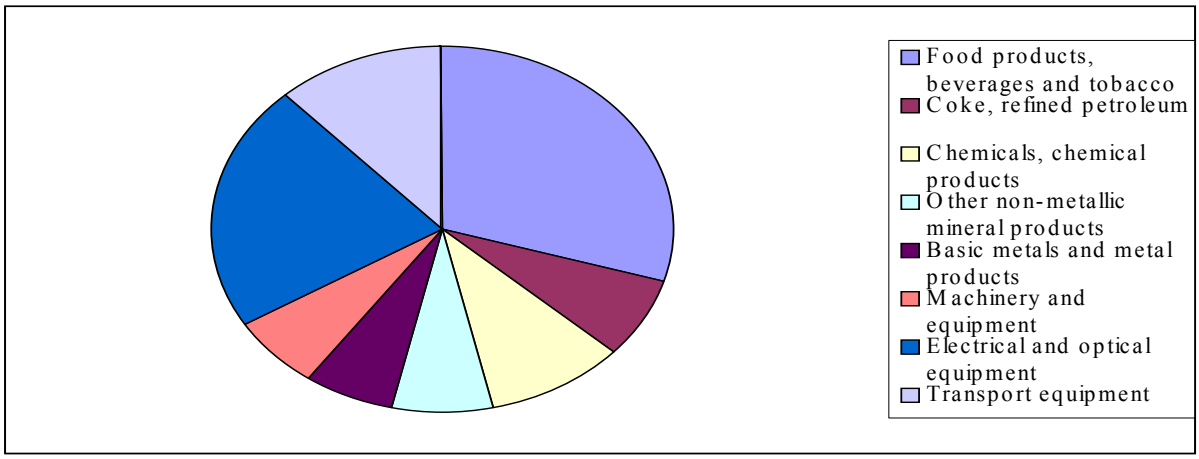
A recent (from 1999) novelty of FDI is related to the increase in FDI outflows, which reached almost EUR 0.5 billion annually in recent years. Initially these outflows were mainly driven by speculative investments in tax heavens, but in the last 3-4 years by the increase of investments in the neighbouring countries. As a result of increased outflows, net foreign direct investments declined, but they still represent an important source of fresh capital and financing the current account imbalances.

Another recent phenomenon is the closure of certain production facilities due to the worsening pride and cost competitiveness of Hungary. As a result, labour intensive investments declined and some major facilities were closed and their production was moved to lower wage countries, mainly China and some neighbouring countries with lower wage levels and costs.

Foreign direct investments have been an important source of financing ICT production and investments. Within the major recipient sector, industry the three major branches that attracted the most of FDI were the food industry, electrical and optical and transport equipment industries. The inflows in the former one were mainly through privatisation oriented at the supply and acquisition of domestic markets, while in the case of other two branches the main motivation was to establish export oriented production lines and their output was oriented mainly at export markets.

The total value of FDI invested in manufacturing in 2001 was 3.8 billion US dollars, which made about 25% of total foreign direct investments carried out in Hungary. The sector composition shows that the main recipients have been the food, chemicals, machinery and electrical and optical equipment industries. The last two sectors comprise the ICT sector, which shows that FDI in ICT related industries has been significant in nominal and relative terms.

Graph C.9. Sector composition of FDI stock in manufacturing



Source: KSH, 2002, Ministry of Economy, 2003

Besides FDI, foreign portfolio investments have also contributed to the financing of ICT-production mainly through the purchase of shares of these companies listed on the Budapest Stock Exchange. Foreign portfolio investment inflows have been much more volatile than direct investments, and have been mainly attracted by high returns on government bonds. On the other hand recently the Budapest Stock exchange performed similarly to major global capital markets, which resulted in declining interest from international hedge and pension funds in the shares of Hungarian corporations.

Finally, net borrowing by the corporate sector has also contributed to capital inflows and financing of ICT investments and production. Due to high interest rates level, the close ties between multinationals, their parent companies and foreign banks, limited supply of financial services and financing opportunities, foreign borrowing by the corporate sector was important all over the decade. Besides borrowing from domestic banks in foreign currency to utilise the expected appreciation of the Forint and the interest rate differences, corporations were heavily engaged in borrowing from abroad. Foreign lending to resident corporations became especially significant after 1997 and it has been kept at relatively high levels.

Another important source of financing ICT investments and production has been the increase of intra-company loans, which are not detected by the statistics, but only anecdotal evidence demonstrates their increasing role. Similarly, corporation finance their new investments partly

from the increase of retained earnings, which are reinvested instead of repatriating back to their parent companies.

C.6. The changes in manufacturing exports

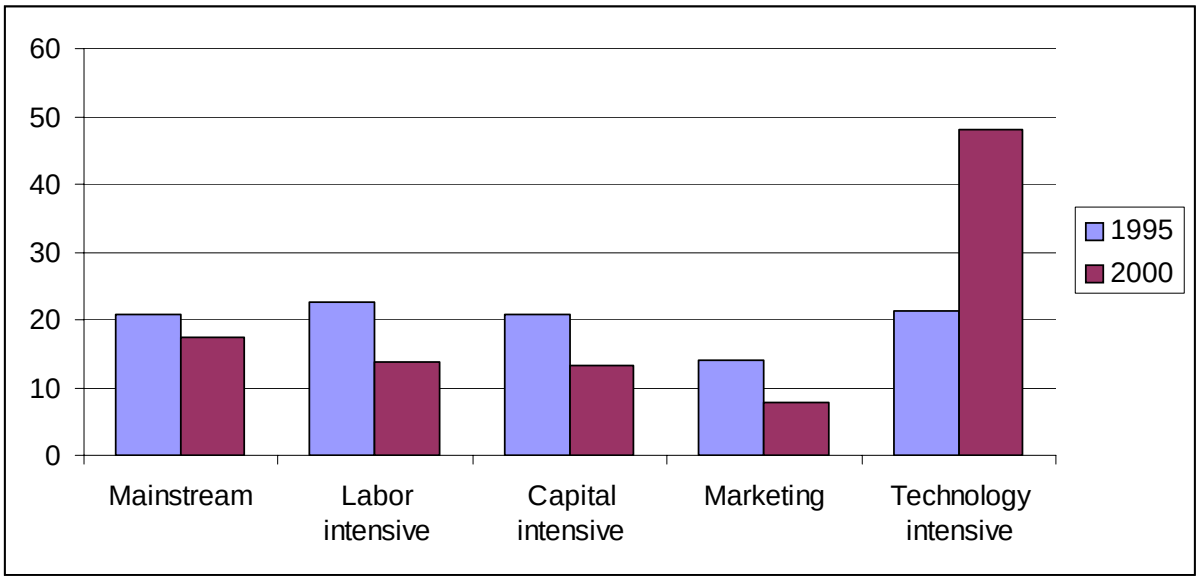
The changes in the pattern of industrial production were also reflected in the composition of manufacturing exports, which were the driving force of export and output expansion in Hungary between 1996 and 2002. The next graph shows the changes in the composition of exports according to the intensity of use of various factors of production: labour, capital and technology.

The most remarkable change is the rapid increase in the share of technology intensive exports, which more than doubled their share in the exports the volume of which increased steeply. Technology intensive products made up 48 % of total manufacturing exports, while the same figure in 1995 was just above 21%. The increase in the share of technology driven exports is closely linked to the growing contribution of electrical and optical as well as transport equipment sectors in manufacturing output.

On the other hand the share of labour and capital intensive exports declined in the analysed period from the same level with similar speed: in 2000 they represented 13-13% of total manufacturing exports.

Besides crowding out by rapidly increasing technology intensive output, labour intensive production lost its role due to the increase of wage levels and labour costs and associated withdrawal of investments in these sectors, while among the capital intensive sectors some have incurred competitiveness problems leading to the reduction of their exports and output shares.

Graph C.10. Manufacturing export structure in 1995 and 2000 in %.



Source: KSH, 2002, WIIW, 2003

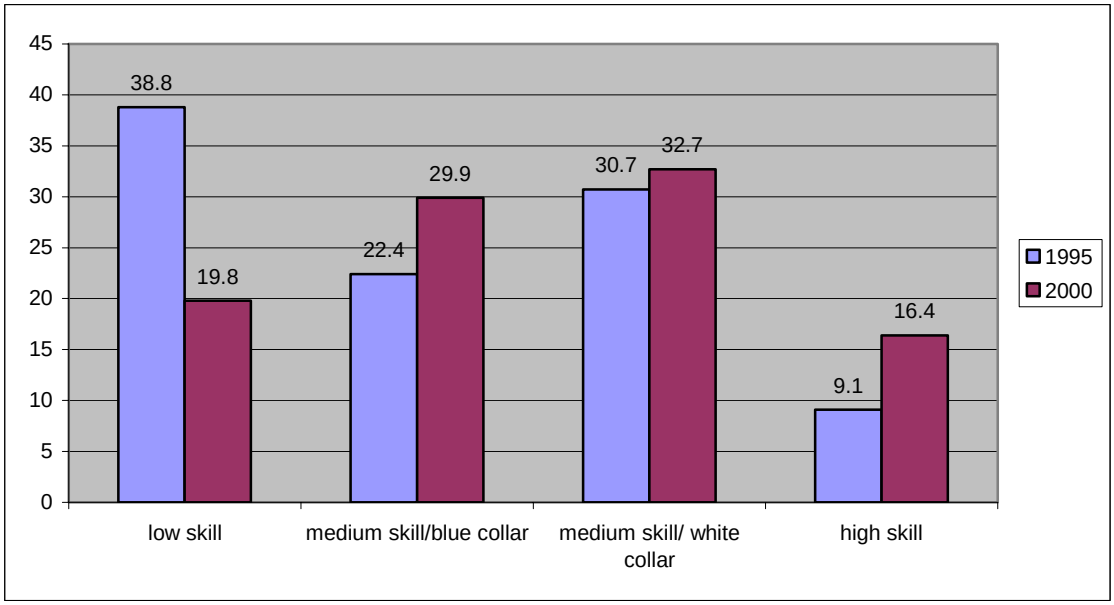
When comparing the composition of exports between Hungary and three South-European cohesion (Greece, Portugal and Spain) and two central European economies with similar size (Slovakia and the Czech Republic) one can observe significant differences.

First, the technology intensive exports occupy share, which is almost double of the average of all other countries in comparison. Technology intensive products represented 28% of total manufacturing exports in the three cohesion countries, while 24-25% in the Czech Republic and Slovakia. On the other hand the contribution of capital intensive exports has been less significant compared to these countries: while in Hungary they make 13% of manufacturing exports, their contribution was well above 20% in the other countries. The reason for this pattern is twofold: Hungary had less industrial background than Czech Republic and Slovakia, and Spain, while on the other hand the huge inflows of foreign direct investment shifted the composition of exports towards technology intensive products.

The dominance of technology intensive products in Hungarian exports can be understood also from the division of exports according to skill intensity. Thanks to restructuring and increase of manufacturing output with higher value added sectors, the contribution of low skilled sectors to exports declined over the 1990s: while in 1995 almost 40% of exports came from low skilled products, their share declined to 20% by 2000. Their decline was accompanied by increasing contribution of high skilled products, which reflects the presence of electrical and optical equipment's in Hungarian exports[40].

It is also remarkable that the contribution of medium skilled/blue collar products increased significantly, which is a sign of the high share of assembly type of exports (machinery industry among others). At the same time the role of medium skilled/white collar products increased only modestly, but their share was relatively high in 2002.

Graph C.11. Skill intensity of Hungarian manufacturing exports in 1995 and 2000



Source: KSH, 2002

[40] This shows strong restructuring and sizeable impact of FDI on industrial production and export performance. Industrial production was mainly driven by export sales and therefore only those branches survived the structural changes, which could remain competitive and could increase their value added content.

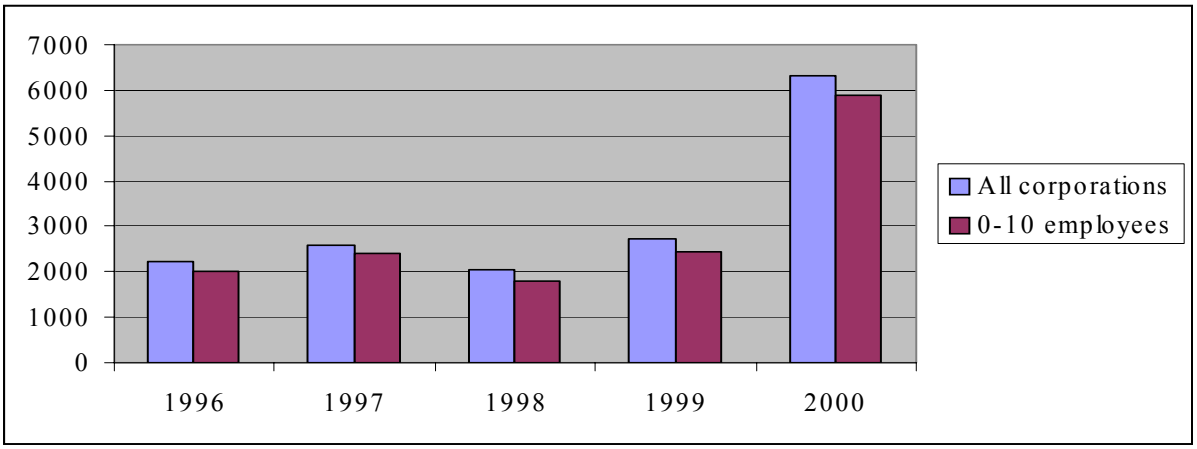
When compared to cohesion countries and other Central European countries the composition of exports according to skills reveals favourable pattern for Hungary. In 2000 the share of high skilled products in exports was above the levels in other countries, while the contribution of low skilled products was half of the cohesion countries and by 30% less than in the Czech Republic and Slovakia. On the other hand both the contribution of white-collar medium skilled products and high skilled branches to total industrial exports was above the values of other countries.

C.7. The assessment of the ICT sector and the size of the market

Both the information technology and the telecommunication market saw a very rapid increase in the last 5 years, driven by the increasing need to use information technology and telecommunication at all levels of economic activity. PC penetration has continuously increased; mobile penetration saw a very rapid growth and increasing number of corporation's use IT services. The net revenue of the computer industry in the last 5 years increased from 94 billion HUF (1997) to 262 billion HUF (2001) (1 billion EUR), and its share in GDP grew from 1.4% to 2.5%.

This increase can be seen from the next graph, which shows the number of different corporations working in this sector.

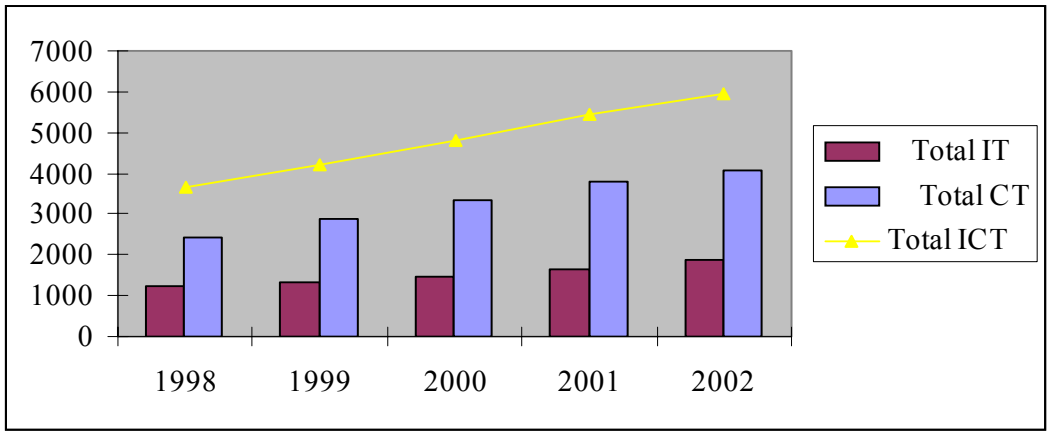
Graph C.12. The number of all and micro enterprises in the ICT sector



Source: Ministry of Informatics and Communication, 2002

The information technology and telecommunication sectors developed with different speed. As the graph shows the value of the ICT market in 2002 was around EUR 6 billion (12% of GDP), which is a 60% increase compared with its EUR 3.5 billion value in 1998. Two thirds of total ICT market is represented by the CT sector and one third by the IT sectors.

Garph C.13. The ICT market value in million EUR in Hungary



Source: HIF, 2002

The value of information technology sector increased by only 50% between 1998 and 2002 and its share from the whole ICT sector declined from 33% in 1998 to 31% in 2002. On the other hand the growth of the telecommunication market was above the mentioned speed and its value was by 70% above in 2002 than in 1998. The share of this segment increased in the analysed period from 66% to 69%. The rate of growth of the ICT sector was well above the average rates of the already high expansion of GDP.

C.7.1. The market size of the Hungarian IT sector

In Hungary increasing amounts have been spent since early 1990s on information technology. While in 1997 the value of the IT market was hardly above EUR 1 billion, in 1999 it was EUR 1.36 billion and in 2002 it reached almost EUR 2 billion (EUR 1.9 billion). The annual rates of growth generally exceeded 10 %.

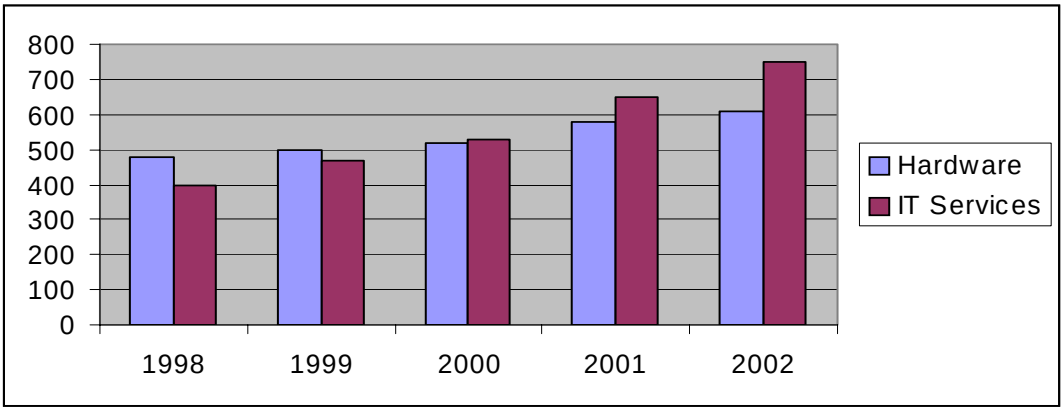
While between 1998 and 2002 the IT market increased its value by more than 50%, the rates of expansion were not equal in all segments of the market:

a) The value of hardware market in 1998 was EUR 458 million, and was dominated by computers, the share of which slightly exceeded 50%. In 2002 the value of the market was EUR 611 million and the share of computers remained unchanged reflecting that the growth rate of the hardware market is similar to hardware computer market.

b) The value of IT services in 1998 represented 32% of the IT market, but thanks to its rapid growth it increased its share by 2002 to 40%. The value of information services within these four years almost doubled and its value increased from EUR 392 million in 1998 to 750 million in 2002. This increase can be regarded as the most dynamic one among all segments of the information market. According to various forecasts the trend is to continue and soon the share of information services may exceed 50% within the IT market.

c) As can be seen from the graph below in 2000 the value of the IT service market reached of the hardware one, and since the differences in growth rates produced increasing gap between the two.

Graph C.14. The value of hardware and IT services in million EUR



Source: HIF, 2002

The increase of the market has been accompanied by the deepening of various penetration indices as seen from the tables in the appendix. In the last 7 years, the most notable trends were the following:

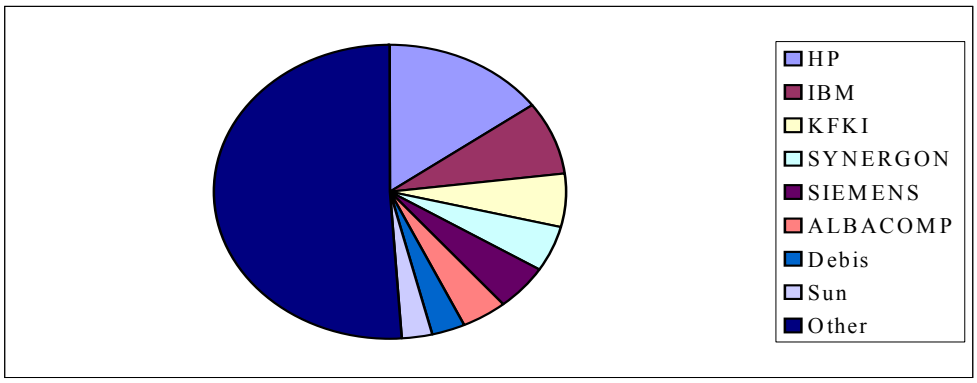
a) The number of personal computers in Hungarian households more than doubled, but in relative level the penetration is still low, as at the end of 2001 only 14% of households had personal computers.
b) The number of computers in the general government institutions more than doubled between 1995 and 2000 increasing from 50 thousand to 111 thousand. The number of so-called big computers has increased tenfold in the same period of time.
c) The number of employees with PC in the public administration (general government level) has almost doubled in the same period.
d) The value of IT investments in the public administration increased fourfold within the analysed period, though the absolute value remained still certainly very low.

C.7.2. The participants of the Hungarian IT market

On major feature of the Hungarian IT market is that it has several market players. According to various statistics the number of those corporations, smaller companies, which professionally deal with computers exceeded in 2002 10000. Out of them 90% are represented by micro and small enterprises, which mainly provide information services. The number of employees at the IT corporations increased between 1998 and 2002 from 13.000 to 25 000, that is almost doubled.

When one investigates the revenues, the highest market share is represented by PC producers but in recent years the market position of service providers has strengthened too. The majority of the Hungarian IT market is controlled by big multinationals, but several Hungarian corporations (KFKI, Synergon, Albacomp) have also appeared and play an increasing role, though foreign owners are also present in these companies.

Graph C.15. The main companies on the Hungarian IT (hardware and services) market in 2002



Source: HIF, 2002

The graph shows that the highest market share in 2002 was represented by Hewlett Packard-Compaq. Generally the leading global producers of computers belong to the leading corporations in Hungary too (IBM, Sun). Among the corporations that provide mainly services, two Hungarian owned companies (KFKI and Synergon) have above the average market shares. The traditionally PC producing companies change their market strategy and today they perform increasingly the role of system integrators instead of being sole hardware producers.

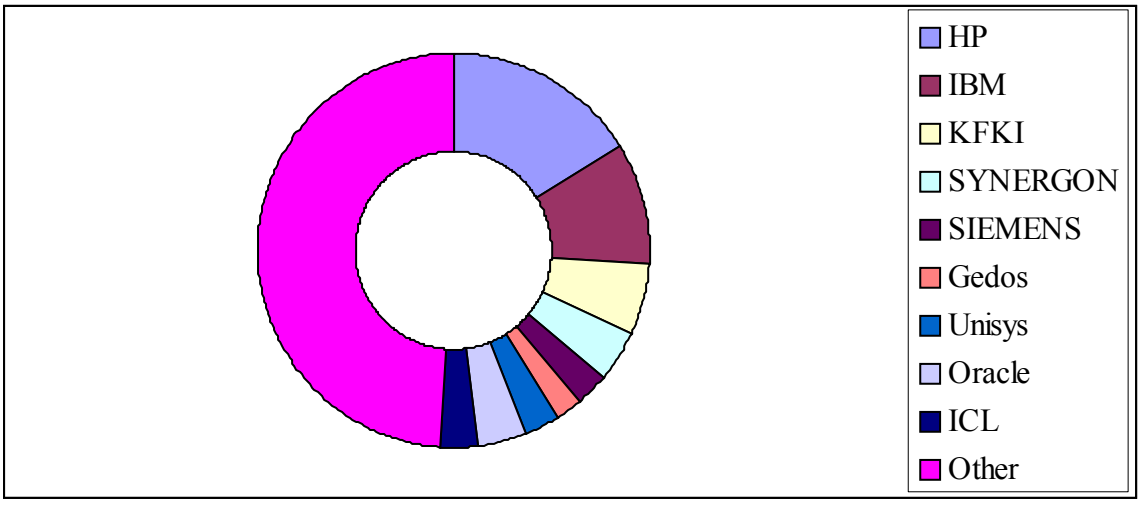
While the domestic PC market grew in recent years with moderate speed, Compaq increased its market share considerably. In 2001 Compaq had the highest share with its 22.5%, while among the competitors IBM, HP, Dell controlled each around 20% of the total domestic PC market.

C.7.3. IT services

In the recent year increasing number of corporations demand information technology services, which reflect simultaneously the spread of information technology and the increased role of outsourcing. The companies try increasingly concentrating on their core activity and outsourcing all other activities.

One characteristic feature of the IT services market is that small and medium size enterprises control almost half of the market. The reason behind this is that several big corporations buy these services from medium sized or small companies because of cost and flexibility advantages.

Graph C.16. The main players on the IT service market in 2002



Source: HIF, 2002

The biggest suppliers (HP, IBM, KFKI) are the secure providers and suppliers of services, while in recent years increasing number of outsourcing companies emerged, which provide services in information technology related areas (like Gedos, EDS, or Accenture).

C.8. Telecommunication

C.8.1. The size of the domestic market

The rapid increase of the telecommunication market can be regarded as one of the most spectacular growth in the Hungarian economy. While in 1998 the value of the telecommunication market was EUR 2.4 billion, it reached by 2002 EUR 4 billion.

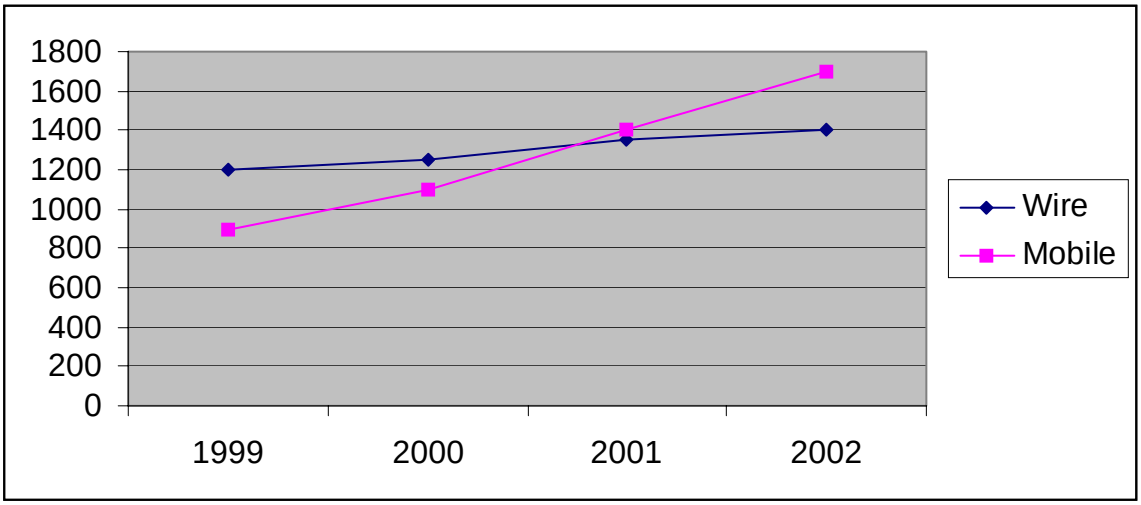
The driving force of this swift increase was been the growth of mobile telecommunication. Mobile penetration reached by the end of last year 70%, which is a huge increase from the 5% value recorded in 1998: the number of mobile phones in use increased between 1998 and 2002 from 500 000 to 7 000 000.

Looking at the division of the market in 1998 18% was represented by telecom equipment's, 82% by telecom services. The shares did not change significantly in the last four years, though the services have slightly gained in share and their contribution to the market was 85% in 2002 and equipment represented 15% of the total market.

The value of the market of telecom equipment was EUR 509 million and 80% of the market was represented by network equipment. The value increased by 2002 to EUR 900 million, but the share of the network equipment's basically remained unchanged. The telecom equipment market expanded in its size between 1998 and 2002 2.5-fold and forecasts assume that this expansion will gradually decline as the mobile market reaches its saturation by the end of this year.

The value of the IT services market increased by 50% between 1999 and 2002 and reached EUR 3 billion in 2002.

Graph C.17. The value of market services in million EUR.



Source: HIF, 2002

Within this growth one may clearly make distinctions between the growth rates in various sub segments:

a) The value of fixed line telecommunication services increase between 1999 and 2002 only from EUR 1.2 billion to EUR 1.4 billion. The number of wire telephone equipment almost remained unchanged within these 4 years, and the share of wire services from all telecom services continuously declines: in 1997 it was 61%, in 1999 54%, and in the last year only 43%.

b) The value of the mobile phone market was EUR 0.9 billion in 1999 and it increased to slightly above EUR 2 billion by the end of 2002. The rapid market growth has been driven and accompanied by explosive increase in the number of mobile phone users and sold equipment's. As a result of dynamic growth the share of the mobile service within the telecom services increased significantly from 31% in 1997 to 52% in 2002. The expectations are that this share will only gradually increase though the spread of mobile Internet may still slightly increase its role.

c) Cable TV services represent much lower share of the market than the mentioned two other services. The value of the market in 1999 was EUR 83 million, and the increase between 1999 and 2002 was almost 60% reaching a market value of EUR 145 million. The share of this market segment in total increased from 4% to 5% thanks to the very rapid growth of mobile phone suppliers.

C.8.2. Ownership structures in the telecommunication industry

The ownership links characterise very strongly the telecommunications market in Hungary. In case of fixed line services the presence of 4 interest groups can be observed:

a) The major market player is MATÁV, owned by DT, which represents 80 % of the market

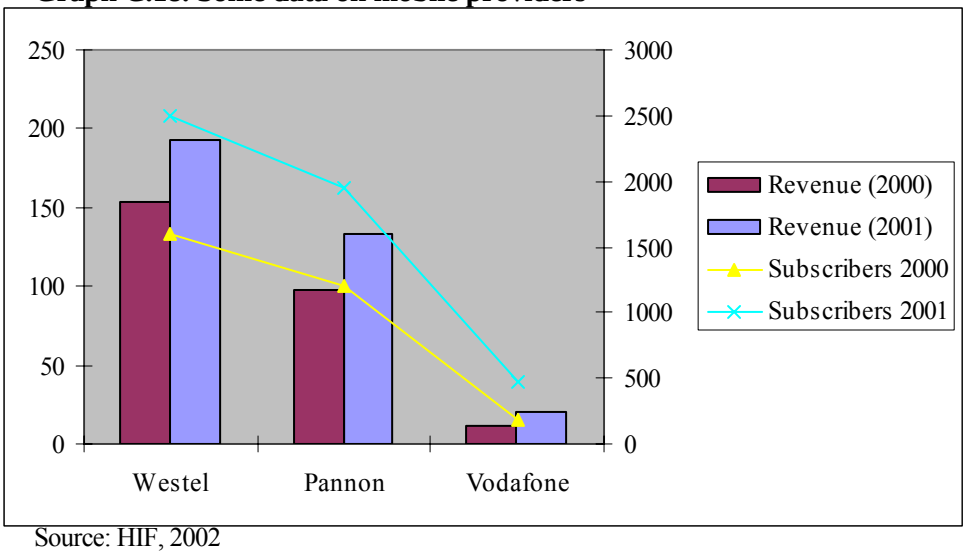
b) The second one is the HTCC group with one regional supplier, owned by MATAV

c) The third major player is UPC also with one regional supplier (owned by foreign parent company).

In case of mobile phones there are three corporations on the market:

a) Westel Mobile Telecomm company which is owned by Matáv,
b) Pannon GSM owned by the Norwegian supplier Telenor,
c) VRAM Ltd. owned by Vodafone, which entered the 2 players market somewhat late, only in 1999

Graph C.18. Some data on mobile providers



Source: HIF, 2002

The ownership structure of the four major Internet suppliers is the following:

a) The market leader Axelero is owned by MATÁV,
b) PSInet owns PSInet Hungary, which bought one of the alternative suppliers in 1999
c) GTS-Datanet Ltd. owned by GTS
d) Euroweb Ltd. owned by Pantel

The ownership structure at the three major cable TV suppliers was the following:

a) UPC owned UPC Hungary Ltd.,
b) Matáv owned MATÁV Kábel Ltd.
c) RCS and Cable Communication System owned EMKTV Ltd.

C.8.3. The infrastructure of fixed line communication

The total revenue on this market in 2001 was 368 billion HUF and the share of Matáv was 85%. The role of MATÁV may gradually change as a result of telecommunication liberalisation, which started in 2002. So far the outcome has not been too positive as the new entrants (Vivendi, UPC and Pantel) were not able to gain significant market share against MATÁV, but the process of declining gap is under way.

The number of main lines in operation did not change in recent years, and it remained around 3.7-3.75 million. On the other hand there has been a gradual improvement in the quality of these lines, as the share of ISDN lines increased from 14% in 2000 to 21% in 2002.

C.8.4. The mobile phone market

A more robust growth has been experienced on the mobile phone market, where the number of calls in 2001 reached 3.5 billion representing a 60% increase compared with the previous year, and similar development was observed in 2002.

The minute traffic in 2001 also exceeded 4 billion which represented 40% growth compared to 2000, and similar growth was recorded last year. The number of sent SMS was 810 million in 2001, while in 2000 there was hardly any observed traffic in SMS.

There has been a huge functional development behind the numbers. In recent years the introduction of SMS, MMS (2002), WAP (2001) took place, which is expected to maintain - at least in the short-run - the speed of the growth of this market segment.

The penetration on the mobile market is around 70%. The market is relatively concentrated though the shares are different in case of corporate and household subscribers. In case of corporate subscribers Westel has a two third market share, Pannon around 30% and Vodafone around 5%. In case of households the position of Pannon is better as it had 40% of all subscribers, Vodafone 10% and Westel 50%.

C.8.5. Production of mobile equipment's

The mobile equipment's are mainly supplied by Nokia, Motorola and Samsung, while in Hungary Alcatel plays also some role in the lower value added segment of the market. The relative shares are close to the global ones.

C.9. The Information technology sector: the main players.

The tables below present the main players of the Hungarian IT and CT market according to the available statistics covering 2000 and 2001. The major segments presented include the hardware producing companies the software developers, the system integrators, the producers of wire and mobile phones.

The hardware producer companies are partly subsidiaries of well-known company or are local producers[41].

Table C.1. Hardware producer companies

	Revenue (2000)	Revenue (2001)	employees 2001
Compaq	33 000	40 000	260
Albacomp	10 800	11 500	280
Human Soft Ltd.	3 762	3 871	85
Systrend Ltd.	3 720	3 700	53
Bull Hungary	3 500	4 700	50

Source: HIF, 2002

[41] Among the companies listed above only Albacomp and Systrend are in majority domestic ownership.

The software developers are almost exclusively domestic companies.

Table C.2. Software developers and traders

	Revenue (2000)	Revenue (2001)	Employees 2001	
Graphisoft	8 000	7 500	180	
Debis IT Services	4 258		130	
MÁV Informatika	3 554	4 500	550	
Online Business Informatics Ltd.	1 580	1 500	120	
Mikro Volán Electronics	1 327	1 200	101	

Source: HIF, 2002

The system integrators represent in equal share foreign multinationals and local corporations.[42]

Table C.3. Systems integrators

	Revenue (2000)	Revenue (2001)	
Compaq	33 000	40 000	
Synergon	14 250	21 500	
KFKI	15 700	21 500	
SAP Hungary Ltd.	5 687	7 120	
Montana Ltd.	4 200	6 845	
HP Hungary Ltd	11 554	13 205	

Source: HIF, 2002

The fixed line and mobile phone producers are the internationally well-known producers.

Table C.4. Producers of wire phones

	Revenue (2000)	Revenue (2001)	Employment 2001	
Siemens	72 036	71 013	1 040	
Panasonic	16 000		45	
Alcatel Hungary	3 007		80	

Source: HIF, 2002

Table C.5. Producers of mobile phones

	Revenue (2000)	Revenue (2001)	Employment 2001	
Nokia	63 000		1 500	
Ericsson	45 000	29 000	700	
Alcatel Siemens	3 007		80	

Source: HIF, 2002

[42] Synergon, KFKI, Montana Ltd. are in majority domestic, the others in foreign ownership.

The wire phone market is heavily distorted and shows monopolistic position of Matáv, while the mobile market is more competitive.

Table C.6. Wire phone service providers[43]

	Revenue (2000)	Revenue (2001)	Employment 2001	
Matáv	445 945	547 852	14 380	
Hunagro Tel	8 669		390	
Emitel	6 663	7 000	316	
Monor	6 382		201	
GTS Hungary	5 495	7 609	86	
Vivendi	40 200		1 250	
Pantel	5 000	10 000	180	

Source: HIF, 2002

Table C.7. Mobile phone providers[44]

	Revenue (2000)	Revenue (2001)	Subscribers 2000	Subscribers 2001	
Westel	153 350	193 598	1 600	2 500	
Pannon	98 400	132 800	1 217	1 953	
Vodafone	11 100	19 900	184	477	

Source: HIF, 2002

C.10. Service and industry sectors investing in ICT

Within the service sector there is a clear division between the level of investment in business and public services: while there are exceptions in terms of individual institutions, the clear difference is that while the business services heavily invest in ICT the public services generally lag behind in these investments. Among public service the level of ICT investments is especially low in public administration, while the situation is slightly better in public education and health care sector.

In case of business services three have been the most advanced in terms of ICT investments: the wholesale and retail trade and the financial services[45]. The demand for ICT in the financial sector is linked to the nature of these services and also to the heavy competition in this sector in the recent years after the initial market penetration and division period between the major players was finished. ICT investments are especially high in the banking sector, while the insurance and other financial services slightly lag behind the banking one.

The demand for ICT investments in wholesale and retail trade is explained by the spread of warehouses, megastrores and logistics centres in the country driven both by the growth of domestic demand and central geographical location of the country that allow for many companies to deploy their regional centres to Hungary. The investments in ICT recently are

[43] All of the service providers are directly or indirectly in majority foreign ownership.
[44] All of the service providers are directly or indirectly in majority foreign ownership.
[45] In some branches (retail and wholesale trade) there was a strong correlation between the evolution of gross and ICT linked investments, while in others (financial services) below the average investment rates have been accompanied by higher ICT investments, which reflects the nature of the sector.

higher in case of warehouses and logistics centre, while the wholesale trade market is relatively oversupplied due to the recent expansion observed between 1997 and 2002.

Within the industry, the major sectors investing in information and communication technologies are the ones that have decisive shares in the output and export of this sector and are heavily outward oriented. The highest levels of IT investments are recorded by the machinery industry, by electric and optical equipment producing sectors and also by the chemical and pharmaceutical industries.

The use of ICT is driven by the tough competition in these sectors, by the strong outward orientation and openness of production and sales to international trade in these branches and also by the presence of multinational firms that closely integrate the Hungarian market and production to their global networks. These factors together with the constant pressure stemming from global competition result in very significant investments in ICT.

C.11. Major sectors of innovation activity

There is a close link between the sectors that are in leading position in innovation and in terms of their capacity to use ICT in their production. Within the industrial sector, the machinery industry, the electrical and optical equipment sectors and the ICT sector itself belong to those, which have the highest R&D expenditures and are the leading ones in innovation.

There are several factors that explain the high innovation propensity and potential in these segments. First, these sectors are exposed most to international competition and as the companies sell overwhelming majority of their output on international markets, they are forced to remain competitive and innovate constantly.

Second, the companies in these sectors are mainly part of the international network of major multinational producers, where strategic decision on investment, innovation and production are made on global levels and this provides the needed synergies between their subsidiaries in the individual countries in terms of innovation and competitiveness. This also creates a continuous demand for innovation within these companies, as they have to remain a competitive and attractive site for activity within the multinational companies.

Finally, the supply of the country with well-trained and experienced labour force resulted in the shift of the regional, R&D centres of multinational companies to Hungary. This is especially the case in the machinery and electrical and office equipment sectors, where several multinationals[46] moved these centres to Hungary increasing innovation there. Besides the shift of regional innovation and R&D departments to Hungary, the supply of the well trained labour force was also a decisive factor that contributed to the increase in innovation activity in these sectors.

C.12. Concluding remarks on the future of ICT

The ICT sector in Hungary has the general strengths and weaknesses such a sector may have in a small open economy.

One of the strengths is that ICT industry seems to be integrated more to the Hungarian economy than other sectors where the presence of FDI is so overwhelming, so less dualism is

[46] The examples include General Electric, Bosch-Siemens, Suzuki among others.

observed in that sector. One reason that may explain is the high contribution of domestic human capital and the integration of local human capital to production. Another reason can be that in certain segments (mainly software, but also in some hardware) local producers have been efficient and could integrate their activity with foreign multinational companies.

Another strength comes from the synergy effect of past investments. Past investments in the ICT sector resulted in strong spill over effect to other sectors, brought in further investments, and led to renewed investments among suppliers, sub-contractors. This spill-over effect was especially strong in case of assembly type production

The weaknesses are linked to the exposure to exogenous shocks and the evolution of costs and productivity. The sector is unable to handle the exogenous shocks leading to worldwide redeployment of the production if its competitive position does not improve radically and higher value added activities do not replace the labour intensive ones. While there has been a shift towards activities with higher value added, and more sophisticated production, the dependency on labour costs remains high and this poses a general threat to the Hungarian economy and within it the ICT sector.

The future of ICT industry, which currently produces more than 10% of GDP depends on various factors. First, as the major contributors to this output are foreign companies and their domestic subcontractors, a key factor is the international competitiveness of the Hungarian economy. Recently there has been some worsening in this respect as both labour productivity increased slowed down and one could observe an accelerated catch up of wages.

The rapid increase of unit labour costs has led to the decline of ICT production those areas, which are labour intensive and strongly depend on the global economic conditions. In order to expand these activities in Hungary, there is a strong need to increase competitiveness and keep costs pressures under control as well as to increase the contribution of the higher value added sectors within the ICT industry.

On the supply side another important precondition for this mentioned structural shift lies in the increase of human capital and provision of the adequate supply of high quality human and physical capital. On the demand side one may not expect that the domestic demand will be the driving force of the ICT industry due to the size of the country and also to the strong openness of the sector.

C.13. SWOT analysis on the industrial development and competitiveness of the Hungarian economy

Strengths	Weaknesses
1. Diversified and up-to-date industrial structure 2. High stock of FDI 3. High productivity growth, catching up from low levels 4. Services are well developed, especially the financial ones	1. Volatile private capital formation 2. Significant differences in productivity between domestic and foreign corporations 3. Poor quality of public services 4. Regionally different telecommunications services
Opportunities	Threats
1. Increased intra-industrial trade and specialisation linked partly to EU accession 2. Expanding services, 3. Good regional location and perspectives for infrastructure development	1. Poor effect of EU accession on the SME sectors 2. Speed of catch up in attractiveness and competitiveness aside wages, and tax concessions,

Strengths

There are four major strengths in the recent industrial development and competitiveness of the Hungarian economy. First, as a result of economic transition strong and broad based industrial sector has been established, which didn't exist to the current extent prior economic changes? The diversified industrial structure produces mainly medium and high value added products and the structural features of both production and exports are better, compared with the level of development of the Hungarian economy.

The second strength is the pool of FDI, which has a backward and a forward-looking element. Looking backward, it has contributed to the described structural, organisational and skill changes; upgraded the domestic productive sector and has been the main driver of growth and modernisation. Looking forward, the presence and experience of multinational corporations allows for future new capital inflows, stimulated foreign investors to relocate their regional and R&D centres to Hungary with their positive spill over effects.[47]

Third, the productivity growth in recent 5-8 years was spectacular and was the main driving force behind output growth in manufacturing besides capital deepening. While output growth is certainly dependent on the output increase of manufacturing which hinges on export sales, these increases seem to be long-term phenomena and will drive up further industrial activity.

[47] While some production is reallocated to lower wage countries, FDI is expected to grow, stimulated by geographical proximity of major markets, expected reallocation of produciton strcutures within enlagerd Europe, gradually improving competitiveness of the Hungarian economy.

Fourth, business services are highly developed, especially the banking and financial ones in general. This is true despite all weaknesses of financial intermediation and lack of certain forms of financing.

Weaknesses

Insufficient level of capital accumulation

The insufficient level of capital stock results in rapidly growing but still moderate level of investments. While providing finance to the private sector is no longer a problem, a more business friendly environment with simplified regulations and more transparent rules is needed. The volatility of the business environment inhibits domestic investments: domestic interest rates remain high in comparison with the EU, high collateral requirements and high risk premiums for businesses limit the growth of the productive sector.

Productivity gap between domestically owned and multinational companies

The productivity gap is mainly caused by the low level of capital accumulation, rising labour costs for qualified workers and low investments in new technology among the domestically owned firms, while foreign owned firms have a cutting edge in these respects. Within domestically owned firms there is group of middle size firms with outdated technology, who compete in international markets in low value added industries, and were not replaced by more efficient enterprises.

Poor quality of public services

The quality of public services is very low in Hungary, which is a significant drag on industrial and economic growth. Public sector is excessive, public employment above the efficient levels, public investments are low and institutions do not function appropriately. There is a need for the reform of public institutions and fast improvement of the quality of their services, as their current level has become an obstacle for growth and modernisation.

Regionally very different development level of telecommunication infrastructure

The quality of the telecommunication and network infrastructure is a bottleneck to Internet access. The density of telephone lines varies significantly, spreads and depends on the strength of the economy of the area concerned. Broadband services are only accessible in the larger cities. The Hungarian telecommunications infrastructure needs to be comprehensively developed both in terms of bandwidth (data transmission speed) and improved coverage. The lack of a regional wide telecommunications infrastructure is a major obstacle for the economic development.

Opportunities

The opportunities (and also the threats) are partly linked to the EU accession and partly to endogenous growth of the sector. First, one may expect further increases in intra-industrial trade and specialisation of production following the EU accession of Hungary. This intra-industrial trade is already above the level that would be consistent with Hungarian level of economic development and its further increase is likely.

The second opportunity is ahead of the service sector: EU accession, new funding opportunities, increasing domestic corporate and household demand will push up the demand for services and will accelerate their growth.

Finally, Hungary has an excellent geographical location, which will be conducive to infrastructure development among others. The central location of the country could also stimulate the redeployment of R&D, human resources, logistic centres of various multinational companies to Hungary from other European countries giving further boost to FDI and growth.

Threats

Two potential threats may effect industrial development. One is the expected negative effect of the EU accession on the SME sector, which is already somewhat behind the general average level of development. It is generally feared that increased competition, observance of acquis will require huge additional investments from the domestic market players and most of small and medium sized enterprises will not be in a position to meet the preconditions and will exit the market.

The second threat is linked to a time factor, namely to the speed with which the country will be able to find new sources of attractiveness to domestic and foreign investments, competitiveness growth after the recent significant wage and labour costs increases as well as after the entry to the EU will disallow to continue the past practices of corporate support.

D. Presence of the most relevant economic activities for IST applications

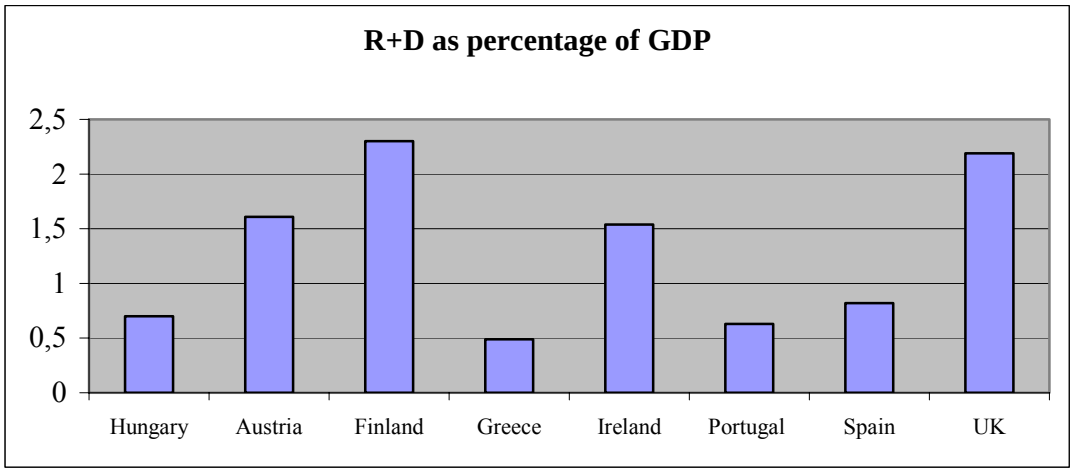
D.1. Trends in R+D expenditures and structures

The total amount of R&D spending is very low

As a result of the economic crisis accompanying the transition in Hungary, the proportion of spending on research, development and innovation compared to GDP dropped significantly at the beginning of the 1990s to less than half the previous rate. (From about 1.61% to 0.67% of GDP). The figure has remained at the lower level throughout the second half of the decade. This unfavourable trend was broken in 2000 when the proportion of GDP increased, mostly as a result of state subsidies.

In 2001 the figure was 0.94%. However, this ratio (and particularly in absolute terms) is still very low and half the EU-15 average of 1.9%. To compare the similar level was in 2001 0.49% of GDP in Greece, 0,63% in Portugal, 0.82% in Spain but 1.15% in the Czech Republic and 1.54% in Ireland.

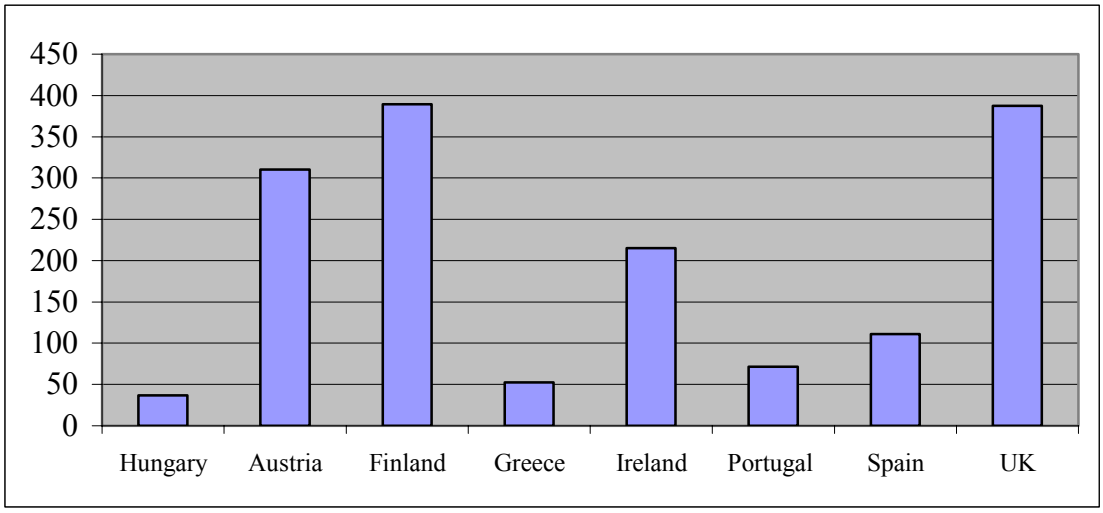
Graph D.1. R+D expenditures in international comparison.



Source: Eurostat

If measured by R&D spending per capita the differences between Hungary and these mentioned economies are even more striking. While in 2000 the per capita spending was around 46 US dollars in Hungary, it was 78 US dollars in Portugal, 120 US dollars in Spain, 58 US dollars in Greece, while in Ireland was 225 US dollars. The differences in per capita term show a bigger distance between Hungary and the OECD countries than measured in relation to GDP.

Graph D.2. R+D expenditures per capita in international comparison.

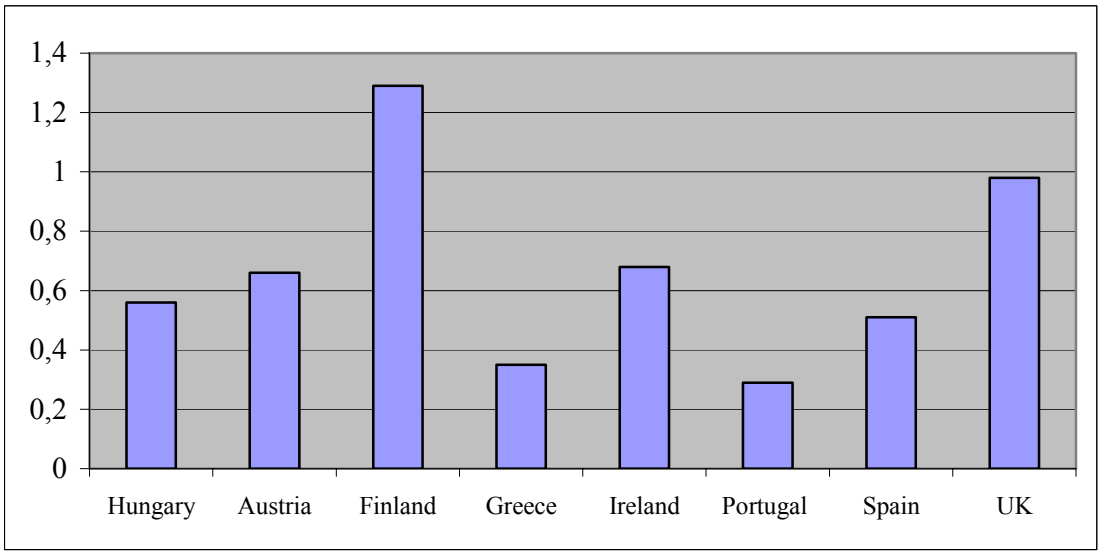


Source: Eurostat, KSH, 2002

In order to close this gap in spending, resources from the state and private sector need to work in partnership and concentrate on the key areas for R&D and innovation to reach the EU average.

While the total number of employees occupied in areas linked to R&D activities has declined significantly between 1990 and 2001, in international comparison their share in total employment is higher than in comparing the share of R&D expenditures to GDP. In 2000 in Hungary 0.56 % of the labour force was employed in R&D activities, while the similar figures for Greece was 0.29%, for Portugal and Spain 0.51-0.53%, while in case of Ireland was 0.68% and the Czech Republic 0.9%.

Graph D.3. The share of R&D employees to total



Source: Eurostat, KSH, 2002

These differences point to the different contribution of this sector to employment but also to the productivity differences among the sectors. Out of all OECD member states only in 7 is the share of public expenditures above the private sector contribution: in Iceland, Italy, Poland, Portugal, Mexico, Turkey and Hungary, while elsewhere the private sector contributed more to funding.

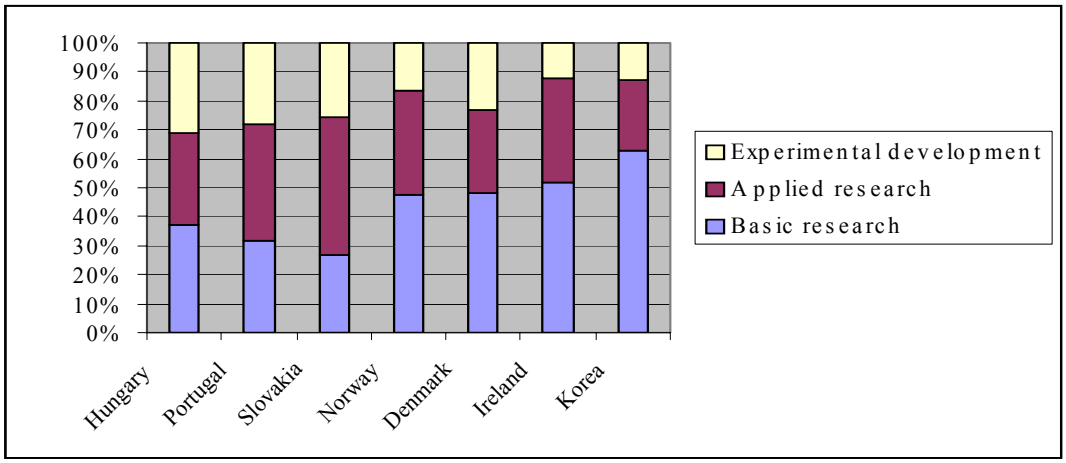
If looking at the composition of the employment in R+D related activities, further interesting shifts could be observed during the 1990s. First, as the table shows the total number of employees between 1990 and 2001 declined from 36 000 to less than 23 000: in the first half of the 1990s transition crisis wiped out significant number of workplaces, and the number of employed declined by 1997 below 20 000. Since the second half of 1990s there has been a gradual increase in employment, which allowed in 2001 to reach 22 942 workplaces in these activities.

Second, the composition of employment is far from appropriate. The employment losses in the R&D activities in 1990s occurred almost exclusively in the corporate sector and among public R&D institutions: while in the former sector in 1990 13 000 employees were employed, their number declined to 6 700 in 2001, and the same decline was almost similar in the latter case from 11 500 to 7 500. The only institutions which were able to maintain their employment at around 8 800 employees wee the public and within them the academic research institutions.

These shifts show that the exiting state owned corporations reduced the number of R&D personnel significantly, and the private sector was not developed and determined to take the lead and substitute for the loss of R&D personnel in the corporate sector. As a result of this in 2001 only 28% of the personnel was employed in the corporate sector, 33% in the research and development institutions and 49% in public research institutions.

A final weakness of Hungarian R&D is shown in the division of R&D activities between basic and applied research s well as experimental developments. While in international comparison the share of basic research is not low, comparing to major European economies it seems to be below their average. The Hungarian pattern of R&D composition s closer to the pattern of economies with similar level of development while more advanced economies spend more on basic and less on applied research.

Graph D.4. The division of R&D spending between different types of research

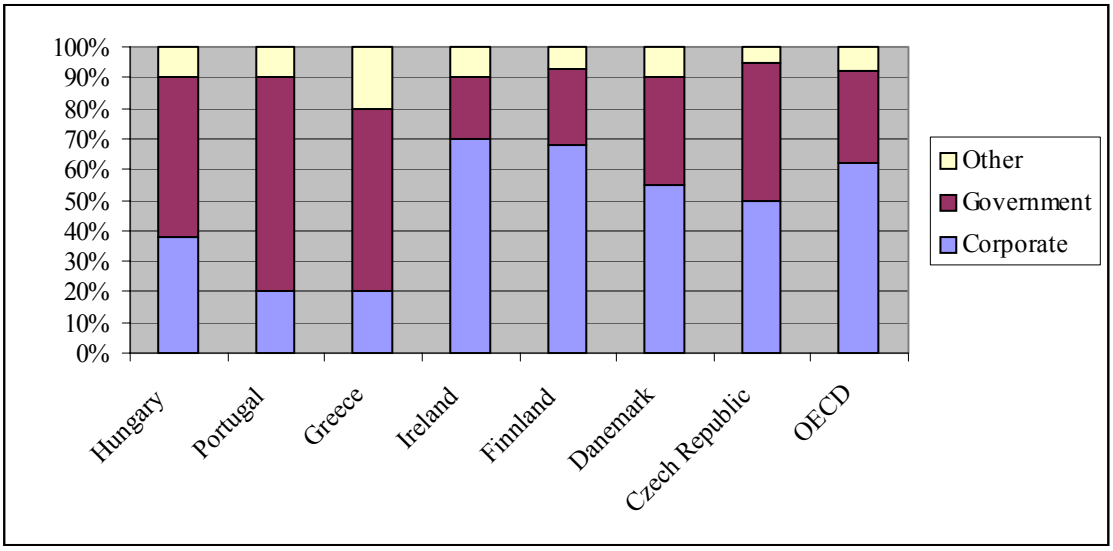


Source: Eurostat, KSH, 2002

D.2. The R&D spending is predominantly state expenditure

In addition to the low level of research and development expenditure the financing structure for this work is also unfavourable. Over half of R&D expenditure is provided by the business sector in developed EU countries, in Hungary the figure is far less. The share of the public sector expenditure for R&D in 2001 was 53.6% and in the business sector it was 34.8%.

Graph D.5. The division of R&D expenditures between major sectors



Source: Eurostat, KSH, 2002

In Hungary the division of R&D expenditures between the major sectors is similar to the economies with similar level of development as Portugal or Greece, though in the Czech Republic corporate sector spends more than the government one. Comparing the sector composition of R&D expenditures in Hungary with the OECD average it stands out that on average the share of the corporate sector is much lower in Hungary than the average of OECD and more advanced economies.

In advanced economies, businesses in domestic ownership usually spend a greater portion of their sales revenues on R&D expenditure than comparable companies in foreign ownership.

The reverse is true for Hungary: the current R&D expenditure within the domestic corporate sector is extremely low, (0.07% of the production value) whilst foreign owned companies in Hungary spend more (0.25%). 65% of the R&D spending is concentrated in Budapest, and is much weaker in the regions. However, Budapest accounts for 61.8 % of the researchers whilst the regions account for the rest.

The state dominance in R&D spending and the low return on corporate R&D investments contributes to the under achievements in this area, especially for companies in Hungarian ownership. To resolve these problems state interventions should target support at the key sectors and profitable businesses and seek a far greater collaboration between the state, education and business sector. State funding should aim to ‘pump-prime’ effective corporate investment.

D.3. The R&D infrastructure is outdated and research teams are an ageing population

Financial under investment, outdated infrastructure and ageing population involved in R&D activity have led to a significant decline since the 1990's. Between 1987 and 1998, the ratio of researchers between 30-49 years of age dropped from 65% to 52%, yet the ratio of those over 50 years increased from 22.5% to 35%. As demand for highly qualified research and development professionals grows world-wide the migration of highly qualified professionals represent a serious threat to scientific research in Hungary.

This is exacerbated by the low wages paid to Hungarian researchers. The decline in R&D investments during the 1990's, also caused the equipment to become outdated, as the research establishments failed to modernise and keep pace with technological changes.

Hungary has joined the EU's 5th Framework Programme from 1998 to 2002 and 6th Framework Programme (2002 to 2006). However, successful international co-operation is hindered by the obsolete equipment and facilities within the publicly financed research establishments. This inhibits the Hungarian researcher's ability to fully participate in the various R&D programmes in the EU on an equal basis.

Under-investment is therefore hampering the advancement of the R&D sector, inhibiting partnership arrangements and turning the results of research into successful business innovations and opportunities. R&D and Innovation could concentrate on a mixture of developments to guide and direct key research, promote financial investment and foster productive partnerships and co-operation.

D.4. The link between the R&D sector and the business sector is weak, the spin-off activity is not intense

The lack of networking and knowledge transfer (innovation centres, technology transfer centres and technology incubator houses) is evident and restricts development. The research and development results lack effective implementation and ideas are rarely brought to market. If they are implemented, there can be significant delays before they are productive which affects profitability. Inter-company co-operation is weak and the lack of pooling and sharing of knowledge restricts partnerships and joint ventures. R&D activity amongst SMEs is very poor and the creation of spin-off companies from R&D activities is very low.

In Hungary an 'ivory tower' academic research activity is prevalent and the good ideas often fail to reach the commercial market. This weakness is explained by the inherited institutional structure, lack of experience and practical commercial sector knowledge, lack of knowledge about business start-up and enterprise opportunities. A strong spin-off activity for R&D restructuring could be the development of environment friendly technologies that will aid economic development.

D.5. The innovation ability of the private sector is low

The weakness in the R&D sector has resulted in less commercial activity. The knowledge production, transfer of technology and the research and innovation activity does not take the form of protected intellectual property. In 2001 106 patents were registered in Hungary and 173 Hungarian patents were registered abroad. This is only one fifth of the number registered in 1990. Eurostat data for 2001 shows Hungary is significantly behind the European average

concerning the number of patents per one million residents (80 in Hungary - 161 in Europe, EPO).

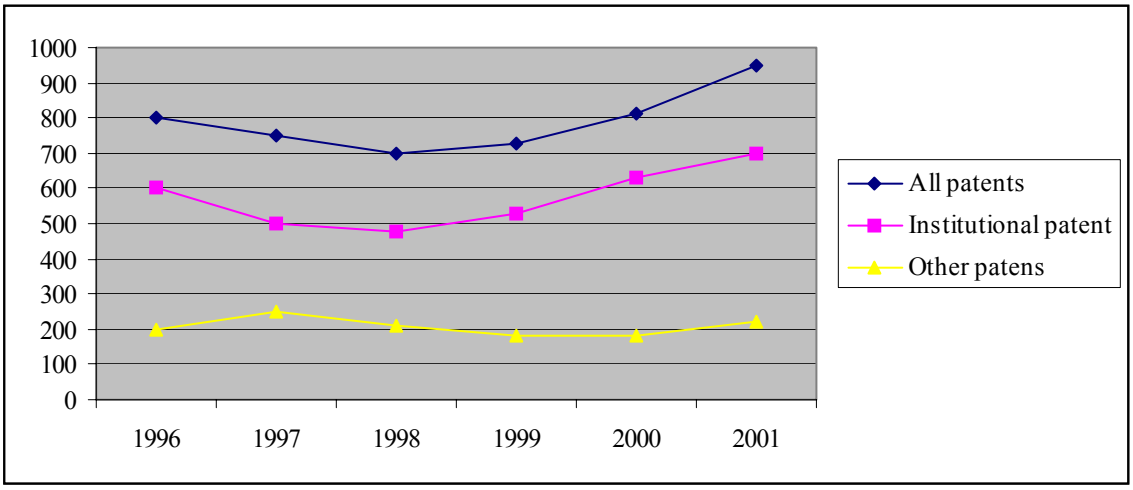
The figures clearly show a weak innovation activity stemming from low spending on the R&D and the under-developed innovation systems, which requires changes to be made to, and increased investment (financial, infrastructure and human resources) as well as a framework for R&D and innovation ability.

Besides the low innovation ability of the private sector another weakness of the research and development activity in Hungary is the inappropriate government support and stimulus given for this activity. According to a recent survey by the OECD the member states employed in the late 1990s altogether 52 different support schemes and out of them 40% were different tax concessions. In Hungary in 2000 the share of tax related stimulation measures was 5% and most of the mentioned 52 methods were either not applied or only with limited efficiency and scope.

D.6. Patents are on rise

The number of patents submitted by Hungarian institutional and other sources is relatively low in international comparison. As the graph shows the recent evolution of the patenting activity closely followed the economic cycle. After the economic restrictions imposed by the 1995 stabilisation package the number of patents submitted, mainly by the institutional sources, has declined considerably compared to the level in 1995-1996. As the economy overcome the shock caused by the harsh stabilisation and adjustment package the number of patents started to increase, again in the case of institutional sources, while the number of patents submitted by other sources remained relatively stable.

Graph D.6. The number of patents



Source: KSH, 2002

D.7. SWOT analysis on the relevant economic activities for IST application

Strengths	Weaknesses
1. High level research tradition at university (academic) level 2. International companies with R&D activities are locating into Hungary	1. Low amount of R&D expenditure 2. R&D is predominantly state funded 3. R&D infrastructure is obsolete 4. Low innovation activity of the corporate sector and weak links between R&D and businesses
Opportunities	**Threats**
1. Growth of communications and IT sectors 2. Increasing demand for these services 3. Increasing weight of knowledge intensive sectors	1. Private sector may increase R+D hesitantly, and public sector will be constrained by adjustment needs

Strengths

The three major strengths the Hungarian economy has in the area of economic activities relevant for IST application are the level of academic and university research, the presence and increasing activity of companies with internationally recognised R&D activities and the integration of domestic research to international networks.

The first has traditionally been one of the comparative advantages of the Hungarian economy and as human capital a major source of economic growth. The second factor has emerged recently, when increasing number of well established international corporations started to move their research and development centres and networks to Hungary to utilise the presence of human capital, its low costs and the infrastructure and location opportunities.

Weaknesses

Against the mentioned strengths one may determine four major weaknesses. One of them is the low level of R&D expenditures both in relation to GDP and on per capita level. This is especially striking in international comparison. Second weakness is the dominance of the state funded R&D activity in Hungary and the declining contribution of the private sector. Moreover the innovation activity of the corporate sector ahs generally remained low and there has been a weak link between the corporate sector and R&D activities.

Finally, an important weakness, which has however so far only partially reduced R&D has been associated with the outdated R&D infrastructure and the lack of financial backing to renovate it.

Opportunities

Three opportunities may shape the development of economic activities relevant for IST application. One of them is the increasing demand for IT and telecommunication services. Liberalisation, increase of incomes, demonstration effects will all lead towards growing demand for such services. Second, utilising the competitive advantages of the economy as well as the recent experiences and short-term historical lessons, the IT and communication sectors face rapid expansion of markets and output in forthcoming years.

Finally, building on the synergies between research and production as well as on the human capital accumulated in the country there is an increasing weight in the economy for knowledge intensive sectors.

Threats

One threat is that the private sector will not be able to increase R+D expenditures fast, while the government will be constrained by the pressures coming from fiscal adjustment, meeting SGP and Maastricht criteria, which may force it to reduce the politically less costly items in the budget, among which R+D expenditures play an important role. Thus it may become difficult to increase R+D expenses above the current levels.

E. Information society technologies (IST) penetration

E.1. Introduction

This chapter deals with the penetration rates of the information society technologies, divided into two subsections: the supply side of the IST or the state of IST infrastructure, and the demand side, the use of IST in different sectors of the economy, namely the household, government and corporate sector. The chapter uses different data sources. If available, official data collected by the Hungarian Central Statistical Office was used, but the sector also relies heavily on the recent monitoring report carried out by the Ministry of Informatics and Telecommunications to support the initiative of the Hungarian Information Society Strategy (referred to as MITS in the following chapter). For international comparison, the recent eEurope+, 2003 monitoring report, or the SIBIS 2002/03 report was used, and in some cases, journal articles about related research results were used to underpin the statements. Most data are for the year 2003 if not stated otherwise.

E.2. Infrastructure of the IST

On one hand, the indicators of the IST infrastructure penetration ratios show the current state of information society from the supply side. On the other hand, there is the demand side of the use of IST technologies. The penetration ratios of fixed and mobile telephony, cable television service, the use of PCs and the number of internet service providers show a favorable picture than the demand side of the IST, the internet penetration ratios and the structure of internet usage.

In the EU-15 a boom of IST infrastructure and usage has been experienced in the last decade. In Hungary, this could been only followed by the field of fixed telephone network that could catch up with its historical drop behind to a moderate 36% penetration rate, the mobile telephone services, that were first introduced in the beginning of the nineties, and still experiencing an increase in the demand. There is a quite wide access to cable television networks. The internet service providers have a relative well developed but rather concentrated market. The lag is clear in the PC penetration ratios and the number of internet connections.

E.2.1. Telephony

The supply side of telephone network was historically under the demand in the years of transition. The waiting period for getting a single telephone line could be measured in terms of years. The state owned postal company was the operator of both telephone service and nationwide broadcasting service until 1989, when it was split into three individual firms and was prepared to be privatized separately from Magyar Posta. Later in 1993 the telecommunications service provider was privatized as Matáv Rt, to Deutsche Telecom and Ameritech International, and was introduced to the Hungarian Stock Exchange and NYSE simultaneously. Even the company is fully private since 1999, the state still has a share with veto authority. Besides the ancestor of the former state owned company, 13 local telecommunications operators could gain access to the network.

The first phase of the decade the legal regulation was a concession system that binded the service provision to the permission given by the telecommunications authority. This phase was also experiencing a very dynamic growth and modernization of the fixed network, as there was a very strict rule of annual development rates implemented into the concessional contracts. The

13 firms gradually merged with each other and in 2003 there is five LTO left. In 2001 the system of concessional contracts was over, and the market was fully liberalized for all service providers with or without an own network. This was implemented with a new law based on and harmonized with the New Regulatory Framework of the EU. This law was followed by a new, even more liberalized regulation in 2003, with a strong and independent authority[48] and measures against incumbent operators with significant market power, cost-based interconnection an unbundling prices and international benchmarking possibility on the prices used by the service provider with significant market power. Full carrier pre-selection is introduced except for local calls, and number portability for both mobile and fixed subscriptions. The prices of fixed telephone are expected to fall as a result, but according to the most recent analysis there is a threat of the development stopping simultaneously.

The development of the fixed and cellular system is illustrated by the number of subscriptions and traffic shown in Table E1.

Table E1. The development of mobile and fixed network

	1996	*1998*	*2000*	*2002*
Number of main lines (thousands)	2 651	3 385	3 801	3 670
Number of main lines per 100 inhabitants	26.1	33.5	37.3	36.2
Number of mobile subscriptions (thousands)	473	1 034	3 076	6 886
Number of mobile subscriptions per 100 inhabitants	4.7	10.2	30.7	67.8
Calls initiated in the fixed network (millions)	3 433	4 144	4 191	3 728
Calls initiated in the cellular network (millions)	532	949	2 258	4 399

Source: KSH, 2003

In 2003 there were 3.6 million telephone subscribers that mean a penetration rate of 35.6%. In an international comparison this is a rather poor result, well below the EU-15 average. Luxembourg has the highest rate of 79.8% and Germany has 65.9%. From the CC-10 countries, the highest is Malta with 52.7%.[49] The fixed telephone penetration has an importance in the access to broadband internet connection (which is very low in international comparison), and because of technical limitations cannot be fully substituted with mobile phones of the second generation. Widespread access to broadband internet is therefore threatened by the low penetration rate of fixed telephone subscriptions, and in addition to this, the number of fixed lines gradually decreases since 2000. The growth of internet subscriptions cannot offset the effect of customers subsidizing fixed with mobile phones. This can also be due to the high prices of phone access in international comparison. The network is digitalized up to 90%.

The fixed phone monthly rental charge is the highest amongst the CC-10 countries with 24.3 EUR/PPP. The traffic prices are also relative high, for example the price of a 3-minute local call is 26.7 EUR cents/PPP that is almost double than the EU average of 14.5 cents.

The first analog cellular phone service was introduced in 1991, and was followed by two digital GSM and a DCS operator in the middle of the decade. The first analog and one of the digital service providers is in the interest-group of Deutsche Telecom, and the other is owned by a Scandinavian holding, and the youngest service provider with the most dynamic growth result is owned by another global service provider, Vodafone. Paging service was also introduced in

[48] www.nhh.hu
[49] IBM

the beginning of the decade, but could not gain significance, and the operation was stopped in 2003, together with the analog mobile phone service provision.

The mobile phone market is highly competitive, and shows a dynamic growth rate from the beginning on. The number of mobile subscribers reached 7.9 million, a penetration rate of 78.6% of which 78.4% is prepaid[50]. The turnover of mobile services is growing with a fast pace, SMS and MMS services are gaining importance. The access to the internet via mobile phone is also getting significant amongst other ways of access. Even two of the three service providers are identified as significant market power operators due to their market share, the movement of prices does not underpin the need for regulation. Prices of the cellular service are close to the EU-15 average.

Even after the bad experiences in the EU countries, the preparation for issuing 3G license to mobile services has already started, the GPRS, and in some small areas EDGE system is already working to improve the bandwidth of mobile connection.

Regarding the interconnection prices, the new regulation introduced a LRIC based calculation for the significant market power service providers. The reference interconnection offers are currently under revision, but the high prices are expected to change. The interconnection prices before the new regulation were significantly above the EU average. For example a double traffic fixed to fixed interconnection in terms of EUR cents was 2.54, the corresponding number for the EU was 1.74 cents.[51]

On the market of leased lines, Matáv is identified as a significant market power operator. All local telecommunications operators and some alternative service providers with backbone networks offer leased line services, and the market is highly competitive. All types of access speed leased lines are available in Hungary, but in comparison to the international prices, at a rather high price level. For example a national leased line with 2Mbit/sec bandwidth and 2 km length is 12930 EUR in comparison to the EU average of 6697 EUR. This number refers to the incumbent operator's price, some alternative service provider offer prices 30-40% below this amount.

The total value of the telecommunications market was about 3.7 billion EUR, 41% of which is fixed, 48% mobile and about 8% is the data segment including leased lines.

E.2.2. Cable television

The cable television service provision is well developed in Hungary[52]. According to the latest available official data 424 service providers exist on the market, which includes private enterprises and some municipalities (22% altogether). In contrast to the great number of service providers, the market is rather concentrated. The five biggest provider’s share 72% of the market revenue, and 64% of the flats connected to the network. Service provision is not subject to authorization process, the market is fully liberalized. The latest regulation modified the rule that prohibited service providers to gain more than 1/6 of the market share in terms of subscribers in a single area to 1/3 and decided to fully erase it by the end of 2004 as it is not compatible with the EU regulation. The aim was to prevent telecommunication operators to gain a market share close to monopoly in both telephone and cable television service supply,

[50]KSH, 2003
[51]IBM Graph 47.
[52] KSH, 2004

and to increase competition between internet service provision through telephone network and cable television network.

The cable television network system is 94 thousand kilometers in length, 21% of which is capable of two-way communication, internet access and other interactive services. 45% of the backbone networks use fiber optic technology. 41% of the settlements in the county and 42.5% of the flats are connected to a cable television network. The cable television market has a total of 1.7 million subscribers that means 17% of the population. A total of 1400 different program packages are available to the subscribers with 400 different channels.

The market has gone through a consolidation recently. The municipalities are treating back from this kind of service and giving their networks to private enterprises for operation. The investments to cable television are touching the bottom, but it is expected to change as the result of the deregulation mentioned above. The biggest operators UPC and MatávKábeltv (a subsidiary of the biggest incumbent telephone network operator) are expected to invest into their networks because of the tax allowances given as the part of the MITS strategy for broadband internet access infrastructure.

The broadband access to the internet by means of the cable television network is 77 thousand altogether, this is 11% of the total internet subscriptions.

E.2.3. Internet service providers and places of access

One of the main indicators of the information society infrastructure is the possibility of connecting to the internet that can be measured by the number and structure of internet service providers (ISPs) and the number of internet connections.

At the end of 2002 there has been a little more than 80 ISPs in Hungary,[53] most of them telecommunications service providers in their main activity. About eight ISP can be regarded big with more than ten thousand subscriptions. The market is therefore rather concentrated. The ten biggest ISP owns 90% percent of the subscriptions and 80% of the net revenue of service provision. The incumbent telecommunications operator's share of the market is about 44%. The net revenue is growing in a fast pace. From 2001 to 2002 the index is 168%, but the revenue from internet service is only 5.7% of the net revenue of the companies in total.

The total number of subscriptions was 674 thousand in 2003[54] (0.7% of the population). This means more than 50% growth in a single year. 52.8% of the subscriptions were public switched connection using a modem, and around 17% is xDSL broadband in type. The penetration is rather low in comparison to the EU average, but the structure is more or less the same, with a relative high broadband ratio. According to the eEurope+ household survey 2003, 13% of the home computer users in candidate countries benefit from broadband connection. The xDSL technology is still in its early stage in Hungary, but quickly expanding. Form 2002 to 2003 the number of xDSL connections more than tripled (358%) and the number of cable TV internet connections more than doubled (247%)

As a part of the MITS strategy, tax allowances are given to local telecommunications operators for building the infrastructure for xDSL connection especially in rural areas. As a target,

[53] KSH, 2003
[54] KSH, 2004

100 000 subscriptions had to be reached by the end of 2003, and was accomplished easily.

The internet penetration is rather low in comparison to the other CC countries[55]. The internet user penetration is around 17%, and the household penetration is around 12%. Slovenia is the highest with user penetration of 42% and household penetration of 38%, but still way under the EU median of 45%.

The costs of internet access are above the EU maximum. For example a 20 hours off-peak time modem connection is about 44.2 EUR/PPP 19.7 EUR of which is the price of the internet service and 24.5 EUR is the PSTN service price. The EU maximum is 18.8 EUR for a comparison. In terms of an average monthly household income, a 20 hours peak dial up connection is about 10.8% according to the calculation of the ITU[56].

The questions of internet security has became one of the main concerns as more and more daily activities take place in the virtual space. This is not only the matter of personal privacy but also has financial interest as highly sensitive information is being exchanged through the internet. The future of eBusiness also lies in a secure network. The number of secure internet servers has a high correlation with the awareness of security. In Hungary the number of secure internet servers is about 36 per million inhabitants. That is exactly the CC-10 average, and lies beneath the EU-15 average of 48[57]. According to the eEurope+ household survey of 2003, 50% of the interviewed internet users have come across ICT security problems in the last 12 months, 89% of which computer virus matters and 11% abuse of personal information. About 15% of all internet users have taken some kind of internet security precautions.

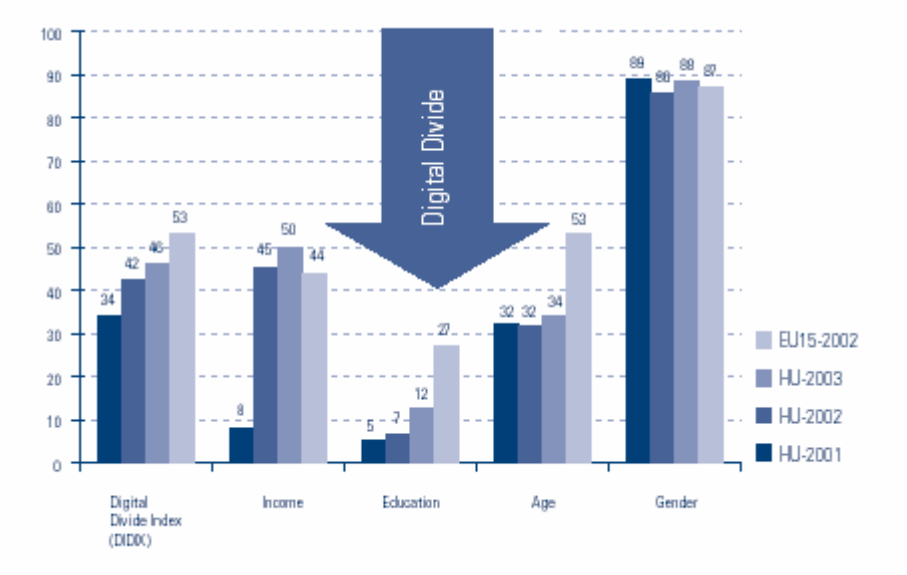
The new regulation of the telecommunications sector has an effect on the market of internet service provision. The regulation of local loop unbundling for xDSL service and the connection of reference unbundling offer to long run incremental cost counting method increase the probability of the broadband internet prices to sink.

E.2.4. Digital Divide

There are many aspects of the phenomena referred to as the digital divide. The society is split into the information rich and the information poor and it is illustrated with a single digital divide index[58] with reference to the effect of income, education, age and gender. The index for Hungary is slightly increasing and has a value of 46 in 2003[59].

[55] IBM
[56] www.itu.int
[57] eEurope+, 2003
[58] "The digital divide index (DIDIX), a compound index comprised of four indices, measures diffusion of computer and internet access and use amongst the four identified "at risk" groups in relation to the population average. It provides a valuable insight regarding the picture at the EU level over time. The lower the Index value the more severe is the divide, with parity resulting in a value of 100." SIBIS, 2002/03
[59] IHM, 2003 The same value calculated by the SIBIS, 2002/03 report is 36.

Graph E1. Digital divide in Hungary and the EU, 2001-2003



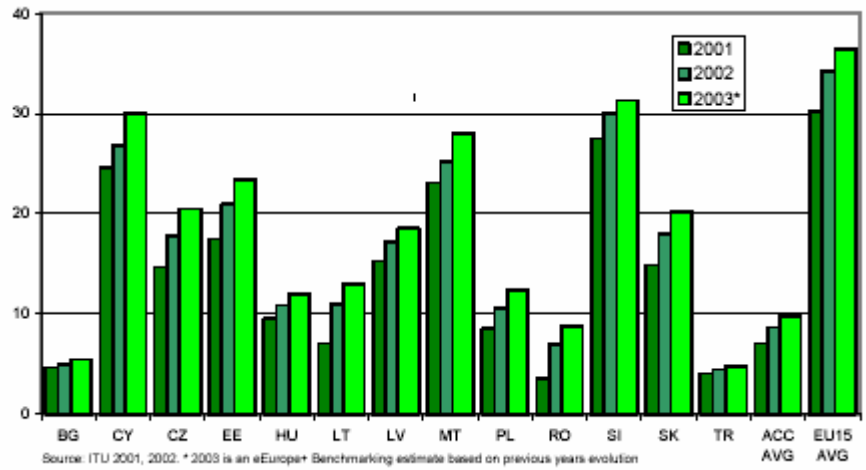
Source: IHM, 2003

Young and educated people are more likely to have access to take part in the information society than others. The educational divide has a value of 18 according to the SIBIS pocketbook.

PC penetration rate is one of the key infrastructural issues of the digital divide. The rate has been slightly increasing, but still lagging behind that of the EU-15, 12% in comparison to the average 35% in the EU-15[60].

Overall, it can be assessed that both in terms of internet users and PC penetration rate per population the gap is still significant between Hungary and the EU-15 countries.

Graph E2. Number of PCs per 100 inhabitants

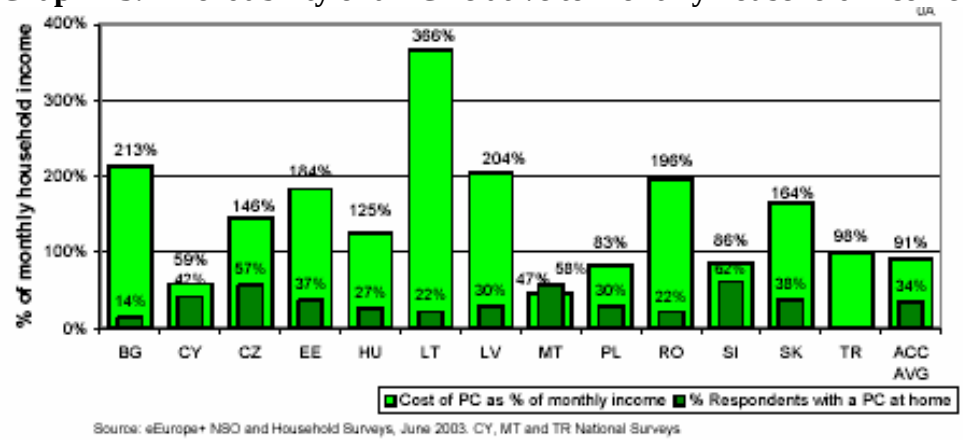


Source: eEurope+ monitoring report, 2003

[60] eEurope+, 2003

One of the main reasons for the low PC penetration is the affordability of a computer relative to the average monthly household income. In Hungary, a PC is about 125% of the average income of a household, and with this, it is above the average of the CC-12 countries index (91%)[61].

Graph E3. Affordability of a PC relative to monthly household income



Source: eEurope+ monitoring report, 2003

ITU uses a single index to measure the ICT access potential of a country, the Digital Access Index (DAI). This index includes variables as affordability and education as well as infrastructure, usage and quality such as percentage of broadband access. The countries are then divided into subgroups like high access, upper access, medium and low access. Hungary is in the upper access category with an index value of 0.68, and with this it is the fourth in the region after Slovenia (0.72), Estonia (0.69), the Czech Republic (0.66), and it is followed by Poland (0.59)[62].

E.3. IST usage

The main inhibitors of IST application boost are on the demand side. The indicators suggest, that the lack of ignorance and the financial boundaries are the keys for the low internet penetration rates in the household sector, and the lack of legal framework, the lack of digital signature in the government and private sector.

E.3.1. IST usage in the household sector and by individuals

The key issues of IST usage in the household sector is the overall internet and PC use in terms of percentage of the inhabitants, the main purposes of internet use, computer literacy and the main inhibitors of IST use amongst the people without internet access.

According to the latest eEurope+ monitoring report, the main problem of the IST use in the household sector is not the lack of infrastructure, but the ignorance and fear of the relative new means of communication.

[61] eEurope+, 2003
[62] www.itu.int

E.3.1.1. Infrastructure

The report assesses that as an average, 90 percent of all households have some form of telecommunications that is capable of providing access to the internet, 72 percent with fixed telephone, 69 percent with mobile phone and 53 percent with cable television network system. Despite this, the connectivity to the internet is low, as seen below.

E.3.1.2. PC use

The use of PC is the other key issue. According to the Bell Research sample-based survey[63], 36% of the population above the age of 15 uses a personal computer on a regular basis that is a rather low number. The age has a significant effect on the use as seen on the Graph.

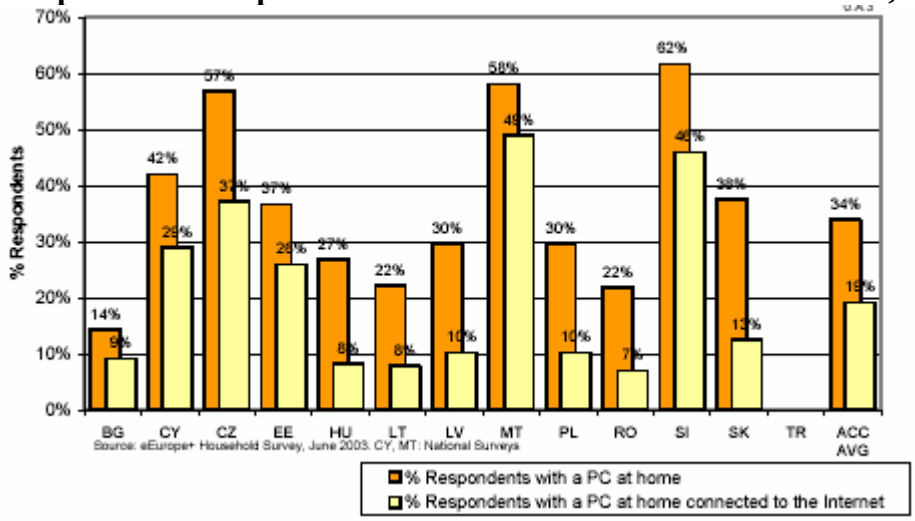
Table E2: The use of PC as the percentage of the total age group, 2003

	Age groups					
	Total	*15-24*	*25-34*	*35-44*	*45-59*	*60+*
PC use (percent)	36	80	44	50	23	2

Source: Bell Research, 2003

27% of the population has a PC at home, and about 8% has a connection to the internet according to the latest eEurope+ monitoring report. The EU average is 34% and 19% respectively.

Graph E4. The respondents with PC and Internet access at home, 2003



Source: eEurope+ monitoring report, 2003

In Hungary 61% of the PC users use it at home, 41% at the working place and 35% at home (multiple answers possible), and most PC users consider the effect of the computers of education, work, and entertainment positive.

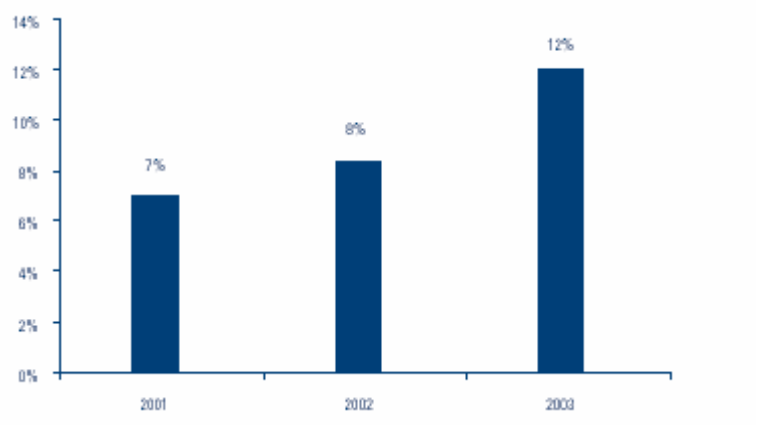
The main reason for not using a PC is the ignorance and the lack of computer literacy rather than the financial matters of obtaining a PC.

[63] BellResearch, 2003

E.3.1.3. Internet access

Contrary to the high infrastructural ratio, only 12 percent of households and 25% of individuals have some kind of access to the internet, including access at home, at workplace or at an educational institution. About 3 percent of households have high-speed access at home, and 19 percent of individuals use the internet regularly (at least once a week).

Graph E5: Percentage of households with internet connection, 2001-2003



Source: IHM, 2004

E.3.1.4. Computer literacy

The computer literacy is another key factor of the IST usage. The COQS index[64] is a single number combining four types of skills in using the internet. (Communicating, obtaining and installing software, questioning the source of information on the internet and searching for the required information with search engines). The index value is 0.3 for Hungary, 0.8 for the EU-15 and the highest1.4 for Denmark. All four sub-indexes for Hungary are among the lowest in Europe, and the overall index shows a relative big lag behind. There is a significant age divide that could also be seen above at the digital divide issue.

E.3.1.5. Places of internet use

Of the 25% of the individuals with access to the internet[65], 10% uses it at home, 9% at workplace, 8% at a relative or friends home, 2% at a library, 2% at an internet café, and 1% at the community hall.

E.3.1.6. Purposes of use

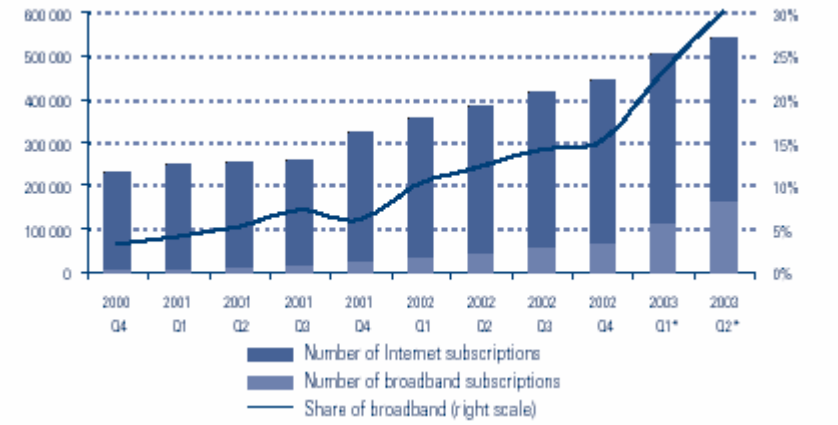
18% uses the internet for sending and receiving emails, 16% for playing games online or downloading music, 15% for searching information about goods and services, 12% for reading the news, 3% for banking services, and only 1% for purchasing goods in the net. 17% uses it in relation to training and educational purposes[66].

Intensity of internet use[67]: of the 25% having access to the internet, 19.3% can be regarded as regular users (at least once a week), and 10.6% heavy users. In these respects, Hungary has

[64] SIBIS 2002/03
[65] eEurope+
[66] eEurope+
[67] Szonda Ipsos, 2003

gone through a significant development. In the last three years, the number of people having access to the internet has grown 50%, and the number of users with 85%. The intensity of use is therefore growing as well.

Graph E6.Internet and broadband subscriptions, 2001-2003



Source: IHM, 2003

E.3.1.7. Demographic factors of internet use

The gender gap is closing. Of the internet users in total, the ratio of men is 56% and the ratio of women is 44%[68]. The age gap can be seen clearly, as 40% of all internet users are between 18 and 29 years of age, and the young users between 15 and 17 are more than overrepresented with their 21%. 16 percent is between the ages 30 and 39, and again 16 percent is between 40 and 49, and 7% is over 50 years. The use correlates significantly with the level of education. 40 percent of all users have graduated from high school. The use is the highest in the capital, Budapest, but the significance of this gap is rather low. In contrary, the financial status of the users shows a significant correlation with the internet use. Among the internet users, 43% is from the first quintile, 33% from the second, 15% from the third, 6% from the fourth, and only 1% from the fifth quintile of financial status.

E.3.1.8. Inhibiting factors of internet use

The main reason for not using the internet is neither the financial nor the infrastructural. 34% of the respondents state, that there is no need to be connected to the internet, 30% has no PC, 26% not interested, 18% says it is too expensive, and 17% has an insufficient computer literacy to use it.

E.3.1.9. Use of the media content of the internet

Quality and quantity of services and media content available in the Hungarian cyberspace can attract more people to intensify the use of internet, or join the online community and thus be part of the information society. The online content and the services will be discussed at the sections dealing with the government and corporate sector, the main suppliers of the web content. The demand side can be illustrated with a survey on household internet use. The media content of the internet can be divided into the following sub-groups (with the percentage of interest of the household panel in brackets). Cultural and entertainment sites (60%), education related sites (40%), merchandising and commercial sites (32%), video, books and music

[68] Netsurvey (intenetezők összetétele, Netsurvey, 2001)

related, including the downloading of media (28%), adult content (22%) and online games, chat and forum use (19%). The number of daily average visits is growing with a steady pace, and also the number of pages downloaded.

Table E3: The average daily visits and site downloads, 2001-2002

	2001/III	*2001/IV*	*2002/I*	*2002/II*	*2002/III*	*2002/IV*
Average daily visits	800 000	1 200 000	1 400 000	1 600 000	1 600 000	1 900 000
Average daily site downloads	4 500 000	5 400 000	9 200 000	11 100 000	16 600 000	20 900 000

Source: Homoki, 2003

Although a slight change in the attitude towards the internet can be seen, as an overall assessment of the IST use in the household sector we can say that the vast majority of the Hungarian society is left intact from the vision of information society. The new media is attracting a minority because it has not been yet accepted as a trustworthy tool of gaining information and organizing life, and this is in connection with the lack of up to date, popular content and services. The debate over the regulation of online content is from time to time in the headlines of the offline media, and the internet is usually appearing in a rather negative context. This makes the acceptance even harder.

E.3.2. IST usage in the corporate sector

For the corporate sector, the availability of the IST infrastructure is a key issue for evaluating the eBusiness readiness. Many surveys based on samples aim to answer the question of IST use in the corporate sector, and the results differ because of the different methodology and categories used. No official data is available at the moment, and there is also a lack of comparable time series, because most researches unique or irregular. The following section is based on the sample survey carried out by IHM for the eEurope+, 2003 report[69].

E.3.2.1. Telecommunications infrastructure use

The vast majority of enterprises with 5 or more employees have a fixed phone (86%), mobile phone (85%) and a fax machine (84%).

E.3.2.2. PC penetration

88% of enterprises with 5 or more employees use a personal computer in the normal routine. 42% uses only PCs, 30% uses notebook computers and 37% local servers. The average number of PCs is 12 among the enterprises equipped with computers. The computer use is higher in the service sector, namely the enterprises in the financial, commercial and other economic services sector. 46% of enterprises have a local access network, 9% have an intranet. 3% have a web EDI system, 2% extranet, and 2% EDI system as a means of communication.

[69] IHM, 2004

E.3.2.3. Internet, websites

According to the latest eEurope+ monitoring report[70], 78.4% of the Hungarian enterprises use the internet, and 40.5% has a website or a homepage. 56.6% of enterprises use at least two security facilities, and 34% of the total number of persons employed use computers in their normal work routine.

The internet penetration rates are in a strong relationship with the size of the enterprises. The access to the internet among enterprises with less than 10 employees is 38% and that of the enterprises with 100 or more is 91%. There is a shift towards broadband access to the internet.

The corporate use of the internet. The most frequent corporate use of the internet is searching for information (95%), email (91) exchanging documents by attaching to emails (66%), database access (53%), market watch (52%), banking (45%), merchandise and marketing (39%), buying goods and services (28%), selling goods and services (28%).

There is significant difference in the services available on the corporate websites. The vast majority of the websites only transfers information to the customers and clients, without incorporating any facility for carrying out transactions. The 40.5% means 23200 corporate websites, of which 17000 (73%) is only for one way information transmitting, 4200 (18%) with simple interaction like searching of different brochures and catalogues, 1600 (7%) with transaction facilities, and only 400 (2%) with fully integrated transaction websites. 49% of the websites is Hungarian only, 39% is bilingual (Hungarian-English).

E.3.2.4. Different types of access to the internet

The share of broadband internet connections is the following: 29% of the internet connections are xDSL, 7% leased line, and 7% is the share of cable modem internet use. The share of ISDN is 45% and 31% is the share of analog connection (modem).

E.3.2.5. The use of integrated corporate management systems

9% of the PC using companies has an integrated system for corporate management, with 41 users as an average. More than half of the companies uses some kind of IT support for payments, billing and about one-third for ordering and about 18% for logistics and stock management.

The overall assessment of the IST use in the corporate sector is the following: although the international comparison is rather hard because of the specifications and methodology of the data collection used, one can say that in the use of PCs and internet, Hungary is way under the European average.

On the other hand, using PC penetration and internet use is not the best proxy for the eBusiness readiness. If we take quality aspects of the IST use in the corporate sector into account, some other sources of information suggest, that Hungary is among the best Eastern European countries. This is because the compound index used by for example McConnel International

[70] IHM, 2004. Some other sources of information show much lower penetration rates, 55% with internet access and 20% with websites. The reason for the difference is the handling of micro- and small enterprises with less than 5 employees. This latter incorporates these, the other does not.

market research institution to evaluate eReadiness[71] incorporates aspects of human resources working in IT field, and Hungary was given an extraordinary good grade**.**

Box E.1: IST in the financial sector

Among the sectors of the Hungarian economy, the financial services including banks and insurance companies are the most developed in respects of the IST usage. For this reason, the latest developments are good illustrations for the future of the services sector or even the economy as a whole. Expectations in the banking industry for the IST use can proxy the condition of the whole economy and act as a possible forecast.

The survey was carried out by GKI Gazdaságkutató Rt. in association with Westel Mobil Távközlési Rt. The sample consists of 18 banks representing 80% of the total market, and12 insurance companies representing 92% of the market. The reference period was the 1. Quarter of 2003.

The results of the research suggest that the online services in both banking and insurance industries are at the beginning of a boom. The number of customers with internet banking contract has grown 60% for the individual customers, and 110% for corporate customers in the 12 months before the survey. The income for insurance companies from online sales of insurance is still marginal but most companies are planning to expand their services to this direction.

***Telebanking** in the finance industry. In the reference period, 27% of individual and 9% of corporate customers had contract for telebanking. The expectations suggest that in the following 12 months the number of contracts might increase 20% for corporate and 25% for the individual customers.*

***Internet banking**. Of the 18 banks in the survey, 12 had online banking services available for public services, most of them offered information on account and account history, transferring money, and deposits. The number of customers with internet banking contracts has grown in a fast pace. 60% for individual and 110% for corporate customers in the 12 months before the survey. The ratio of internet bankers from all bank customers is 6.8% for the household and 10.9% for the corporate sector, and the expectations suggest the growth to be continued in the future. An additional 30% percent for individuals and 76% for corporations is expected in the following year.*

*The **expectations** are the same for mobile banking, and internet based portfolio management services such as brokerage. All types of transactions carried out through the internet are expected to grow in the future. Remittance with 52%, controlling transactions with 40%, securities transactions with 36%, and depositing with 31%.*

Source: GKI-Westel-Sun, 2003

[71] MKIK, 2003

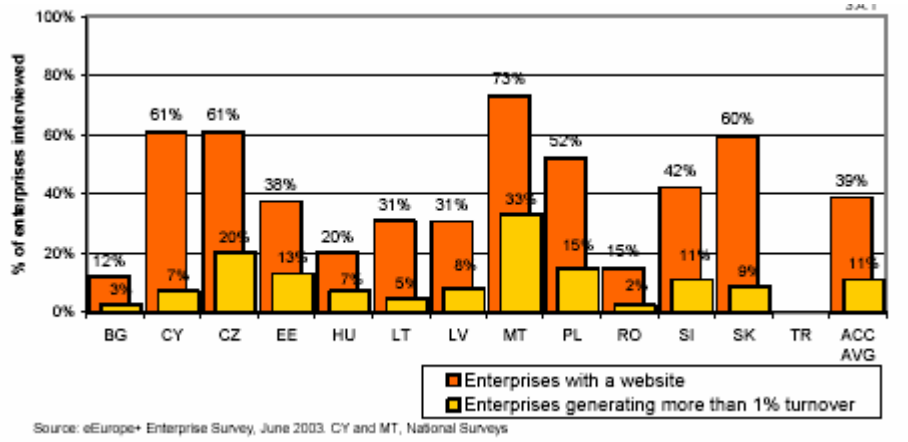
E.3.3. eCommerce

The impact of IST use in the corporate sector and in the household sector is the appearance of eCommerce. This section deals with the aspects of B2B and B2C. B2A is discussed in the following subsection.

The most informative figure is the total turnover of enterprises from eCommerce activity. According to the latest eEurope+ monitoring report, 0.36% of the turnover of companies is from selling goods and services via internet, and 0.05% from EDI applications. Another source of information suggests 0.5-0.6% and 2.4-2.8% respectively[72].

The ratio of enterprises that have a turnover over 1% from eCommerce is 7% and 20% among the companies with internet connection.

Graph E7. Percentage of enterprises generating more than 1% turnover from eCommerce



Source: eEurope+ monitoring report, 2003.

E.3.3.1. B2C

The percentage of individuals having ordered or bought goods or services for private use over the internet is less than 1%. The SIBIS report suggests a slightly more favorable picture, 2% for regular and an additional 1% occasional user, but still shows Hungary being the last among both EU-15 and CC-10 countries.

E.3.3.2. B2C and B2B

Among the enterprises with at least 1% turnover generated from eCommerce, 4.3% received orders through the internet, and 0.4% through EDI or other applications, and 5% is the total ratio. 0.2% of enterprises received online payments, and 2.8% of the enterprises with internet sales. 41% of the companies that received purchases online the total turnover generated through the internet were between 1-10%, and only 5% reported over 50%.

13% is the ratio of enterprises that have purchased products or services via internet, 0.9% via EDI applications and 14.7% for the total. The financial sector has a higher ratio with 25% and the agricultural sector is less than 2%. For about half of the companies, these purchases only

[72] IHM, 2004

make up 1-10% of all purchases, this shows that the importance of eCommerce is small for most companies.

The ratio of enterprises whose IT systems for managing orders or purchases are linked directly to other internal systems is 17.1%. And 5.4% of the enterprises have an IT system directly to IT systems of suppliers or customers outside their enterprise group.

3.9% of the connected companies use banking and financial services through internet. The use of specialized internet market places is less than 0.7% of all companies.

The share of B2B is about 58% of the value of total turnover of eCommerce, the share of B2C is about 36% and the rest, 6% accounts for B2A transactions.

60% of the value of total eCommerce activity is national, and 29% is the share of online sales to the EU-15

A survey conducted among the executives of enterprises[73] tries to reveal the motivations behind the eCommerce activity and also for not using this type of merchandise channel. The main motivations for using the internet were the following: obtaining new customers, imaging the competitors, improving the image of the enterprise, improving of quality of services, placement of new products and services, expanding the geographical boundaries of the market, and cutback on costs. The main reasons for not using the eCommerce among companies without online sales were the following: the product or service is unsuitable for electronic sales; the customers are not ready to accept eCommerce yet, the problem of internet security, the lack of legal framework, and the problems of logistics.

All these figures suggest that the eCommerce is lagging behind the EU, and one can say, that the vast majority of the enterprises are left intact of the eCommerce boom experienced in the EU in the last few years. The expectations of executives suggest that no radical change is in progress.

The government is also aware of the weaknesses, and the building of the framework for eCommerce is one of the pillars of the recently launched MITS strategy. The implementation of the eCommerce Act and the Digital Signature is also part of this process, as it provides a secure atmosphere.

E.3.4. IST usage in the public administration

This section follows the same logic as the previous ones. First, the IST infrastructure use will be illustrated, than the willingness of the apparatus to use it, and finally questions of B2A will be discussed. The government can be divided into central governing bodies (ministries etc.) regional central institutions (local subsidiaries of ministries etc.) and local deconcentrated bodies like municipalities. The figures will illustrate all three.

E.3.4.1 PC and internet use in the government.

The use of PCs in the government has a penetration ratio of 100%. Except for one single institution, all bodies have a PC, fax machine and a fixed telephone line. The use of cellular phones is 99% in the central governing institutions, and about 75% for the municipalities.

[73] IHM, 2004

The PCs are connected into a LAN network in all cases, and 62% of them are WAN connected (long distance network connection). 81% of the institutions have an intranet, (85% regional, 68% for central and 83% for local deconcentrated bodies) and 10% an extranet.

The use of internet has 100% penetration among the central and regional institutions, and 70% for local governing bodies. 98% reported to use some kind of electronic mailing system, 13% uses EDI and 20% web EDI system.

The ratio of the PCs connected to the internet varies from 12% to 100%. The highest is in the Prime Ministers Office (MEH) and in the Ministry of Foreign Affairs, and the lowest for the Ministry of Justice.

Table E4: The availability of IST infrastructure as a percentage of the total number employees, 2003

	Central government	*Deconcentrated central governing bodies*	*Deconcentrated local governing bodies*
Fixed telephone line	33	25	19
Email	62	47	54
Intranet	48	48	54
Extranet	2	5	5
Internet	66	48	25

Source: IHM, 2004

The use of security measures is rather poor. About 70% is the ration of use of secure servers, about 70% of firewalls, the use of encryption varies between 35 and 4%, and the most popular security measures is making security backup copies. The most common connection type is the leased line, followed by xDSL and ISDN and the ratio of modem connection is also significant.

E.3.4.2. The IST use in the government

The most common use of internet in the government is the use of email, searching for information, transferring electronic documents and connecting to databases.

E.3.4.3. The appearance of institutions on the internet

About 24% of the governing bodies reported some kind of basic services available online. Some other sources of information suggest 29,5%. The availability is higher for central institutions than for regional and local authorities.

The variety of services available differs significantly. The most common services are direct emailing possibility, contact information etc, that is a rather passive appearance. 91% of the websites have a description of the given organization, 86% email, 79% links to related institutions, 44% a search engine, 43% connection to at least one specific database. Only 2% of the websites have special services for disabled persons.

The highest quality services are available at some ministries. The Hungarian Prime Minister's Office (MEH) (www.meh.hu) handles the main government portal (see Box E2), the Ministry of Cultural Heritage (www.nkom.hu) has searchable online library catalogue, the Ministry of Education (www.om.hu) has scholarships and education related databases, and the brand new EMMA initiative of the government. (See Box E2)

Box E2.: Government portal

The Orban-administration (1998-2002) has launched a national government portal (www.ekormanyzat.hu) that was developed and was meant to be one of the first steps toward a serving state. This site offered a broad range of links to the main institutions, posted all types of information (for example on calls) and most important, offered information on all types of problems and cases a citizen can face. For example one could look up under the personal documents section where to go if the validity of his/her personal ID is over, could look up all types of information on the accession to EU. After registration even more personnel information was available. The Medgyessy-administration (2002 -) has changed the site to www.magyarorszag.hu, and the site is being developed constantly. It tries to integrate all websites of central government institutions with a link database, and the services expanding daily. These services include information on consumer rights, universities, and a database of vehicles, real estates, government offices, enterprises, and accredited education. It also has a description of the organizational scheme of the Hungarian government, geographic, economic, political and demographic data, and functions as a portal with facilities like customizable newsletters. It is available in English and German also.

The Unified Hungarian Labor Database (EMMA, www.emma185.hu) was launched in may, 2004 in order to handle the data on the 2.5 million working Hungarian and all enterprises with employees. Statistical data can be gained on the movements of the labor market, and the database is linked to the health and pension insurance databases. All employers are obliged to announce any changes in labor relations of their employees.

Sources: www.magyarorszag.hu www.emma.hu

Some potential online service provider is lacking, like the Ministry of Justice with a possible company information database or Ministry of Finance. One of the extremely popular online service is that of the Taxation and Finance Controlling Authority (www.apeh.hu). The downloadable tax form filling and checking software was used by more than a million taxpayers last year.

The SIBIS reports an average of 2.7 out of 7 basic services available online. With this result, Hungary is close to the EU-15 average of 2.9.

E. 3.4.4. The popularity of eGovernment services

The percentage of individuals using the internet for interacting with public authorities is 12%. Of this, 11% is using the net for searching information on the related government body, 3% for filling a form on the site, and 1% for sending back filled form.

The percentage of enterprises using the internet for interacting with public authorities is 2.2% for information gathering, 28.6% downloading of forms, 20.2% sending back forms, and 9.6% for full office routine.

The number of average visits is unavailable because the lack of precise measuring in most cases.

According to the SIBIS report, 30% of individuals would prefer to use the internet to fill in and send back income tax return, 42% would prefer to look for a job online, 36% would request a

passport or a driving license, and car registration. These figures show a potential in the future development of eGovernment services, as there is a need for it in among the inhabitants. These figures also show that the willingness of people to use these services are above the average of the CC-10 countries, and sometimes close to the EU-15 average.

E.3.4.5. The use of eCommerce in the government

The use of internet in the public procurement process is not very common. 1.3% of the value of procurement in the central government is mediated with some kind of electronic network, but less than 0.2% in the deconcentrated government bodies. The use of electronic money transferring in the government institutions shows a little more favorable image, 33%, 30% and 9% respectively.

The use of electronic marketplaces is rare also. 12% of the central government institutions, 16% of the regional deconcentrated and about 9% of the local deconcentrated institutions used this facility in the public procurement process at least once. All these figures show that the use of eCommerce in the government is lacking.

As an overall assessment of the eGovernment in Hungary, one can say that except for some popular and up-to-date central services and some recent initiatives, the eGovernment has a lot to develop especially in the local governing institutions. The demand side shows that there is a need for it, and the infrastructure is also given. The willingness to change organisational solutions is missing in many cases. The main motivations for not using the given possibilities of the internet is the lack of time, money and the computer literacy, and the inhibiting factors for the eCommerce use is the lack of legal framework, trust and the problems of computer literacy again.

E.3.5. IST usage in the educational system

The use of IST in the education can be assessed from two viewpoints. The first is the use of IST infrastructure, PC and internet penetration rates, and the quality of IT education in the different levels of education, and the participation of inhabitants in lifelong learning. This section deals with the first aspect, but also shows some figures of the quality of IT education.

The level of connectivity is one of the strengths of Hungarian information society[74]. In the 1980s, a programme (IF programme) was launched to install an electronic network to connect different tertiary institutions and research institutions to each other, and this process was boosted in 1992 with the NIIF-Hungarnet (National Information Infrastructure Programme). Next, in 2000 the connection of HBONE (Hungarian Research and Educational Backbone Network) to the GEANT (European Research and Educational Network) was brought about. For the primary and secondary education, a program called Sulinet was started to equip most of the schools with internet connected PCs, and as a result, both the number of connected schools and PCs with internet access available for education is high.

The HBONE access network is Budapest based, and consists of several “propeller wings” connecting the regional centers to Budapest. The minimum bandwidth is 512 kbps and the highest is 10 gbps. There is a separate network for governmental use parallel to the HBONE network. Almost all tertiary education institutions are connected to the internet as a result.

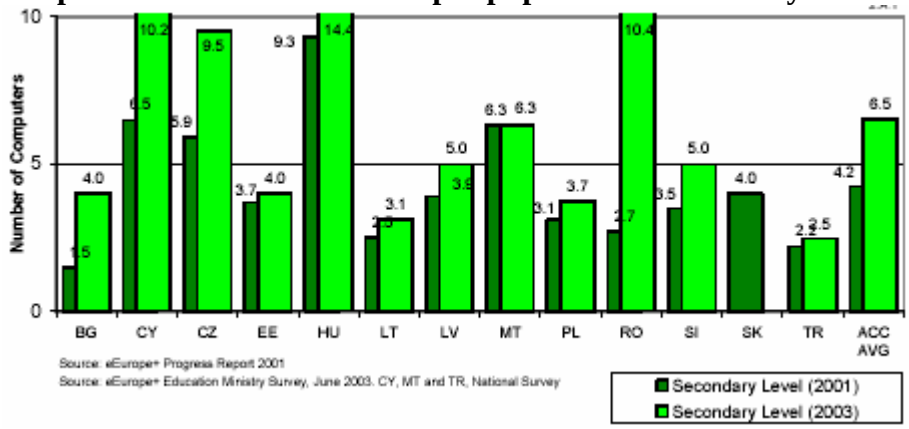
[74] IHM, 2004

As a result of the Sulinet program (educational network for primary and secondary schools) 99% of secondary schools are connected to the internet with at least an analogue modem, and 20% of primary schools as well.

E.3.5.1. The availability of PCs and internet connections in education.

Number of computers per 100 pupils is 5.98 for primary education, 12.27 for secondary education and 10.91 for tertiary education, but 6, 14.4 and 20.46 respectively, if we only take full time students into account. About five students share a computer in the tertiary education. The total is 9.02 computers per 100 pupils.

Graph E8: The number of PCs per pupils in the secondary education, 2003



Source: eEurope+ monitoring report, 2003

The number of PCs connected to the internet (with broadband connection in brackets) is the following: 2.34 (1.87) for primary schools, 9.11 (6.71) for secondary schools and 10.05 (6.62) for tertiary education, 18.86 (12.43) if only full time students are taken into account.

E.3.5.2. Teaching with IST tools

9% of teachers use the internet for non-computing education on a regular basis, 16% of teachers in secondary level, and 21% in tertiary level institutions.

E.3.5.3. Lifelong learning

According to the SIBIS report, Hungary is relative behind the CC-10 countries and the EU-15 countries concerning the level of participation in lifelong learning. About 9% of the sample on basis of the labour force has participated in any education in the last four weeks. With this, Hungary is the last. eLearning as a new method of training in both education and at workplace is relative unpopular in Hungary. About 3% used online and an additional 2% offline eLearning material for obtaining up-to-date skills and knowledge. In this respect, Hungary is only ahead of Poland.

E.3.5 4. IT education.

About 32% of the workforce has participated in (at least) basic IT training in the past. The IT knowledge is important because of the IST diffusion in the society as a whole, but also increases the growth potential of the economy.

The level of students participating in some kind of IT related education in the tertiary education is relative high in comparison to the CC-10 countries. A total of 44750 students (of which 25436 full-time) are taking part in such an education, and 4281 (2418) are graduating in 2003. The ratio of IT students is 11.7% (12.5% for full-time). The quality of the IT related education is high and the degrees obtained in Hungary are accepted thus worldwide.

About 8% of both primary and secondary school teachers have a degree that makes them qualified to teach computing, and 11% for tertiary schools. This does not mean a tertiary level degree in IT, but at least a course done in the field.

E.3.5.5. Websites and internet use in education

38% of all primary and secondary schools have a website (43% if we take the connected schools into account). 75% of the websites have a direct contacting opportunity, but only 17% have teaching material online on a regular basis.

The use of internet as source of information, communication and searching for scholarship opportunities is very common among the teachers of tertiary level education. 80% of universities use the internet for administrative tasks, and 32% for assessing the students.

Box E3: The Sulinet program

The Sulinet program was launched in 1998 with three aims. Building the infrastructure of secondary and primary education institutes, libraries, student residences and community halls providing access to the internet and PC labs, building education related content and supporting related events, exhibitions and conferences.
Since the initiation of the program, the number of connected PC labs tripled, from 1564 to 4800, the average bandwidth increased significantly, and the main backbone networks were established. The portal, www.sulinet.hu has material for education including language tests, collection problems of various subjects to support teachers work, a link database, eBooks, contests and prizes, material for university entry exam preparation, and various scholarship programs and databases.

Source: www.sulinet.hu

E.3.6. IST usage in the healthcare system

There is no official and systematic data collection on the IST usage in the healthcare system in Hungary. However, according to the most recent "general practitioners survey[75]" conducted by GKI on behalf of TÁRKI, the leader of the consortium responsible for measuring the eEurope+ indicators one can still get an idea of the state of health online. The data collection based on a sample survey show that 21% of health professionals have access to the internet in the consulting rooms. 61.6% of general practitioners use the internet as a source of information on products, drugs and treatment methods, 12.2% use it to exchange patient records with other health organizations and 6.1% for other reasons. As the means of communication, general practitioners with internet access use it mainly for communicating with other health care professionals (47%), secondary care institutions (19,5% administration, 14,6% clinical) with pharmacies (16,4%) and with patients (5,5%). 91% of general practitioners use electronic

[75] forrás

patient records with non-standardized record structure. 58% of clinics, 65% of pharmacies and 99% of hospitals have internet connection.[76]

The attitude of the population towards eHealth can be characterized by the percentage of internet-users searching for health-related content on the internet. 19 percent of the internet users reported online searching for health-related information in the last 4 weeks, and an additional 13 percent within the last 12 months. The same figures for the whole population are as little as 4% and 3% accordingly. As an international comparison, a little over one third (36,4%) of the internet users and 19.8% of the EU-15 population searched for health related content in the 12 months before the survey[77].

The lack of a modern information technology infrastructure makes it impossible to implement an evidence based and well monitored decision making in health policy for the government, and has an adverse effect on the state of health globally. This can also be seen in the demographical indicators of the health of inhabitants that remained almost the same since the transition. These data also show that there is an increasing need for the use of IT in the healthcare sector to increase the efficiency of information exchange, but there is a lag-behind in comparison to the EU-15.

As a part of eEurope-eHealth and the Hungarian Information Society Strategy (MITS), a government supported and EU Structural Funds financed program was recently launched to improve the state of eHealth in Hungary. The priorities of this program includes the development of electronic content services for the professional audience and the provision of information to inhabitants through internet and call centers, integrated information systems with the introduction of electronic document, database and messaging patents, electronic thesaurus, monitoring system, the implementation of digital signature in healthcare and special portals for professionals, inhabitants and for disabled people. This program also includes regional development. Three regions (Northern Great Plain, Northern Hungary and Southern Transdanubia) were chosen to have access to funds through tenders for developing inter-institutional network and information exchange system that will work as a standard in the future. This shows that the government is well aware of the necessity of the eHealth for the future, and it is a priority in the MITS strategy.

E.3.7. Media and web related content

An up-to-date and trustworthy internet content in the national language would be a tool to burst IST use. The facilities of eBusiness and eGovernment were discussed in the sections above, here we only mention some highlights of the new media.

Even of the variety of online media, the use of internet as source of information is only popular among a small minority. Nearly all important offline media all have their websites set up and in most cases provide more and/or different content than in their offline activity. Also new, exclusively online media came to existence and the 3 most popular online magazines and journals have transformed into portals. Online televisions also exist, a major motivation for their development was the launch of reality shows – viewers now can follow the actions through the Internet as well.

[76] eEurope+, 2004
[77] SIBIS, 2002/3

There is a brand new initiative based on the integration of offline and online media to exploit the possibilities of broadband internet. (See Box E4 for details.)

The Median Webaudit measures the most visited Hungarian portals regularly. The following table summarises the most visited portals – average of daily visits in April 2003. One can get a vision of the importance of the new media from these figures.

Table E5: Daily average visitors and page impressions of the most popular websites, April 2003

	Visitors	*PI (Page Impression)*
Origo	620 424	5 033 658
Startlap	340 399	1 001 771
Index	292 691	2 470 617
Korridor	175 057	1 829 426
True Network	162 158	1 301 380

Source: http://www.webaudit.hu/

Box E4: Origo Play

One of the most recent initiatives in Hungarian entertaining cyberspace is that of the incumbent telecommunications operator, Matáv that also owns the biggest internet service provider, Axelero, and the most popular Hungarian website, www.origo.hu.
The main aim of the initiative called OrigoPlay (www.origoplay.hu) is to exploit the possibilities of broadband internet connection, and the integration of different media, radio, television and portal technology in order to make broadband connection more attractive to potential customers.
The site is an experimental one, with music, videos, and a virtual guide able to read the content of the pages aloud, a customizable radio and so on.

Source: www.origoplay.hu

E.4. Impact and SWOT analysis

In almost all aspects of IST penetration indicators, Hungary is below the European average. Especially PC penetration and use in the household sector, as well as internet use among inhabitants is low in international comparison.

On the other hand, the foundations of the IST use have been established, and the much needed take-up is hindered from the demand side. The majority of the population has remained intact of the information society, both interest and computer literacy is lacking, and the use of eCommerce is negligible in both private and public sphere.

The telecommunications prices, including the charge of fixed phone and internet subscriptions, especially broadband are high in terms of PPP, one of the highest in Europe. This is one of the most important hindering factors of a much faster growth in IST applications, especially if prices compared to the level and growth of disposable incomes. On the other hand, free dial-up internet services exist, threatened by the new telecommunications regulation and therefore their effect is still moderate.

Besides telecommunication and internet access costs, the prices of PCs and other equipment are relative high in terms of percentage of an average household income. This is so even if various government programs have supported with tax deductions the purchase of hardware: but deductions were certainly not used by those who had low income levels.

Besides the access costs the low level of IST applications is also due to the weak content, especially in case of the public sector. The extent of online services, the quality and content of online services are all factors that strongly hinder the application of these services.

This backward situation is true even if a great variety of online services came to existence in recent years, especially the development of eGovernment is significant. The fragmented online governmental services are now under the process of unification. A new and promising information strategy has been launched at the end of 2003, but there has been a significant cutback in the budget of Ministry of Telecommunications and Informatics budget. Tax allowances support the broadband infrastructure spread in both cable television and telephone services sector. These changes show a new and a more positive approach of policy makers towards IS developments but while the “flow” figures and developments are much more promising than earlier, the “stocks” are sill extremely weak.

The financial and banking sector is a relatively strong IST user while agricultural sector is lagging behind. There are huge differences in geographical distribution of IST use and infrastructure, Budapest and the regional centers are significantly better in all indicators. Besides the more advanced position of the capital and major cities the regional differences are sizeable between the more advanced western and especially north-western and central parts of the country vis-à-vis the southeastern part.

SWOT Analysis: IST Applications

Strengths	Weaknesses
• Basis of IST infrastructure has been found • Strong, innovative and competitive cellular telephone service providers • Strong and competitive internet service providers • Widespread cable television access • Research and educational networks, high PC penetration in Education • High number of skilled professionals in IT, strong IT tertiary education • Relative high ratio of broadband connections	• High cost of internet access • High cost of telecommunication • Low PC and internet penetration • Computer literacy • Lack of interest towards internet • Fear of new media • Low eCommerce use in all aspects • Budapest centered infrastructure • Uneven geographical distribution of IST use
Opportunities	**Threats**
• New electronic telecommunications law and information strategy of 2003 • Possibility of falling internet and telecommunications prices due to new regulation • Third generation cellular technology licenses will be issued soon • Introduction of digital signature is expected soon • Innovative web content in private sector, expanding eGovernment services • Strategy on defragmentation of online government services • Dynamic growth of number of broadband connections • The use of cable television networks for internet access	• Digital divide for education, age and financial state is growing • Number of fixed telephone lines low and constantly falling • Fear of local telecommunications operators cutting back on broadband infrastructure investments • Internet security ignored • Cutback on Ministry of Informatics and Telecommunications budget

The current state of IST application in Hungary is rather weak. The internet penetration rates are low in comparison to the EU-15 average, the number of telephone lines is falling, and the prices of telecommunications are high. The vast majority of the population is rather ignorant towards the internet and the media portals, the use of internet is mainly entertainment for most users. The turnover of enterprises generated from eCommerce and the use of B2A in the government is negligible.

On the other hand, the infrastructure is given for a boom. The ratio of broadband internet connections is constantly growing. Most universities and secondary education institutes are connected to the internet, and almost all households have at least one possible channels to go online. The prices of telecommunications are expected to go down as a new regulation was introduced that inhibits the incumbent operators to exploit their significant market power. Many internet providers exist, the biggest with international background, and free internet service are also present. The government supports the cable television operators to provide broadband access via their networks, and the cable television home pass is high. The new telecommunications regulation and the falling income of local telecommunications operators

on the other hand might cut further investment into broadband infrastructure, and no third generation mobile systems are expected in the near future.

The main inhibitors of the boom are the fear of internet as a new media, the fear of internet security, the lack of ignorance and computer literacy on one hand, financial factors and lack of media content on the other. Although the eGovernment services are being constantly developed and the fragmented government portals unified, and innovative, exiting web content in the private sector is being published daily. The new act of digital signature might boost the use of eGovernment and eCommerce services. In the education, the new generation is coming across PC and internet use that might also change the attitude towards internet. The number of highly skilled professionals in IT sector is worth mentioning too.

F Institutional capacities and regulatory background

F1. Privatisation: policies and outcomes in Hungary

In line with the political changes in Hungary during the nineties, the progress with privatisation has been fast and successful. While at the beginning of the decade the state sector represented 85-90% of the economy, this ratio has been turned around by 2000: the private sector of the economy is of equivalent size to the average of countries with advanced market economies.

In 1990, there were 1857 state enterprises and 11000 trade outlets awaiting privatisation. The number of operating state companies contracted to one tenth, with over 1000 companies privatised and 740 wound up due to unprofitable operation. Privatisation proceeded mainly on a commercial basis: there was no reprivatisation and no free asset distribution. Compensation vouchers purchased only 10-11% of state assets. Over the ten most intense years of privatisation, total revenue from privatisation totalled 1746 billion HUF, 60% of which came from foreign investors. This amount represents 40% of foreign direct investment in Hungary. The average selling price was 170% of book value. The direct costs of preparation for privatisation were 5-6% of the total income. On the whole, the financial balance of privatisation is positive.

Besides financial indicators, other aspects indicate as well that privatisation has been a success. It led to technological modernisation, to improvements in management and organisation skills, to rising productivity, and improving efficiency. By now, the private sector is running the banking system, the insurance sector, pharmaceuticals, pharmaceutical trade, chemicals, construction, engineering, tobacco, brewing, food, leisure and hotels, printing, paper, packaging, the food and the general retailing system. (Macher 2001) Large part of public service companies has also been privatised, including Matáv (the incumbent telecommunication company), the national oil and gas company, the electricity supplier and generating companies. The years after 2001, when the largest proportions of state property have already been privatised, are characterised by the creation of legal and institutional bases of more efficient operation of the remaining state assets.

However, the shortcomings of Hungarian privatisation merit some remarks as well. During the privatisation process several objectives needed consideration, and there were numerous trade-offs involved. A quick privatisation generates funds for the government, and leads to the quick creation of a competitive environment, but at the same time, may be accompanied by payment and solvency difficulties, and may fail to generate the maximum attainable income. Even so, the Hungarian privatisation can rather be characterised as fast instead of prudent. The public disputes on the main objectives and methods of privatisation were not settled satisfactorily. Also, the strategic aims and interests of the government could not be achieved in this quick process satisfactorily.

The legislation guiding the process of privatisation was created in line with the instantaneous interests of the government, and the institutional background of privatisation was changing too frequently, posing large costs on the whole process. The frequent institutional changes were generated by the fight of diverse interests shaping the privatisation process. Meanwhile, the regulatory frameworks needed to ensure the proper functioning of the privatised sectors and the enforceability of social interests were created far less quickly. These problems manifest themselves mainly in the case of sectors related to public services, for instance in the case of the telecommunication and the pharmaceutical sectors. (Bágér – Kovács 2004) While pointing

to existing problems, these remarks do not invalidate the previously described generally positive outcomes of privatisation. The particular characteristics of the privatisation of the telecommunication incumbent are deeply intertwined with the regulatory and market developments in the main telecommunications markets; therefore they will be detailed only after a description of telecommunication regulation and market developments.

F2. Regulation/deregulation of main markets affecting the IST industries

The major markets that can be distinguished in telecommunications are the fixed, the mobile and the data and internet services markets. Their developments follow interconnected paths, and their regulation and deregulation are usually described in the same law: in this chapter, they also shall be dealt with jointly.

The rest of the chapter is divided as follows: first, the main historical events in regulation/deregulation and privatisation that took place in these markets will be described, based on sectioning by different time periods. Secondly, main elements of the current Telecommunications Law will be described. The opening of the market in fixed line services occurred in 01. 01. 2002, based on this law: the developments after, however, did not fulfil the optimistic hopes for competition. Thirdly these developments will be listed.

In 2002 the newly elected government recognized the importance of improving upon the existing regulation to promote competition on the fixed line market and thereby in others (most importantly in the internet segment) as well, and decided to create a new telecommunications law. The first draft of it is ready, and now it is in the phase of public consultations. The law will be discussed in the parliament this autumn, and is hoped to come into force in 01. 01. 2004. The fourth part of the chapter will deal with the discussion of main elements of this new law, and its proposed effects on main markets in telecommunication.

The chapter will be closed with the analysis of the effects of the current and future position of the telecommunications sector on the whole economy, definitely with regard to regulation.

F.2.1. The past: the evolution of regulation/deregulation of main telecommunications markets, and of privatisation in these markets[78]

1990-1993

Hungary began the transition process with a serious backwardness in telecommunication infrastructure. In this period, infrastructure development was the major priority, strongly supported by political will. In 1992, the law on telecommunication, and in 1993, the law on frequency management were created. This was the period, when the main directions of the development of the telecommunications market were determined: the system of concessions was created, and the privatisation of Matáv started.

The concession system was intended to create the ground for future competition: the alternative service providers were supposed to gain strength economically during the 8 years period. The local service area of Matáv was split up among the newcomers: Matáv remained in a monopoly position on the market of distance and international calls. Concessions were given to those

[78] This part of the section is based on the article Pápai, Z. (2002): After legislation - before liberalisation: the new law on telecommunications. In: Kurtán et al. (2002): The political yearbook of Hungaryon 2001, Centre on Democracy Research Hungary, Budapest.

areas, where 51% of municipality mayors chose to have it. Anyhow, this structure was economically not rational, since the Hungarian market and territory is small, and too many concession companies were created.

The privatization of Matáv was decided on in 1993, and so, Deutsche Telecom and Ameritech became the majority owners of it. Changes in the ownership structure of the company took place in later years as well. The state retained its preferential stake.

In 1993, the first GSM tender took place, which created the digital mobile market with two concession companies Westel and Pannon GSM.

1994-1997

This period is characterized by the functioning of the concession system, by the development of the regulatory structure and by the first anomalies. The functioning of concessions did not start without problems and time lags, due to the low expertise of the newly formed companies, and the lack of valid applications. The main goal of the concession system was infrastructure development, and this goal was mainly reached during this period, at a high quality.

In the new system of local monopolies in fixed market, price cap regulation was chosen. The regulatory framework had to be developed already before privatisation, and so the government was clearly not interested in strong regulation and in designing a fierce implementation. In addition, the application of the system was burdened with difficulties. The existing law on prices defined only the terms of minimum and maximum regulated prices. Public servants and politicians without the necessary expertise did not trust the new method, which seemed too indirect to them. Also, the efficient functioning of the system was hindered by subjectivities in determining the productivity index, the shares in the relevant product basket and the inflation level.

Interconnection remained an unresolved issue in this period, because of the income distribution scheme applied, which was totally independent of costs.

Many problems the telecommunication market faces nowadays are inherited from this period, and stem from the concession system, from price regulation problems, and from interconnection regulation.

Meanwhile, GSM technology started to be applied in the mobile market with an unexpectedly large success. Both companies were aiming at attracting new subscribers and prepaid phone users, and this supported the development of - regulated, therefore restricted - competition. Mobile service providers were regulated to be free to develop their own infrastructures, but had to use leased lines from Matáv or the concession service provider to switch their own networks and the public telecommunications one. If Matáv would fail to provide interconnection for three months, mobile operators could build it on their own. (Bozzay - Csiszár 2001)

Privatization of Matáv continued: in 1995, the shares of the Deutsche Telekom - Ameritech consortium increased, and in 1997, the state sold its preferential share. The only company remaining to be privatized in the telecommunications market stayed Antenna Hungaria, which was specialized in broadcasting programmes. Its privatization was left to the year 2002.

1998-2001

During this period, the state and the regulator were getting prepared for liberalization, and so did the largest incumbent, Matáv. Price regulation got degraded to an anti-inflation tool in the hands of government. Terms and conditions of interconnection were decided by government, and not by consent of service providers. The main cause of problems was the lack of access to the local loop. Interconnection problems were increased further by the role of mobile service providers.

A process worth to mention in this period is tariff rebalancing: tariffs in under priced and in overpriced services started to approach their real levels, preparing the grounds for real competition without cream skimming and similar practices.

After 1998, a consolidation process was started among the concession companies. The main consolidator was Vivendi, but Matáv also managed to buy firms in some territories.

In the interim, the internet sector became increasingly dynamic. Main telecommunication companies and new alternative service providers entered the internet market. This market was liberalized from the beginning: new service providers faced only the authorization process before entry. Here the development of alternative infrastructures was allowed in the regulation from the beginning.

Mobile markets experienced an even more unusual boom, and a third player, Vodafone entered, also with a concession contract. In 2001, the auction of wireless point-multipoint systems took place, successfully. On the cable market, local monopolies were forming, that exist up to these days. Since, it is a regular task of the National Competition Office to deal with the several problems created by misuse of power in this market. Matáv, the largest company was banned from cable market participation in largest towns. Cable internet started to spread slowly, and investment in cable infrastructure rose.

Voice-over-IP service was not subject to any regulation restricting competition, and during the end of the nineties, this was the only voice market segment, where real competition started to develop.

In the final moment before opening the telecommunications market, it was common knowledge, that Matáv retained its economic power during the concession process, if not even increased it. Some claim, that market opening would have to be done earlier, in 1998 or 1999, and so favourable investment processes would have accompanied it on the international telecommunications market. Nevertheless, this was not an alternative to consider, since concessions were awarded for a longer period, and the incumbent tried to set expensive conditions for the case of an earlier opening.

Main elements of the 2001. XL. Law on Telecommunications

The law on telecommunication was intended to be an up-to-date law to guide the forming competition. During its creation, the persons designing it, its main internal goals, and the institutional background in which it was developed changed several times, mainly due to political reasons. This hindered the process severely, and finally resulted in the fact that by the time of market opening, decrees that would have furthered its implementation were still not ready. Service providers could also not get ready for the new circumstances with preparing

their reference contracts, due to lags in regulation. So the effective liberalization of the market fell behind by at least half a year.

The parliamentary discussion of the proposal was surrounded by extremely intense lobby activity, and this pictures itself also in the present text and structure of the law. Some claim, that lobbies managed to create holes in the regulation that were used after only by the large firms and this prevented real liberalization to happen.

The outcome of the regulation process is a law that is mainly liberal, and mainly tries to promote competition. Its content is harmonized with EU regulation, but several researchers claim, that in implementation and in the spirit the regulation is not fully EU-conform. Also, several crucial implementation questions were not decided in the law, leaving a heavy administrative, lobby pressure burden, and considerable freedom on decree creation.

The regulator had to decide, what kind of competition to promote. Restrictedly infrastructure based competition was chosen, to ensure that returns on infrastructure investments of the incumbents are guaranteed, but also to realize some advantages of service oriented competition. In this spirit, duplication of infrastructure is admitted only in some segments. Based on this choice, it is costly to appear on the market as a new service provider, but in the long run, well-founded competition is more likely to develop.

In the new law, entry to the market was liberalized, and now it consists almost solely of technical authorization. Carrier selection and pre-selection are also required elements of entry. Still, entry requires high investment costs. The division of access to scarce resources (spectrums and identifiers) was decided on, in an equitable way; even joint real estate usage was regulated.

Recognizing the strength of Matáv, and the favourable position of other incumbents, the term of an operator with significant market power (SMP) was introduced. While in the EU an operator is considered to be SMP if its share in the relevant market reaches 40%, in Hungary this number is only 25%. This made the second largest player in the mobile market to become an SMP, which has consequences in the determination of interconnection charges. Based on this regulation, five SMPs were identified in the fixed market.

Being an SMP entails an extra level of obligations for the period while real competition does not exist: reference interconnection and reference unbundling offers have to be created, and they are to be approved by the Telecommunications Decision Making Committee.

Income distribution schemes got substituted for by cost based calculations in interconnection regulation. An operator is entitled to the cheapest interconnection offer, if it is present in 3 regions from the 9 ones in telecommunications provision. Since serious interest conflicts are present in the interconnection area, most debated issues were known to land on the desks of the Telecommunications Decision Making Committee.

Tariff rebalancing was not completed fully by 2002, and so in the local loop, services carry a loss. An access deficit charge of 2 HUF was intended to compensate for it. However, several operators and researchers emphasize the need to make this charge disappear.

Price cap regulation continued to exist. Income sharing between internet service providers and fixed line operators rose to an important issue during codification, and lead to several problems after.

The group of universal services was defined in the regulation, and the terms of filling of the universal service fund were defined in a decree in January 2003. Basic fixed line services are among universal services, and in the law, the needy are entitled to them. In the decree, need examination vanished. Since convergence and rapid development of technologies characterize the IT market, preferring fixed lines in USO is ambiguous on technology neutrality grounds. Also, it can be questioned, why mobile and internet providers have to finance the largest incumbent (Matáv) in the fixed line market. Several operators claim, that after USO regulation, Matáv received support for services that were provided earlier on a market basis. In Europe, where USO was implemented, penetration rates were higher than in Hungary, promotion of USO in a market with a stagnating lower penetration may not be fully defensible. Otherwise, the services in USO are similar to other accession countries; they cover connection to fixed network, access to voice telephony, emergency service use, payphones, directory of subscribers and directory enquiries.

The description and the evaluation of functioning of the newly created institutional and regulatory structure can be found in Section B.

F.2.2. Processes in the market after liberalisation, problems of the regulation

At the beginning of 2002, economic circumstances were not favourable to the Hungarian telecom liberalization. International telecom industry stagnated, and suffered from capital shortages caused by failed UMTS tenders. Hungarian companies, that were their affiliates, were among the first candidates for sale in this situation. This created a situation, where almost all future competitors of Matáv were facing serious problems.

The small territorial size of the Hungarian market and its low level of purchasing power may be an additional cause of limited success of liberalization. Concession companies would need further consolidation, but now telecom investments are stagnating worldwide.

Regulatory failures are the most widely claimed reasons for unsuccessful liberalization. Due to the slow creation of the law, trends and market environment on the telecommunications market have changed. Convergence became stronger, and competition between fixed and mobile segment intensified, which was not taken into account in the regulation. As expected, the creation of decrees accompanying the law was too slow.

From the first day of liberalization, Telecommunications Decision Making Committee had to deal with all problems in the implementation of the law, and it became overburdened due to lack of resources. Possibilities of expert support of the organization were not regulated in the law. TDMC considered not having legal approval to use international benchmarks in deciding whether the offers are reasonable. At last, after all offers were approved, only very few real interconnection contracts were created, and no market player was satisfied with the TDMC.

RIO and RUO offers were debated intensely and debates remained unresolved for a long time. LLU, local loop unbundling does still not exist. After RIO offers were decided upon by the TDMC, three fixed to fixed, and six mobile to mobile interconnection contracts were created. These numbers also indicate that market players were not satisfied with the solution. Nevertheless, interconnection charges in the fixed to fixed and in mobile to fixed are quite high in international comparison (ECSC - EC - EAEC 2002).

The need for cost orientation was recognized in RIO regulation: after a period of interconnection charges based fully distributed costs (FDC), a decree introduced long run costs

based (LRIC) regulation. This may contribute to lowering of otherwise high interconnection costs.

The law did not regulate price squeeze practice: Matáv created a RIO, where it offers a higher price to alternative operators as a wholesaler, than the price he is using in contracting with businesses as a retail trader. This could have impeded broadband penetration, where alternative providers claim, that they did not receive a valuable offer from the incumbent.

Access deficit charges are claimed to be high by some market operators, but cost calculations could not be based on the lagging decree on accounting separation.

Division of returns between telecom and internet providers lead to endless debates. The law opened the possibility of a decree-type regulation of the question. 'Free' providers tried to use their low lobby power to increase their share from the amount of traffic generated by them, while the incumbent tried to shift the burden of billing on the ISPs, and to reduce the share ISPs are entitled to. The outcome can be regarded as being a returns division where ISPs receive a share near the EU-average. One interesting aspect of this process is, that the possibility of using flat rate dial-up packages was not considered in the debate. Not long after the decree came into effect, Matáv terminated its most popular and cheap flat rate dial up package. The government tried to quiet down the society by supporting flat rate dial up packages of Matáv: but thereby, again the incumbent received support that was not market-oriented and not neutral in terms of competition. The state support of ADSL penetration was organized in a similar way in the first quarter of 2003.

The government decree on the USO fund came into power in 01. 2003 but was attacked immediately by service providers, and does not function since. The main problem with the present USO system is, that it is not technology neutral, wastes considerable funds and still, does not serve the needs of consumers.

Meanwhile, UMTS tender was cancelled based on international experiences. In 2002, the privatization of Antenna Hungaria was started.

An indicator of results of the liberalization is the number of new entries into the market. After 2002, only a few new operators entered the market. Now in public voice telephony there are 9 local and 13 national service providers, while in network services only two local and 13 national providers. Carrier selection and carrier pre-selection is functioning except for the local calls and the call of non-geographical numbers. Monthly rental charges both to residential population and business are quite high in fixed market compared to EU average. ADSL is also relatively expensive, nonetheless, penetration rates are growing, as the only signs of competition in the local loop. Leased lines are also somewhat more expensive than in the EU.

In the internet market, the number of ISPs is higher. Ninety national and 65 local ISPs operate. The share of the fixed incumbent operator is 44% in this market. Dial-up is quite expensive in international comparison: prices in peak time are relatively high, but the main differences are present in off peak time. This hinders further internet penetration, it is pictured in the evolution of residential access, even though the number of hosts per capita is high.

Summing up developments in these markets, it seems that liberalization cannot be considered to be successful yet: low entry, high prices and otherwise no structural changes are to be found.

The main gainers in the liberalization process are up till now the largest business consumers. The ICT sectoral study of Bell Research and Think Consulting on liberalization indicates, that fixed line operator activity increased mainly in this market segment: cheaper and more diversified services are provided, and one third of these firms (employing more than 250 workers) consider to have won with liberalization.

In the future, service providers will certainly be the most active on the business segment of the internet market, where penetration rates are around 50%.

In the longer run it is highly probable, that Matáv will be interested in the wholesale market, because it shall be the main segment where its competitive advantages will be most efficiently used.

Competition is not occurring in the residential segment, however. Operators offered some price discounts only for long-term contracts; but in the contracts serious financial punishments were included for the case of changing operators. Otherwise, prices have only increased, and no entries occurred in local service provision. At present, in the residential segment, a limited competition can be witnessed in long distance and international calls. Operators claim, that they have widened the variety of available services, too. Western experiences suggest, that the effects of liberalization reach the market only over the longer run; it may take further 3 or 5 years.

F.2.3. Solution prospects: the new Law on Electronic Communications

Recognizing the problems with the regulation[79] and the need for further regulatory stimulus in the process of liberalization, the newly established ministry of telecommunication prepared a new law, and the law got accepted by the parliament on 24 November. The law will come into force in January 2004, while some of its elements (for example the number portability and the accounting separation requirements) take effect only later.

The new law is intended to have a more coherent strategic view, and is going to deal with all challenges in telecom development. Its main goal is to invite capital into the market. It is supposed to develop the backward data and internet sector. Since providing broadband access to everyone is not a viable policy goal, the regulation intends to spread the internet by promoting flat rate dial up packages, in areas where any type broadband penetration is missing (using FRIACO - flat rate interconnection scheme). To reach this goal, it obliges the incumbent to give flat rate wholesale offers that are available to everyone, to support market entry of alternative ISPs. The law in several places overtakes EU regulation, to make the regulation more EU-conform and market-oriented.

The main changes in the new regulation are as follows. Interconnection will become more cost-oriented, and the regulator will have the opportunity to use benchmarks. Price squeeze regulation will be introduced, this is meant to regulate the wholesale trade. The present lack of effective unbundling of the local loop shall be dealt with. With regards to USO, municipalities will be entitled to investigate needs, and provide the inhabitants in need with vouchers. The participation of the mobile service providers in the USO is still a not satisfactorily resolved question. Mobile operators will be obliged to accounting separation and will have to report their costs. Number portability will be introduced on the fixed market from 01. 01. 2004, and in

[79] Experts asked by the new ministry to examine the 2001 law detected 139 mistakes in it, from several viewpoints of course.

the mobile market on 1 May 2004. Number portability is reported to have increased competition in several countries noticeably, but until interconnection problems will not be solved, number portability will remain meaningless. Some fear that real carrier selection will only be possible after a long while. According to the new regulation, the obligations of SMPs will ease after effective competition evolves. Some consider this section of the law to be too optimistic in the Hungarian environment.

On the cable market, the earlier one-sixth constraint on the size of the market players got not abolished entirely, because that would have required a qualified majority approval – instead, the limit is set for cable providers at one third of the cable market size for their share. This is still not technologically neutral, although increases the profitability of broadband investment, and increases the possibility of broadband telecom service spread.

A new institutional structure is going to be created, with more capacity to deal with complaints and debates, but also with increasing responsibilities: a National Telecommunications Authority will be created, and a new representative will be dealing with customer rights in telecommunication.

While the parliamentary debate of the law is over, the executive decrees are in the way of preparation, and the new institutional structure does not exist yet, so it is too early to assess the implementation capacities of the new system. International experience suggests, that the more liberal a regulation is, the more likely is competition to develop. The ministry expects a large redistribution from the incumbent to the alternative service providers, and it is hoped that competition will force the alternatives to pass on to the consumers from the benefits. In the case of Hungary what can be said for sure is that competition needs a longer time horizon to develop, and, if hopefully the new law will create a favourable regulatory environment, still other market factors will play role in shaping liberalization as well.

F.2.4. Economy-wide effects of telecommunication regulation

Telecommunication regulation has several types of spill over effects to other sectors of the economy. The most important ones relate to the effects of real competition: by lower prices and a wider variety of services efficiency of both the enterprise and the government sector can be improved. Also, if services and access to the internet are cheaper and available to a broader share of the population, the human capital of the country can improve substantially. It is true, that only a part of the services serves this goal, and not only the availability of internet but also the use of it is crucial in improving human capital: but still, if people have more possibilities, their education and skills have the chance to improve. The role of human capital in growth cannot be underestimated.

As stated above, competition in the business market started to develop, mainly for the larger consumers. This can increase the competitiveness gap between SMEs and FDI-driven larger organizations. Regulatory incentives for further competition would lead to the smallest level of distortions, while direct subsidies to SMEs and governmental pilot projects involving SMEs can also handle the problem, if its size is considered to be large. The SME segment on the business market is equipped with the least purchasing power.

Lack of competition in the residential market can threaten the position of ICT producers and retailers, who are less able to sell their equipment, if the usage prices are high. Also, without enough residential access to existing infrastructure, further infrastructure development is prohibited, and the spread of new technologies can be threatened. Content-oriented regulation

can also promote the spread of internet, but access prices and the price of technical equipment matter to a large share of population.

One evident spill over of the existing market structure and the market power of Matáv in it is, that Matáv is a major employer and taxpayer in the country. It cannot be envisaged yet, whether the number of employees will change significantly, if the quasi-monopoly position of Matáv will be threatened, but the benefits of several people being employed can only be valued against the costs of the asymmetric market structure.

Although telecom market is experiencing a worldwide downturn these days, it still can be considered to be among the leading sectors of the future with the potential of serious contribution to the economic development of a country. It is needless to emphasize, that a telecom market with competing operators that are equipped with the needed amount of capital and have long run goals in the market is from every aspect the best choice of a country for long-term economic development.

F3. Privatisation in the telecommunication sector of Hungary

The main privatisation issue in telecommunications was the transformation and privatisation of MATAV, Hungary's main telephone service company. The history is the following:[80]

Under the communist regime telephone service belonged to Magyar Posta (Hungarian Post). On 31 December, 1989 it was divided into three individual companies: postal services, broadcasting and telephone services. On 31 December, 1991 the telephone company was transformed into MATAV Hungarian Telecommunications Rt., still state property in 100%: the State Property Agency, the legal predecessor of Hungarian Privatization and State Holding Company was the exclusive owner of this company.

In November 1993, the share capital of MATAV was increased by the EBRD and IFC, and the Hungarian State Holding Company also increased the share capital from company capital reserves, so that its share would not fall below 10% after the EBRD-IFC action. In a tender of the State Holding Company and the responsible ministry, the consortium MagyarCom (Deutsche Telekom and Ameritech International) bought 30,29% of MATAV on 22 December, 1993. The State Holding company reinvested 400 million USD after the sale, to provide capital for infrastructure development.

On 19 December 1993 MagyarCom signed a concession agreement with the Ministry of Transport, Communication and Water Management. Some of these concession rights were transferred to MATAV. On 22 December 1993 MATAV signed a concession agreement as well: this contract entitled MATAV to exclusive rights in the field of domestic long distance and international public telephone services, and local cable services in 29 primary districts for the period of eight years, terminating on 22 December 2001. The full term of concession was 25 years, which could be extended for an additional period of twelve and a half years.

In the second turn of the privatisation MagyarCom became the major owner of MATAV, holding 67,36% of it by the end of 1995. Meanwhile in 1994 MATAV employees converted their capital notes into shares, and a capital increase was implemented. In the same year, more than 250 municipalities received shares in exchange of land used by MATAV.

[80] http://www.matav.hu/matavcsoport/ceginformaciok/cegtortenet/index.html

In 1995, after the further round of privatisation, the concession agreement of MATAV and the ministry was amended, since the agreement had to be harmonised with the New Shareholder Agreement: the rights of approval of the Ministry were extended.

In March 1996 the Hungarian Privatization and State Holding Company sold 278833 ordinary shares to employees on a preferential price.

Due to a change in the privatisation law, after 1997 the state was only determined to hold a single golden share in MATAV instead of 25%+1 vote shares. Therefore the rights associated with the already issued golden share were extended, and the ownership of this golden share was transferred to the Ministry from the State Holding Company. Finally, on 14 November, 1997, 26% of the stocks of MATAV were introduced in the stock exchange of Budapest and New York. MATAV was the first Central-Eastern European company to have its stocks registered in the New York Stock Exchange. Sale of assets comprised issues in the US, Canada, and in Hungary. Institutional investors gained 77,4%, small domestic investors 22,6% of the marketed shares.

In December 1997, the city of Budapest and some other municipalities were issued shares from the MATAV.

The financial crisis after 1998 radically altered investor attitudes: due to losses in secondary markets, they became extremely cautious on primary markets. This resulted in postponed actions in the privatisation and restructuring of MATAV, and to a new method of pricing of its assets. The growth potential of MATAV in the local cable and non-cable sectors, the transparent price regulation scheme applied by the government, and its monopoly position until 2001 prevented the prices of the shares of MATAV from extreme drops. The positive valuation of MATAV was also influenced by the positive valuation of Hungary in the capital market. (Kovács 2001)

In the spring of 1999 the Hungarian State has sold the last 5,75% of its MATAV stocks. The state still owns the Preferred Stock. In July, 2000 Deutsche Telekom has bought the MATAV stocks of its consortium partner and by this became the owner of 59,53% of all stocks. MATAV is not only a fixed line telephone company but a group of different telecommunication enterprises. It owns T-Mobile[81], one of the three major mobile service companies, Emitel, a smaller fixed-line company, Axelero, an Internet-provider, and has international interests – MATAV Group is the majority owner of MakTel, a Macedonian telecommunication company.

Main actors of the Hungarian Telecommunication Market:[82] (2004 April)

Fixed operators	Mobile and personal call operators	Business Communication Service providers	Major Internet providers	Major Cabel TV providers
MATAV Emitel Rt Invitel Rt. Hungarotel Rt. Monortel Rt.	T-Mobile Pannon GSM V.R.A.M./Vodafone Eurohívó Rt.	HungaroDigitel Banknet Antenna Hungaria Equant Hungary GTS-Datanet Novacom PanTel E-Tel Magyarorszag	Elender Interware Euroweb Axelero	UPC Hungary EMKTV MatavkabelTv Fibernet

[81] The branding of the company changed in May 2004: its previous name was Westel.
[82] http://www.hif.hu/menu3/m3_16tulajdonosi_20030304.pdf

On the market of fixed operators, Hungary has been divided into 54 districts. MATAV operates 36 of them, Emitel (property of Matav Group) operates 3, Vivendi has 7, Hungarotel has 5 and Monortel works in 1 district.

Ownership structure of main operators[83] (as of 31 December 2003)

Fixed operators

Matáv Rt. (1991[84]):	MagyarCom 59,49%, public ownership 40,51%, one golden state share.
Emitel Rt (1995):	100% Matáv Rt.
Invitel Rt (2000):	AIG Emerging Europe Infrastructure Fund L.P. 50%, GMT Communications Partners Ltd. 50%
Hungarotel Rt (1994):	HTTC USA 99,99%, Hungarian Municipalities 0,01%
Monortel Rt (1994):	Paruse B.V. 96,224%, Hungarian ownership 3,776%

Mobile and personal call operators

T-Mobile Rt.(1993):	Matáv Rt. 100%
Pannon GSM Telecommunications Rt. (1993):	Telenor Mobile Communications A/S (74,99%), Telenor Hu. No. 4 Telecommunications Holding Rt. (15,18%), Telenor Hungary No. 3 Asset management Kft. (2,69%), Telenor Hu. No. 6 Telecommunications Service Kft. (2,69%), Telenor Hungary Telecommunications Kft. (2,35%), Telenor Mo. No. 5 Telecommunications Asset Management Kft. Vagyonkezelő Kft. (2,10%)
V.R.A.M./Vodafone Rt. (1999):	Vodafone International Holdings B.V. 75%, Antenna Hungária Rt. 12,1%, Vodafone Hungary Holding Asset Management Kft 12,9%
Eurohívó Rt. (1994):	Magyar Posta (Hungarian Post) Rt. 100%

Business Communication Service providers

HungaroDigitel Kft. (1990):	Antenna Hungaria (54%), Portugal Telecom (45%), Műszertechnika (1%)
Banknet Kft. (1991):	Consolidated Communications Corporation Plc. 100%
Antenna Hungaria Rt. (1992):	ÁPV (Hungarian Privatisation and State Holding Company) Rt., Social Security Fund, Municipalities. 74,07%, Hungarian institutional owners 22,63%
Equant Hungary Kft. (1993):	Global One Communications Holding B.V, EGN B.V.
GTS-Datanet Kft. (1993):	Antel Holdings Ltd. 100%
Novacom Kft. (1997):	Pantel 100%
PanTel Rt. (1998):	KPN Telecom BV. 75,2%, PT Invest 14,7%, MÁV (Hungarian State Railways) Rt. 10,1%
E-Tel Magyarorszag Kft. (1999):	eTel Central Europe Limited 100%

[83] NTA (2003)
[84] Year of foundation of the company.

Major internet service providers:

Elender Kft. (1990):	Wallis Rt. 77% , private ownership 23%
Interware Rt. (1996):	Nupremis Inc. 100%
Euroweb Rt. (1997):	Pantel 51%, Euroweb International. 49%
Axelero Rt. (1998):	Matáv 100%

Major cable service providers

UPC Hungary Kft. (1994):	Telekábel Hungary N.V. 42,67%, Kabelkom Holding Co. 57,33%
EMKTV Kft. (1998):	Cable Communications System N.V. 23%, Romanian Cable Systems Rt. 68,96%, private ownership 8,04%
MatavkabelTv Kft. (1998):	Matáv Rt.16,39%, Investel Magyar Távközlési Befektetési Rt. 83,61%
Fibernet Rt. (1999):	Mural Holding B.V. 100%

F4. Regulation of issues related to the internet

Since the internet gathers, stores and transmits millions of pieces of data that are of personal character or of general interest, questions of data protection regulation shape the process of its spread. The acceleration of the spread of Internet in Hungary is continuously creating new needs for legal action that could prevent the misuse of important personal information and facilitate access to public information. While these regulations are already well developed in Hungary, the evolution of Internet creates need for further changes and innovations.

The actors of the Internet (service providers, operators of websites and the users) have already issued several technical and organisational measures in the area of data protection, and increased the amount of publicly available information. The websites contain guidelines on data protection, and the users implement operations to protect themselves as well. The world wide web is not a lawless area, but the regulations relating to its operation may prove difficult to implement with the same content and form. This creates the need for regulation.

The laws regulating actions on the Internet include the following legal documents:

- 1992. LXIII. law on the protection of personal data and on the publicity of data of general interest
- 1995. CXIX. law on the handling of name and address information
- 1997. CLV. law on consumer protection
- 2001. XXXV. law on e-signature
- 2001. CVIII. law on electronic commerce services, and services related to information society
- 232/2001 (10. 12.) decree on financial transactions, on services related financial transactions, and on electronic payments
- 2003. XCVII. law on the modification of the 2001. CVIII. law
- 2003. LXXXI. law on electronic firm registry
- the law on competition.
- 2003. C. law on electronic telecommunications
- regulation of domain name registration by the Hungarian Council of Internet Service Providers.

Based on the above legal documents, the issues of e-commerce regulation, digital signature, data protection, intellectual property rights, content regulation and consumer rights protection will be discussed next.

F.4.1. Regulation of e-commerce

The 2001 law on e-commerce defines the details of service provider identification on the internet. The service provider is obliged to offer online access to general contracting conditions, has to set the details of modification of the contract, and has to confirm the purchase in 48 hours by email; otherwise the deal seizes to exist. The responsibilities of all contributing service providers (caching, hosting, etc.) are specified. In case of proven consumer discontent, the service may be removed from the server by the Internet service provider without any previous legal procedure. Commercial messages have to contain indicators that notify the receiver even before opening of the mail of its content, and the possibility to unsubscribe has to be offered in each case. The data on those who do not want to receive commercial letters has to be gathered. Those firms that provide services or sell goods online, have to maintain online consumer services that fulfil all functions regular consumer services do. Since the Civil Law, the law on consumer protection, and the government decree on contracts between absent parties also contain regulation that applies to e-commerce, this law only deals with the specific issues related to the Internet.

Data protection in e-commerce is regulated by the 1992. LXIII. and 1995. CXIX. laws.

F.4.2. Digital signature

The law on digital signature (2001. XXXV.) was created in a timely manner as dictated by the 1999/93/EC directive. As the EU legislation, it attaches legal recognition to the electronic form of documents: traditional and electronic documents have to be treated on an equal footing. Digitally signed documents using the PKI standard carry legal effects, they may be used for example as proofs in court procedures. Even the document signed using the simplest type of e-signature is equal to a traditional document, but additional legal privileges are by law only attached to documents signed using increased security. The law can be applied also for e-signatures created before the enactment of the law. The Hungarian regulation permits the use of e-signature in legal procedures, but inhibits it in the case of heritage and family matters, since these constitute lasting static relationships where the use of e-signature would harm interests of those involved. Except for heritage and family matters, the partners in a contract may agree on using simpler forms of e-signature as well.

The law defines types of e-documents based on their contents. Also, it classifies e-signatures into three categories (simple, using increased security, and certified). It defines the legal effects of e-signatures, and states that printed e-signed documents do not carry these legal effects. E-signatures using increased security and certified signatures are issues by certification authorities. The authorities themselves are authorized and controlled by the Telecommunications Supervisory Agency. The types of services and the relating legal issues, for example that of data security are also treated by the law. Authorities issuing certificates are responsible for any damages caused by the acceptance of the e-signature by the receiver.

By May 2004, there are two authorities[85] issuing e-signatures in Hungary. Since February 2004, the use of e-signature in public administration is allowed. Since 31 January 2004, the

[85] Netlock Kft. and MÁV Informatika Kft.

3000 largest firms are obliged to submit their tax receipts electronically, using e-signature. After 1. January 2005, all subjects of taxation will be allowed to submit their tax liabilities electronically. These changes to the order of taxation were introduced by the Hungarian parliament on 10 November 2003.

At the same time, it was regulated, that e-documents may be used when submitting private pension fund liabilities. Firms having the legal form of Ltd. and PLC. can be formed using solely electronic documentation.

At the level of central public administration, the use of e-signature will become general by the start of 2005. After 2010, the acceptance of e-signature will be a core responsibility of municipalities. Today, when only a half of the settlements has websites, and due to weaknesses of the back office and to the lack of e-signature, interactive consumer service remains a far away dream. In order to be able to keep pace with the developments of the IS, municipalities will need financial assistance.

The above developments indicate that the Hungarian government recognized the leading role of public administration in spreading the use of e-signature. The prices of intelligent cards and the needed interfaces are significant burdens for the spread of e-signature in Hungary, and since setting up an authorization firm has large fix costs, by this time certificates are still quite expensive in Hungary.

The first electronic bill was issued in May 2004 for the air company Wizz Air, that hopes to cut its administration expenses using electric billing.

F.4.3. Intellectual property rights

The 1999 law on intellectual property rights took into account the guidelines set up by WIPO, therefore in the main questions the Hungarian legislation set similar rules as the EU directive adopted later on. It is claimed, that the Hungarian law in the second best law in Europe, with the leading position of the Swiss legislation – this was indicated by the European Commission in June 2001 as well. However, there are still some gaps in the legislation concerning the responsibility for content, security in case of breach of Internet security by hackers, and the issues of information protection of firm workers. The main question is not whether the Hungarian legislation was created in due time, but rather its responsiveness to the continuous challenges posed by Internet.

The Business Software Alliance (BSA) has a Hungarian affiliation as well, that functions since 1994. It has dual tasks: it spreads information on intellectual property rights in the area of software usage, and at the same time it collects information on illegal users and intervenes. The use of illegal software is still widespread in Hungary, although increasing number of firms are attaching importance to the use of legal licensed software, and it is partly the result of the activity of BSA.

In the area of P2P file sharing, only those individuals are targeted by the attention of international actors, who share a huge amount of files. Also, ftp servers that illegally sold games, programs and music through the Internet were detected and illegal action was stopped recently in numerous occasions.

F.4.4. Data protection and publicity of data of general interest

The 1992 LXIII. law on data protection can be used to assess data security and publicity on the Internet. It defines the concept of personal information as any information that enables personal identification: however, email addresses solely used by one person are personal information regardless whether the address contains identifying words or not. The law regulates the rights and obligations of data collector firms and individuals. It also contains a classification of data of general interest, and regulates its publicity.

The special circumstances under which firms may automatically gather personal information are regulated in the 30. paragraph of the law. Unless these circumstances apply, or unless the data providers agree on the collection of data, firms have to register into a database that includes all firms that gather and deal with personal data. The same rules apply for individuals, with the exception of data gathering for private use that need not be registered.

In the case any firm or individual breaches these regulations, the consequences depend on the valuation of interests harmed by illegal data collection. The case may be judged by the courts, or by the data protection commissioner. If the breach is severe, even a criminal suit can be started. The firm that abuses the right to safety of personal data, has to bear the financial consequences as well. The data protection commissioner is entitled to stop the illegal use of personal information, to delete the information, and to prohibit any such further practice.

The rights of employees are protected, as far as the firm is not allowed to collect data on private emails of its employees.

Although email address gathering from websites is illegal, it continues and it serves as a base of spamming. However, spamming is an international phenomenon that cannot be stopped by national legislation.

The previous data protection commissioner (Majtényi 2001) indicated, that based on international experience, private encryption methods should not be regulated by the government.

F.4.5. Content regulation on the Internet

The attempts to regulate the contents of the Internet in Hungary related to the aim of protection of children, of personality rights and of human dignity. The first try was included in the 2001. CVIII. law on e-commerce, that has been worded based on the 2000/31/EC directive. However, the harmonisation of the legislation did not prove successful, as it turned out later: both the newly set up ministry and the EU agreed on this point. The law adopted the US 1998 Digital Millennium Act method of notification and deletion: this entails that if a given content harms the interest in a proven way of somebody, that can notify the Internet service provider hosting the content, and the ISP will have to remove the content under consideration. The civil lobby of Hungarian self-regulating Content Provider Association could manage to put through in the legislation process that this procedure applies only in cases when intellectual property rights are harmed.

In 2002, the National Radio and Television Broadcasting Committee prepared a detailed plan on Internet content regulation, but this plan was declined since the Committee was not given the task of preparing this plan. The Ministry prepared in 2003 amendments to the 2001 law, after a detailed consultation with the civil self-regulating associations. The results of the

consultation were included in the amendments, that declared that self-regulation needs to be encouraged, but must not be supervised by state. The Consumer Protection Office received the task of spamming regulation. However, some experts state (Bodoky 2004) that there is no need for a separate law on content regulation. Others claim, that instead of emphasising self-regulation, the EU attaches importance to co-regulation. The proposals of the Ministry do not mention the content filters: it is agreed, that content filters should used by individuals, not by service providers, and the consciousness of the users would need to be raised instead of a central content regulation. Actions harming the interests of children are sanctioned severely by the Hungarian legislation.

F.4.6. Protection of consumer interests

Consumer rights in telecommunications are detailed in numerous laws and are represented by several authorities in Hungary. The three authorities that share responsibilities in this respect are the National Communications Authority (NCA), the Hungarian Competition Authority (HCA) and the General Inspectorate for Consumer Protection (GICP). The activity of NCA is based on the law on telecommunications and on the law on e-commerce. The 2003. law on telecommunications created the new position of telecommunications consumer rights representative, but it took several months to start up the functioning of this position.

NCA has to issue a market surveillance plan, and has to agree on the cooperation with GICP and the HCA. In the year 2003 the legal predecessor of NCA handled 2380 cases, 1504 of which were considered to be not reasonable complaints. This large share of complaints not supported by law may indicate lack of legal knowledge on the part of consumers, but may also point to lack of legal support to several consumer interests. (Bodoky 2004). Interestingly, the decisions of NCA may not be accompanied with compensation.

The Telecommunication Decision Making Committee and the Council of NCA are some type of an arbitration court that deals only with commercial interest conflicts, and does not have the task to decide on issues related to consumers.

GICP, among other general consumer protection issues, is responsible for questions related to spamming. However, since 01. January 2004 GICP does not deal with other telecommunication related issues any more.

HCA has the legal task to secure competition, to enforce the competition law and to examine the results of firm decisions. Inside HCA there is an office for information and communication issues, and that office accepts notifications. Typical problems landing at the HCA are unilateral price increases of cable service providers, and marketing advertisements that are capable of deceiving consumers. The HCA also issues regular market surveys. Last year the related office of HCA received 267 complaints, and 21 examinations started based on the complaints. At the end of its procedures HCA may issue fines, but the fined can postpone payment obligations. Individuals usually lack the knowledge of the competition law, therefore mainly firms submit complaints to HCA. It is not the main task of the Competition Authority to deal with consumer complaints, and it would not be able to deal with them properly, due to prolonged investigation and decision making processes.

There are numerous civil organisations (National Association for Consumer Protection in Hungary, Netért) that represent consumer interests in telecommunication. However, their main tasks should be to provide information to consumers rather than dealing with complaints, and there is certainly a need to improve the knowledge of consumers about their rights in Hungary.

F5. Conclusions:

On the whole, the privatisation process in Hungary can be considered as a successful story, that lead to the creation of a competitive business environment based on private ownership. In this environment, the necessary institutions needed for the proper functioning of the whole economy were laid down early in the transition process. The privatisation process in the telecommunications sector was carried through quickly in Hungary, but the asymmetric structure created impacted on the further development of the sector. Telecommunication privatisation and regulation development pictures the conflicting interests of the government throughout the whole process.

The regulation on the telecommunications market faced serious challenges in the past years, and was changing continuously. The need for improved regulation was recognized steadily, but political and lobby forces hindered the efficient legislation and enforcement. Regulatory failures were accompanied by the downturn in the international telecommunications market that caused a lack of investment initiatives on the Hungarian market. All the above mentioned factors have played a crucial role in the fact that the beneficial effects of competition are not recognisable on the telecommunications market - maybe with the exception of the mobile market and the market for business services. The new law on telecommunications is hopefully going to deal with all these problems, introduce increased competition that could lead to lower prices and increased penetration.

The structure of the main markets in telecommunication is changing: after the introduction of the new telecommunications law a consolidation on the fixed market started to develop.

Basic and necessary acts of regulation in the area of internet relating to e-commerce, e-signature, data protection and intellectual property rights are passed. The laws contain the legal harmonisation requirements of the EU, and treat the most important regulation problems of the internet, and thereby facilitate the development of the information society. It is a favourable development, that the government plans increased actions in the use of e-signature and the development of e-government services. In the area of intellectual property rights, there is a need to tackle to problem of widespread use of illegal software. In content regulation, some important unresolved questions on the role of self-regulation and state involvement remain. The problems of consumer interest representation are partly those of implementation capacity of NCA, and partly a problem of regulation, but it is expected that after the establishment of a new institutional structure in the 2003 law on telecommunications these problems will be solved.

F6. SWOT analysis

Strengths	**Weaknesses**
- Privatisation process is carried out, favourable business environment - Basic regulation is created (telecommunications law, e-commerce, e-signature, intellectual property rights, data protection and data publicity, content regulation) - The existing infrastructure is of good quality - Competition has developed in the mobile market, and is starting to develop in the fixed market - Number of service providers is high in the internet market	- Fragmentation of competitors of Matáv due to structure created by the past concession system - Regardless of the concession period, still Matáv is the most powerful player in the market - Small market with low purchasing power - Slow development of the law on telecommunication, slow creation of executive decrees - Strong lobby influence can force the government and Parliament to go against what would be reasonable for IS development - Past regulatory failures - Inefficient regulatory implementation - Overburdened regulator - Low level of entry, high prices - The treatment of intellectual property rights - Weak protection of consumer interests
Opportunities	**Threats**
- If more strong capital-based investors would enter the market, the strong lobby power of MATAV could decrease and therefore real liberalised market with competition could be achieved. - New law on Telecommunications - More efficient regulatory structure, new institutions - Better implementation of the new law - Coherent political action in the area of all related regulations with a strategic view - Mobile penetration - Cable television infrastructure may provide opportunity for increasing competition in the local loop - Increased involvement of government into the use of e-signature	- If MATAV conserves its extreme ability to lobby, IS penetration rates and therefore IS development can stagnate or not increase enough for years. - International trends: lack of capital in the IT sector - Ongoing regulatory and political failures leading to unintended consequences - Solely business-oriented competition

G: Educational sector and labour force supply, training in IST-related subjects

G.1. Education in Hungary - enrolment, institutions, finances

G.1.1. Institutional changes - elementary and secondary education

The schooling system faced radical changes since transition. Before 1990, the system of secondary education was simpler and more transparent, but at the same time, offered less choice to the students. Elementary education consisted of eight years of studies, and then one could choose between three types of secondary schools: three years of vocational training without graduation, four years of vocational training with graduation, and grammar school. Students of the last two types of schools could continue their studies on the tertiary level.

The 1993 LXXIX. law on public education, while preserving this basic system, enabled the schools to create new forms of training in secondary education. Since then, pupils can enter different forms of secondary education after four or after six years of elementary schooling, too. Considerably more freedom is given to schools in the forming of their curricula: this creates advantages of diversity and competition of schools, but also, creates barriers to students to move from one type of secondary educational institute to another.

The public education reform opened competition between schools not only by providing them with more freedom in the shaping of the curriculum: private schools were allowed to operate as well. The emergence of private and foundational schools at all levels of the educational system introduced new, more innovative ways of teaching. Churches operate 94 grammar schools, 20 vocational schools, and 27 schools that are vocational and grammar schools. Foundations run 54 vocational schools, 50 grammar schools, and 140 vocational schools providing graduation and entry to higher education (HCSO 2002). These numbers are not too big, but indicate a certain tendency of activity of the civil sphere and of the school system getting multi-layered.

Before 1990, students had no choice which elementary school to enter: they had to choose the school in their district. Since the reform, students have this choice as well.

The 1993 law extended school age to sixteen years, and in 1998 this was extended further to eighteen years. The existent system of different school types in elementary and secondary education is illustrated in Table G.1.

Table G.1. Structure of Education

crèche age: 0 - 3		
nursery school age: 3 - 6		
elementary school age: 6 - 14	elementary school age: 6 - 14	elementary school age 6 - 10 or 12 or 14
vocational training school	vocational –grammar school	grammar school
age: 14 - 18	age: 14 - 18	age: 10 or 12 or 14 - 18
	tertiary education:	
	special colleges (1-4 years) or	
	regular colleges (3-4 years) or	
	universities (5 years)	
post degree programs, PhD		

G.1.2. Institutional changes - tertiary education

After 1990, in line with the state-funded tertiary education, private (foundational, church-operated) upper level institutions emerged. Many newly founded schools specialized in areas that were not or not well covered by the public education – marketing schools, manager schools, and accountant schools were opened. Most of them offer 2-3 yearlong training and in many cases the students have to pay tuition. The Hungarian Accreditation Committee (HAC) had the task to give accreditation to these new schools, and most of them did acquire it.

The HAC also had the task to monitor and guide the process of integration of universities. This process was started at the end of the nineties, and its main goal was to form such 'universal' universities, that can offer a broad range of trainings ranging over several scientific fields. This means that a tertiary institution with an educational profile in only one field cannot get accredited as a university. During this process, new faculties and departments were formed, and some institutions joined their resources. For example, the Budapest Technical University solved this task by creating new departments, while the Budapest University of Economics merged with the Regular College of Public Administration. One of the main intentions of the government was to decrease the fragmentation of the system; this goal could not be reached wholly because of vested interests of the universities. Sometimes the institutions solved the problem of integration in a way that runs counter to professional rationality. On the whole, the number of independent state funded institutions decreased during this process, and the now existent institutions have a multiple profile (Table G.5). The assessment of the quality of the integration process remains to be evaluated in 2003.

Educational research in Hungary emphasizes the importance of creation of regional knowledge centres, the cores of which are regional universities that play a role in regional development policy implementation, too. Yet during the process of integration this aspect was not stressed, instead 'city universities' were formed.

Hungary is pursuing the path of changes described in the Bologna process. Thereby a two stage tertiary education system is emerging, offering bachelor and masters degrees. Credit systems

are introduced, and steps are made towards the mutual acknowledgement of educational certificates with other states. The institutions specialized in economics and related subjects are heading this process.

Certain changes were also implemented in the vertical structure of higher education: doctoral training and accredited post-secondary training were introduced. Postgraduate further vocational training was broadened (Polónyi 2000). The long awaited regulation of adult education appeared only in 2001, which fact indicates that life long learning is not among the most important focus points of government.

In spite of all these institutional changes in higher education, the inner organisational structure of institutions did not change much. The regulatory background of education is changing continuously, and in some cases the implementation of otherwise right laws is burdened with contradictions (Polónyi 2000).

G.1.3. Trends in educational enrolment levels

The demographic processes are clearly reflected in the enrolment levels into elementary education: the number of students is slowly but steadily decreasing. In secondary education there is a continuous shift occurring from vocational training to grammar schools, mirroring the changing demands of the economy (Graph G.2. and G.3.). Pure vocational training lost significant amounts of students, while vocational schools offering graduation similar to grammar school graduation gained popularity. On the whole, enrolment into secondary education increased during the past decade. Enrolment levels increased in the areas of quality education, thereby increasing the financing needs of training.

New types of grammar schools were attended by an increasing proportion of students: 65000 students were in these schools in the year 2001/2002 (HCSO[86] 2002).

In the nineties, there was a shift towards mass education in higher education. It was a policy-driven process, and the goal was to reach the levels of the western countries in providing access to a larger share of population to upper level education. This goal will be reached in the forthcoming years: but it is worth to note, that it is only a quantitative goal.

The number of students exploded by 270% in only ten years (Table G.5). The number of full time students has doubled, and main drivers of this change are students of evening and correspondence courses. This type of education gained popularity in spite of long overdue regulation, and the lack of state support to this type of studies. This may be caused by economic pressures and also by changing career profiles of people. The participation of older generations in higher education is also a recent trend of this decade (Setényi 2000). Detailed data on upper level education by area of training is included in Table G.8. and G.9. Enrolment levels in regular colleges that are more practice and labour market oriented grew significantly.

The number of teachers and their qualification impacts on the quality of education. On average, the number of qualified teachers is growing slowly, but steadily. Both in secondary and in tertiary education, the growth of teacher numbers did not follow the pace of growth of students (Table G.4). All this resulted in a shift to a quantity-oriented secondary and higher education.

There are no conspicuous regional differences in educational enrolment that could be spotted from the available data (Table G.10). Each region is provided with similar amounts of

[86] Hungarian Central Statistical Office

secondary schools per number of school-aged children. The only differences lie in the financial capacities of local governments, and this may influence the quality of education. There are only slight differences in the probability of students from different regions to enter tertiary education. In higher education, institutes are present in all regional centres. Data on upper level students by residence likewise does not show any perceptible regional differences.

The numbers of students graduated from secondary and tertiary education follows the processes in the enrolment numbers, with a certain lag (Table G.7). As upper level education gets increasingly available for students, dropout rose in those institutions that provide entry into their programs without an entrance exam (Polónyi 2000). The ratios of those students that have applied and that have been admitted to certain areas of training picture the demands that are faced by these areas: the most popular areas are fine arts, law and economics (Table G.8). In the aggregate numbers it does not show, but informatics and technical management are also getting increasingly popular, catching up with economics.

As already mentioned, life long learning pictures itself most apparently in upper level education. In secondary education it has less importance. No data is available on trends in life long education by area of training. Distance learning is a typical form of life long learning in higher education, and its students do not receive any type of support from government; their training is fully financed by themselves. (Table G.6)

One apparent property of higher education in Hungary is the lack of so-called 'accredited upper level vocational training'. It has been forecasted, that by 2010, the labour market will need more than twenty thousand people with this type of degree. However, despite of slight increases in student numbers, this type of training is not progressing in the needed way (Table G.5).

Compared to remarkable broadening of higher education, the number of doctoral students rises only moderately (Table G.5), but it is likely, that doctoral training will become available to masses of students in the near future (Kozma 2000).

G.1.4. The financial background of education

Before examining the financial tensions present in the Hungarian education system, the division of responsibilities and ownership in different types of education have to be considered. Providing elementary and secondary education is since transition the obligatory task of local governments, they are the owners and the operators of elementary and secondary schools. Elementary schools belong to local governments of the settlements, while secondary schools can be operated by settlement or by county local governments as well. However, central government plays a role in financing this task: municipalities receive normative funding based on several indicators. The role private schools play in fulfilling tasks that have public benefit is acknowledged by their entitlement to the same normative grants that municipalities receive for operating schools. Normative grants are not earmarked grants, and they do not cover the full costs in education. The financial stance of municipalities influences educational expenses.

Secondary education belonged in the past ten years to tasks that placed heavy burdens on municipal budgets - because the services they provide have spill over characteristics - and settlement local governments had the opportunity to pass on the operation of their secondary schools to county local governments, which were obliged to take it over. Due to the fact that counties did have less sources they could get revenues from, this situation caused fiscal

tensions in the operation of county governments and their schools. These tensions are to be relieved by the ongoing local governmental reform.

Providing higher education, its financing and monitoring are the tasks of central government. Institutions are financed in a quasi-normative way, they receive normative funds after the number of their students, but basis approach and task financing play a role as well. Most of the places in upper level education need not be co-financed by the student - in this sense, higher education is free in Hungary, until the acquiring of the first degree. Life long learning is not supported by the state, although it has been estimated, that the knowledge behind a degree looses its relevance in the market in 10-15 years. Most institutions are characterized by low level of own sources.

There are several tensions present in this system, however. Directions of change in the funding of new programs, broadening or narrowing of enrolment in programs are determined by the availability of additional state funding, which deteriorates the responsiveness of institutions to market processes. Efficiency and effectiveness of state funding are hardly ever examined. The relatively low wages of university teachers cause them to use the university infrastructure for own purposes. In spite of rise in student numbers, total state funding did decrease over the last decade in real terms. Any changes in the present system are hard to implement, due to the vested interests present. Therefore, some claim that the present system of higher education is underfinanced and expensive at the same time (Török 2003). Structural financial reforms in higher education are in the phase of preparation these days. (Matolcsy 2002)

To give a broader picture of the current position of education (both public and higher level) among governmental welfare tasks, it is instructive to take a look at the share of governmental education expenses as proportion of the GDP (Table G.11.). Compared to data on other OECD countries, this share is among the smallest ones. Per capita education expenses as a share of GDP show a more promising picture, they are among the average numbers of OECD countries (OKI 2000).

In the period 1990-2000, state educational expenses decreased in real terms by 23%. (Table G.12) This decrease was 22% in the case of per capita subsidies in public education. In higher education, per capita subsidies dropped by more than 50% (Stark 2002). In public finance reform, no structural changes were carried through in higher education, instead; only the real value of funding was suppressed (Hrubos 2000).

This low level of funding is reflected in the equipment of institutions, and in teacher salaries. Low teacher wages were also the results of the financial restraint after 1995. In 2000, teacher salaries in public education were by 24% lower in real terms than in 1990. The need for investments in public education could not be covered from the existing sources.

In secondary education due to low salaries and cutbacks between 1992 and 1997, the number of trained teaching staff decreased by twenty percent. In order to increase the attractiveness of the public sector and to deal with the striking wage differences, the Medgyessy-government increased drastically public sector wages. This increase was not high enough to make teaching more attractive, but caused some financing problems to the government. Municipalities did not receive increased funding in order to be able to pay the increased teacher salaries, and most of them did not have extra funds because of other problems in municipal finances - so this move did not solve the problem wholly.

Tertiary education is funded by the central government, and the central government is clearly devoted to increase teacher salaries drastically - but still, in the year 2001, after the introduction of the first wage reforms in university education, the wage of a university professor still did not reach the market wage of a career-starter ICT student. Teachers in the area of ICT education have to study continuously to stay up-to-date. Besides the proper remuneration, teachers would also need increased help in coping with their training needs.

After 2000, a slight improvement can be witnessed in the share of educational expenses in the budget. Teacher salaries are also beginning to grow, due to the wage reform of public servants. Nevertheless, a further increase of funding of education would be needed to reach the goal of appropriate support of development through welfare expenses (Stark 2002).

G.2. Domestic and international mobility of scientific and technical personnel

Mobility of trained professional increased since transition obviously. Already in the five years before 1990 there was a slight tendency of increasing opportunities for scientific and technical personnel. The past decade can be characterised by intensifying relationships between Hungarian and foreign institutions, both in research and teaching activities. The mobility of teachers and students increased as well (Polónyi 2000). The spread of WWW and of communication technologies provides new opportunities: the courses and even the content of courses of foreign universities can be reached via internet, keeping contacts with international experts becomes easier, Hungarian publications on the internet can also be reached by foreign institutions easily, information on conferences, scholarships, and the latest scientific developments are available. The process of increasing mobility shall be even more accelerated with Hungary joining the EU. Mobility in itself is a process to welcome, but brain drain is to be avoided.

G.2.1. Domestic mobility of scientific and technical personnel

As far as domestic mobility is concerned, not much can be said due to the lack of reliable data. The average domestic mobility of Hungarians is lower than that of the inhabitants of western countries - this may have causes in cultural habits, but also in opportunities. Regional differences in economic variables may drive and may inhibit domestic mobility. Trained personnel is forced to move to larger cities, to centres where working opportunities can be found. Technical personnel can increasingly find possibilities to work in industrial parks as well. Hungary is a small country, and since universities and research institutions are centred in a few cities, and also overwhelmingly in Budapest, domestic mobility is not really costly for trained personnel. Teachers and researchers in academic institution have the status of public servants, and therefore had lower wages in the past decade than others applied in the market sphere. It was usual for academic employees to have several posts at different universities and institution to earn a living, and this may have entailed for several teachers regular travels from one bigger city to another inside of Hungary.

On the whole, domestic mobility of scientific personnel is to the direction of Budapest in all scientific areas except for biological and health studies. Technical sector mobility is towards centres of innovation, investment and teaching. The eastern part of Hungary is more abundantly supplied with ICT-related teaching sites. Budapest is the centre of innovation, while in investments the western part is in a slightly better position.

G.2.2. International mobility of scientific and technical personnel

International mobility is even harder to measure, since after 1990 the obligatory reporting of a foreign job was cancelled, no official statistic can keep track of the internationally mobile personnel. Fortunately, a recent study conducted interviews and gathered data in several institutions on the international mobility of trained professionals. The main focus was on scientific personnel, but since alumni of the Budapest Technical University were extensively covered in this research, some conclusions can be made on mobility of technical personnel as well. The following paragraphs use the data of this research (Tamási 2000).

According to the study, the first signs of increased mobility and 'brain drain' from Hungary occurred in the eighties, and the process accelerated shortly after 1990. Barriers from travelling were removed, but meanwhile opportunities to succeed in a carrier did not improve inside the country: the funding of research shrunk. The study examined the period from 1987 to 1997. The numbers of researchers spending time in other countries boomed around 1990, and decreased since, reached a steady yearly level (Table G.13). This steady level may indicate that the fear from brain drain may not be reasonable. The main motivations of the mobile group are: better wages, better living standards, 'acknowledgement of knowledge', better circumstances to do research, and family reasons. Main target country is the US. The original goal of leaving is either a scholarship, a join project, or a job opportunity. Biologists and medical scientists are to most mobile group. Overall, 61% of those spending time studying or working in a foreign country did not return. The age cohort most likely to remain abroad is between 30 and 40.

As far as ICT experts are concerned, the main driving forces of international mobility are wage differences. As it shall be analysed later, Hungarian higher education cannot meet market demands for trained technical personnel fully yet, and mobility driven by wage differences leading to brain drain is a threatening process to the development of Hungarian information society. Recently wage differences are disappearing due to the inflow of FDI.

After transition, the international mobility of students increased significantly. While earlier for most students a semester at a foreign university was only a dream, the co-operation of Hungarian and European universities made this dream come true. Scientific mobility also increased: conducting research in a western university or institute is more and more common. The number of students having received a PhD degree at Western European and American universities increased, and thereby the networks of scientific research in Hungary became broader. Postdoctoral fellowships and other teaching opportunities are also increasingly used by scientific staff in Hungary. The increasing importance attached to the study of languages has played an important role in all these developments.

G.3. Tertiary sector and research performance in ICT and IST-related subjects

G.3.1. The infrastructure supporting research

The information technology related services for Hungarian academic community (research institutes, universities, and libraries) and thereby for the wider public are developed in the framework of National Information Infrastructure Development Programme (NIID). In the implementation of the programme, the academia co-operates with the government. The information infrastructure improvements of the past ten years will be listed in the next paragraphs. (NIIF 2001)

A new optical network (Hbone, 2.5 Gbit/sec, 30 Gbit capacity in the core) started to operate in the end of 2001 for the academia and for the whole country. IP services on this network are provided by HUNGARNET, which is an organisation of the academy. This setup enables the use of huge intellectual potential of the academy in the services of this network.

Higher education received thousands of up-to-date equipped computers from the government, and the training laboratories of Hungarian universities are by now obliged to participate in the Hungarian GRID system as clusters. This new technological development is about to reform the sharing of computing capacities via Internet.

Libraries, that received computers and internet-access in the Széchenyi plan, got attached to 35 endpoints of the NIID network. By now, more than 200 public libraries are members of this network, and schools participating in the Sulinet project are connected to the network, too. In the process of access of these institutions, several network problems caused by earlier regulations came to surface.

For libraries, there are other ongoing projects. MOKKA is a common catalogue system, KözelKat will be a system of catalogue access to all libraries by the population. SZEZÁM will be a collection of portals in several scientific areas, the first candidates are physics, computing science and library science. Anyway, the number of and the available content at Hungarian virtual libraries is steadily increasing. (http://www.mek.iif.hu/)

G.3.2. ICT and IST impacts on tertiary sector and research performance

Not only tertiary sector and research impact on the development of information society. The spread of using information and communication technologies also impacts on science, and on the performance of research in every area. Action routines, relationships are changing, information markets broaden. The use of IST in research in different by scientific areas: in some quickly changing sciences (biology, informatics, economics) researchers use the internet and the content available quite frequently, while in traditional directions of philosophy, in theology and history this is not the case. In each area, Hungarian scholars use their IST opportunities fruitfully to enrich their research (Fábry 2002).

G.3.3. Tertiary sector and research performance in ICT related subjects

Academic, scientific research in ICT related areas has strong traditions and great achievements in Hungary. MTA SZTAKI has results in research of artificial neural networks applied in recognition tasks, and works together with the University of Berkeley. BMGE and the Mathematical and Computing Science Institute of the Academy have several research results in telecommunications, in data transmission and sign compression, security issues, system- and regulation-theory, intelligent system modelling, robust systems. Ericsson and Motorola co-operate with these research institutes in independent projects. Famous researchers as Adolf Rényi, Rudolf Kalman, József Hatvany hallmark these institutes.

Hungarian innovations have achieved some significant international successes, too: Graphisoft created marketable architectural design softwares in a strong international competition, and managed to become a partner of Apple, the second biggest market player on personal computers. Recognita, a software development for writing recognition was also a competitive achievement, which was sold to an American company[87] due to the lack of capital. (Bakonyi 2001)

G.3.4. Tertiary sector and research performance in IST related subjects

Governmental policies promoting information society were successful in creating research bodies working on gathering information on the Hungarian information society, analysing international experiences, and writing studies on the prospects of Hungary related to different policy directions.

The main independent research institute on IST topics is the ITTK (Information Society Research Institute, ISTRI). It was jointly founded by the Budapest Technical University and UNESCO. Its goal is to conduct independent interdisciplinary research going to the frontiers of science. It has a regular periodical with research reports (Infinit), a journal (Information Society) and publishes books. Most science-oriented independent studies on information society in Hungary relate somehow to this institute. It has several subdivisions and working groups.

Of course, academic research institutes in traditional sciences of politology, sociology and economics also have media and IST oriented research groups. The Central European University participates frequently in IST-related research.

Governmental regulatory bodies need research papers for shaping their policy goals and monitoring the successes of the implementation: research institutes (Tárki, GKI, Szonda-Ipsos, BellResearch, ITGlobe, Netsurvey) satisfy this demand. Stratek is a newly founded governmental research institute related directly to the Prime Ministers Office, conducting strategy-oriented research. The same is done by the Industial Research Institute and by the Institute of Public Education. The latter one is the research site of the Ministry of Education.

The main data gatherer on information society indicators is the HCSO, but all the above-mentioned institutions collect survey level data as well. The public opinion research institute Medián runs a continuous monitor of the popularity of Internet sites called Webaudit.

IST-related research has several opportunities to reach the public; there are numerous journals in Hungary on the subject. The most well known ones are eVilág (eWorld), Információs

[87] Scansoft Inc.

Társadalom (Information Society), Médiakutató (Media Research), and ModemKor (Modem Age). Some of these appear on the Internet as well. Scientific journals in each related discipline publish articles related to IST topics.

Despite of popularity of this area of research among researchers, some weaknesses can also be mentioned. A relatively large proportion of articles have the mission to introduce western ideas from more developed countries to the domestic audience, but there is a clear lack of generic domestic theoretical or policy ideas. This is a natural by-product of the state of affairs in ICT and IST in Hungary, and in the scientific area catch-up to western level is likely to happen more quickly than in any other area of the economy or society.

Not only governmental support, but support from businesses is shaping research related to IST in Hungary. One of the biggest supporters of IST related research is Matáv - it funds several studies of prominent researchers. Recently it participated in the creation of a research centre within the organisation of Budapest Technical and Economics University called MOKK (Media Teaching and Research Centre). The task of this institution is to conduct sociological research related to Internet, and also to participate in research and development projects the results of which can be directly channelled into business use. Matáv publishes an own regular journal on information society, too. Matav also has a training site for IT professionals, and Westel (an affiliate of Matav) has one as well.

G.4. Issues of technology transfer and innovation, the role of academia in innovation, attractiveness of academia for FDI

Several international and Hungarian institutions gather data on innovation, on the practical utilisation of innovation, and on technology transfers. In international comparison Hungary is mainly ranked into an average position, with better achievements in some aspects. IMD, a Swiss research institute ranked 49 countries in 286 categories, and created a summary index of international competitiveness. Hungary was ranked to the 37 position in 1997, then to the 28 in 1998, and its position is not changing since. In the last report, Hungary received better than average rankings in economic performance, but worse than average positions in infrastructure and company efficiency. Technology infrastructure is more advanced (18.), than scientific infrastructure (21.). Zinnes, Eilat and Sachs (2001) analyse the competitiveness of 25 transition economies based on seven indicators (technology, government, financial sector, leadership and labour markets, institutions). On the aggregate, Hungary was ranked to the first place; in technology to the third, in infrastructure to the second. UNICE in its 2001 benchmarking report on the "reNEWed" economy found less attractive results: in the information infrastructure index Hungary is the 29 among 30 countries, and while the number of secure hosts per million residents is 170 in the US and 29 on average in the EU, in Hungary it is 5.

Comparing Hungarian and EU data on firms introducing innovations, two conclusions can be made: Hungarian results are smaller in each category, and the gap between the number of innovations of SME's and larger firms is larger. Lower than Hungarian innovation levels can only be detected in Portugal and in Spain. However, if innovation numbers were to be compared to population level instead of the number of firms, figures would show a more promising picture.

In the previous seven years the environment for innovations changed with the appearance of multinational companies in Hungary. They seem to be less interested in Hungarian innovations, or rather in the not properly detailed and managed Hungarian patents.

There is an initiative, which tries to link the academia and the business: the Infopark (Informatical and Technology Innovation Park) in the centre of Budapest, in Lágymányos, in southern Buda. It is intended to serve as a place for R&D, for academic research institutions and businesses. The territory is close to the BMGE complex, and it will be a place for BMGE and ELTE buildings, will provide a background for high-level education, too. Several firms are among the supporters; the greatest ones are IBM and Matáv. Matáv is setting up a research centre with 800 employees. The main goal of this initiative is to start synergistic processes between academia and R&D, and to build a high quality scientific infrastructure. It could efficiently fight brain drain of the most qualified experts. (Bognár 1998, Gróf 2002)

A software manufactory, and object oriented programming software-technology centre, a multimedia informatical centre is to be set up. Netcall 36 will operate also in the Infopark: it is a private company helping businesses to obtain information and education in business-related topics. The park is open for further businesses. The main elements of the project have been implemented already, the Infopark started to function in 2002.

Another project is emerging recently, which intends to gather innovation, R&D, teaching and business into one region (near the village Zsámbék) to the northwest of Budapest. Its name is Talentis, and it is promoted by businesses and the academia jointly. Not much can be said about the project yet, since its implementation faces several political and bureaucratic barriers, in spite of the fact it was welcomed widely by all parties.

In the creation of industrial parks, similar synergies were intended to create. Now 112 industrial parks function in the country, they channel in FDI, but also provide several opportunities for SMEs. They have a large innovation potential that needs to be exploited in the future, since by today they play no role in innovation, except for the Infopark and the industrial park of the city Győr (Rakusz 2002).

Hungary is participating in the TIP (Technology and Innovation Project) task force of OECD on national innovation policies, yet only as an observer, since research on national innovation policies in the country are not well developed by the time being. The main result of the TIP project is that innovation policy problems are near the same in developed and in catching up countries, only the latter have to work on correcting problems harder.

According to TIP, for Hungary the following statements hold. A system-oriented way of innovation policies needs to be implemented. The present fragmentation of promoting economic, regional, local and technical at the national and at the local level has to be dealt with. Bridging institutions need to be promoted to create a knowledge economy. When supporting firm level innovation, it is not enough to support the largest and the multinational companies, the SMEs need more help. Innovation groups should be created. (Kleinheincz 2002)

G.5. ICT-related education

G.5.1. ICT-use in public education in general

As the chapter on IST penetration has already demonstrated, most educational institutions are equipped with the hardware, software and Internet access needed for the further development of information society via education. This equippedness shows considerable variation: small schools, village schools are in a worse position.

Students mostly use computers for playing, editing texts, and solving homework. In the teaching of different subjects, computers and digital possibilities are hardly explored, due to the fact that ICT facilities serve the demands of strictly ICT oriented education and school administration. Also, students have considerably less access to machines and the Internet outside their classes, since their supervision is usually not solved. (GKI 2002) Multimedia CD-Roms, and other digital methods are most often used in the teaching of foreign languages and vocational subjects, mathematics and physics. In other subjects, ICT use is negligible (Table G.14).

14% of the students of the lowest grades (1-4, 73 000 pupils), 56.3% form the fifth and sixth grades (141 000 pupils), and 76.3% of those in the 7th and 8th grade (188 000 students) have in class access to computers. In secondary schools, more than 70% of the students have access to computers in class. In class access to the internet is less frequent: 7% in 1-4 grades, 25.9% in 5-6, grades, and 40.6% in the 7-8 grades. (GKI 2002)

Hungarian elementary and secondary education was considered some decades ago to be of a great quality. Although quality is hard to measure, some recent trends should raise public awareness and attention. Hungarian students can still gain several prices in Student Olympics, and mathematical and technical education is still a leading element of the whole system, but otherwise less positive tendencies appeared in the past some years. The PISA report claims that a large share of Hungarian pupils face serious difficulties in understanding written texts, and obtain below average ranking in tasks related to having initiative and creativity. These may be the results of the traditional, Prussian-like mentality of Hungarian education, which places little emphasis on initiative and creativity. These processes are dangerous, since these are the skills most important in an information society.

The owners and operators of schools in public education are municipalities. Gallup (Hungarian Gallup Institute 2003) examined the impacts of 'e-consciousness' of municipalities on the schools they operate: it turned out, that in those settlements, where municipalities were aware of usefulness of e-solutions in their own communication and used ICT-tools more frequently, the same was the case in the schools they did operate. This point to the role the spread of e-governance plays on ICT-use in education. (Table G.22.)

However, this study indicated also, that small settlements are in a disadvantaged position. In these villages, Internet access in schools is scarcer, and the use of ICT and IST solutions also. The lagging behind of small cities and villages is caused by several factors, only few of which can be dealt with by creating new ICT and IST policies. A more complex view should be required, sectoral and regional planning should be synchronized with information society goals.

G.5.2. ICT-related education in elementary and secondary schools

Since the schools have gained considerable freedom in the shaping of their curriculum in the last decades, the teaching of ICT-related skills begins in different ages in different schools. ICT-education may begin in nursery schools that use simple math, logical and drawing programs.[88] Computer games are popular among those children that have access to computers at home, and playing also teaches some important IST skills.

Table G.15. shows the start of ICT-education in a breakdown of grades and school types. In most schools it is compulsory to obtain a minimum level of ICT-knowledge: only 14% of

[88] http://www.mediaguide.hu/happykids/indexHU.html

elementary schools do not have ICT-courses in obligatory curriculum. On the secondary level, every school teaches ICT-knowledge. Besides compulsory classes, more advanced training is also available in most schools, in the form of facultative courses and study groups. (Table G.16)

Most ICT-courses start in the 5th, 7th, 9th and 11th grades: these dates relate to beginnings of more advanced level education in other subjects, as well. ICT-courses may last for one-two or four-six years, depending on school type and facilities. Those grammar schools, that provide 6 or 8 years of training, have the longest ICT-courses.

ICT-courses cover several areas: while some contain only the use of word and data processing, drawing and mailing software, others give help on internet issues as well, and teach basic programming.

G.5.3. ICT-related education of teachers and employees in public education

In ICT-education, teachers are young and have the sufficient knowledge. Also teachers in other subjects and older teachers have to keep track of recent developments, and in 2001, many of them have participated in ICT-related courses: 12% of those educational employees who don't teach, and 28% of teachers. (Table G.17.) Mainly those were involved in these trainings, who come from villages and smaller schools.

Distance learning is not typical among them, only 5.6% of schools participated in this type of education. (GKI 2002) The infrastructural circumstances in schools need further improvements for this development to be made.

G.5.4. Institutional resources: ICT-related items in budgets of educational institutions

Institutional resources that cover ICT-related expenses can be obtained from the following sources by the educational institutions: from local governmental support, from tenders and direct subsidies of central government, and from own resources. Data on school budgets is very difficult to obtain: school expenditures are not directly included in municipal budgets, only surveys can be used to receive school level data.

We could only gather data on ICT-related expenses by the type of expense, but not by the type of source of funding, by years and also, we have no information on the needed amount of sources of schools: tendencies in the numbers are therefore difficult to detect.

Elementary and secondary institutions spent in 2000 approximately 5.8 billion HUFs (24 million EUR) on informatical investment and services. Hardware expenses make up for the most part of these expenditures: 4.3 billion HUFs (16 million EUR) were needed in this area. On softwares 1.3 billions were spent, while 212 million HUFs (80 million EUR)cost the creation of school web pages. Town schools had the largest expenditures, except for schools in the capital. It may be the case that schools in an environment with more infrastructures have to spend less, find it easier to detect cheaper ways of investment. (GKI 2002)

Besides investment, schools also spend on the day-by-day functioning of their infrastructure. These costs have reached 2.7 billion HUFs by 2001. Here, maintaining the functioning of hardware costs 1.1 billion HUFs, Internet access costs 1.5 billionHUFs, the half of which will go to telecommunication firms and the rest to Internet providers, and the cheapest is the operation of web pages (1.8 million HUFs). Hardware operation expenses are the highest in town schools; Internet access costs are the most expensive in the largest cities. Access costs

depend on the amount of use. Most schools have ISDN type of access, since this was supported by the Schoolnet program, but this access is more expensive, than other broadband ways. (GKI 2002)

G.5.5. ICT-use in overall tertiary education

In tertiary education, a smaller share of students has access to the Internet. in classes 63% of them have the opportunity to use it, outside of classes even less. Curiously, these numbers are lower in Budapest. (GKI 2002) Access to computers and access to Internet are of the same share, so it can be considered, that almost each machine is attached to the net.

Until a student reaches graduation, has to participate in 109 compulsory ICT-related classes on average. At colleges, this average number is 133, at universities only 82. Besides obligatory courses, facultative ones can only be chosen in most institutions.

By the time students enter tertiary education, they are already familiar with know the basic IST skills. Depending on the area of study, different new skills have to be taught to students. Few teachers use frequently digital methods in class, few faculties have CD-Roms, only 12% of faculties received CD-Roms from the ministry for teaching purposes, and further 40% have own digitalized teaching material.

The informatical infrastructure of tertiary level institutions is almost exclusively used for obligatory ICT-related courses and in ICT-specialized education.

The further penetration of distance learning is hampered by the unresolved issues of teacher-student relationships and supervision of students. Half of all tertiary level institutions provide distance learning opportunities for their students. This method is more popular on the countryside, in Budapest only 15% of the institutions use it.

G.5.6. ICT-related education in tertiary education

Data on ICT-related education by institutions from the school year 2001/2002 can be found in Table G.23. The data shows, that almost every tertiary institution has ICT-related education. Among general ICT-related education, technical informatics and technical management are the most popular and widespread. Although areas different from ICT would also need ICT professionals with area-specific knowledge, this type of training is not widespread in Hungary: health informatics, economical informatics, and space-informatics are the few exceptions.

College level education covers a larger share of students, than university level training. The main type of training is full-time, state financed. Evening and correspondence courses provide training mostly for teachers, while distance teaching is not popular at all. A unique exception is the Gábor Dénes College, which seems to have specialized on distance teaching. (OM 2002)

Enrolment data into ICT-related tertiary education enables us to identify some quite important regional imbalances in the geographical distribution of ICT teaching sites. In this aspect, interestingly, the eastern region is in some advantage: it educates yearly thousands of pupils to ICT-related subjects. The western part is not that well covered, although there are tendencies of increasing coverage. Students are clearly demanding more and more education in this area, in line with the rise in business demands. Widening teaching profiles into this direction is profitable for universities and colleges, since it carries normative funding after the pupils.

However, enrolment frame numbers are determined yearly by the Ministry of Education, and it can create some rigidities. (Bugya 2002)

Hungary has the task to fulfil the obligations of the Bologna Treaty, and that will bring about significant changes in ICT-related tertiary education. Now there is a large demand for ICT-professionals trained to the BSc level, and the shortage of supply could be solved after the introduction of two layer training system. However, the Bologna-reform also requires an education with a new mentality, a differently trained teacher group, and therefore changes can only be implemented on a longer horizon. Now teacher numbers are decreasing, and the average age of teacher's increases due to the contra selection of teachers caused by relatively low wages in tertiary education. The salary of a professor is less, than the salary a fresh graduate can earn in the job market. All the above mean that the quality of informatical education needs to be improved.

A series of interviews conducted in a random sample of 365 students in ICT-related education detected problems related to this fact. Students perceive the contra selection caused by low wages, and claim that their teachers do not have the appropriate knowledge to improve the quality of education, to organise and modernise the structure of materials taught (Siposné 2002).

There are five doctoral schools in Hungary in ICT-related subjects: at the Budapest Technical University, the Eotvos Lorant Science University, the University of Miskolc and of Veszprem, and at the PPKE. On average, in each year, ten to fifteen students receive an ICT-related PhD degree in Hungary. This number is rather low, compared both to the number of students starting postgraduate studies each year (approximately 100), and also to the demands of the academic, scientific, governmental and business sectors. In an ongoing research, doctoral students and their supervisors are being interviewed to find out the main problems leading to the above-described results. (Table G.18.)

The data state that only 11% of the doctoral students received the PhD degree. This picture will improve in some years, since for many students it takes more than five years to obtain the degree, but the question still applies: is the structure of doctoral programs well suited to the requirements of the discipline? The preliminary results of the research indicate, that in the area of ICT-related science, other structure should be applied. (Selényi 2002)

G.5.7. ICT-related further education of employees in tertiary education

Since the average age of teachers in upper level education is rising, most of the cohorts teaching did not have the opportunity to get trained in ICT-related areas in their past education, they need further training. The responsibility of this group of teachers is high in teaching the most up-to-date knowledge to their students. However, average participation rates in ICT-related further training are lower than in secondary education: 9% of teachers, and 18% of the employees in tertiary education who do not teach have participated in further education in 2001. College teachers are by three times more likely to participate in this type of courses.

G.5.8. ICT-related budget items in tertiary education

Regarding the sources of funds, the time series evolution of the expenses and the relationship of expenses to the needed the same can be said as in the case of public education.

Upper level educational institutions have invested 1.6 billion HUFs into ICT equipment in 2000, 1.3 billion in hardware, 265 million HUFs in software, and 8.7 million HUFs in the development of web pages. These amounts are rising since, by 6-8% a year. Colleges tend to spend more on hardware, but less on software. Universities expend more on designing web pages. No regional differences can be mentioned. In 2001, the estimated amount of maintenance and operating ICT-cost is 330 million HUFs. Operation costs of hardware take up 116 million HUFs, web page maintenance 30 millions. In Internet access costs, 60% of the expenses are paid to the Internet provider firms.

All higher education departments in colleges have claimed in the study of GKI 2002, that they would need increased state funding of hardware and software expenses, that the preparation of multimedia teaching packages should be supported along with distance learning support.

G.5.9. Output of ICT-related tertiary education: graduates, their employment opportunities and mobility

Upper level ICT education is in a special position in Hungary. Although there are almost twenty departments providing ICT-related education in Hungarian undergraduate institutions, the job market would still absorb a lot more high skilled ICT professionals. Due to increasing brain drain, this imbalance is not likely to disappear in the near future: the number of positions for ICT professionals is growing exponentially. Based on international experiences, it is forecasted, that the gap between the number of the demanded programming experts and the available supply will reach ten to thirty thousand in the next years in Hungary (Budai 2002). Programming experts are the “elite” among ICT experts, but there will be a serious lack of workforce in other ICT-related jobs, too.

Higher-level education should be more responsive to market needs, since the above processes are crucial to the development of the Hungarian economy. The role of human capital cannot be overemphasised among the factors determining the growth of the country, and the inflow of FDI. Multinational companies are interested in the profitability of their investments, and direct government subsidies cannot replace the role of skilled workers. In the governmental sector there will also be a strong need of ICT-trained personnel.

Therefore, the relationships between the academic world and the business have to be improved, and several measures need to be taken to improve the quality of upper level education in the ICT area. One among these measures could be the restructuring of specialisation areas in upper level education, based on prospective market needs. This step has to be taken quickly, since the adjustment is necessarily slow.

G.5.10. ICT-related education in life long learning: firm level trainings, the case of ECDL and toNet[89]

In life long learning, further education organized or paid by firms for their employees carries ever rising importance. According to the data of HCSO 2002, quarter of the firms that trained their personnel, trained them in subjects related to the main profile of the firm. 13% of all the trainings belonged to ICT and IST related studies. Training expenses and training areas depend strongly on firm size: small firms concentrate on issues related to finances and accounting, while larger ones (with more than 500 employees) are interested in technical and ICT-related education.

[89] toNet: "háLÓRA magyar!" project, untranslatable play with words

Telehouses are supporting the educational system, they provide complementary computer resources and internet access opportunities in those villages that are in the biggest need. They also organise courses in related topics. Nonetheless, most courses in ICT-related topics address the most educated and most well informed age cohort: not all possibilities in providing ICT-related knowledge to the whole population are explored yet. To explore all opportunities of the present and future infrastructure by organizing courses or any other type of knowledge spreading projects for a wide share of population is necessary to bridge the digital divide, which shall be detailed in the chapter I.

It is important to mention one success of ICT-related education in Hungary, the ECDL examination system. It was introduced in 1998, and by now, the Neumann János Computer-Scientific Institution owns and operates 180 examination centres. Hungary became a regional testing centre in Central and Eastern Europe; it has several testing centres abroad, too. The quality assurance system of the Hungarian testing centre is by now adapted officially in Europe, too. ECDL system provides the student with the minimum ICT literacy, but it is standardized, and it became a minimum requirement in public servant training, in teaching and culture employment. National policies bind personal support to ECDL exams. (Alföldi - Szedlmayer 2002)

EDCL exams in Hungary are getting more and more popular even though most companies on the labour market require actual knowledge of PC use and software and not certificates. In February, 2003 the 100 000th ECDL certificate was issued.[90] Related to the promotion of ECDL and support of computer literacy of secondary school students, the Ministry of Education separated 120 million HUF for making the exam free for 12 000 last-grade students in secondary schools.

The to Net program is a similar teaching package to ECDL; the two systems are mutually traversable. The toNet can be used in distance learning, it has a multimedia-teaching package. Public access places can apply for this package in the frameworks of the Széchenyi Plan.

Case study G.1

Information Society heptathlon[91]

The ECDL competition was prepared for the occasion of the 100th anniversary of the birth of the great father of computing, John von Neumann. The competition had assignments like the followings:

- Look up the following data on the domain *neumann-haz.hu:* who is the owner of the domain? Which organisation did register it? What is the IP address and name of the primer name-server?
- Look up train time schedule for attending the Neumann conference in Cegled, 25 October 2003. Send us the pages with the information.
- Look up all articles on Neumann on the website of the newspaper *Nepszabadsag* between 1 January 2003 and 1 February 2003. Send us all the URLs.
- Prepare a website on Neumann. It shall contain his photo, and the following text. […]
- Prepare a new folder in your mailing program with the name *Neumann*. Make a screenshot of it and send it to us.

[90] http://www.ecdl.hu/
[91] http://www.ecdl.hu/IT7PROBA/feladat3.htm

Case study G.2

A course in e-commerce at the International Business School
(Kacsukné - Kiss 2002)

The International Business Scholl started to operate in Budapest as the franchise provider of the four-year BABS (Bachelor of Arts in Business Studies) programme of Oxford Brooks University. It is accredited since 1997 in Hungary, too. The training is practice-oriented, has a "sandwich-structure": students spend their third year at a company. The school always placed a great emphasis on teaching informatics, so that alumni will treat the information systems of their companies as strategic assets, and be able to properly deal with informatical investments. There are obligatory informatics courses during three semesters, and then a two-semester course follows called "Business information systems". Moreover, three optional modules are offered to students in programming, system engineering and electric commerce. In the e-commerce course the language of teaching and of the course materials is English. Business, law and marketing aspects are considered, since the topic is multidisciplinary. Each lecture is followed by an internet-seminar, in order to teach the students to use the e-commerce applications. For the successful completion of the course, students have to create a website for a specific purpose, or to critically analyse a B2C application, or to construct a business plan.

The e-commerce course started in 2001 surrounded by great interests on the side of students. There were some mistakes in the beginning: for example, lectures were taught by outside experts who were not teachers, but this way the structure of the course collapsed. After the whole teaching was controlled by the department. Both second and fourth year students were allowed to study the subject, and there were no differences in their computational skills, but the fact that the older students had more applied experience clearly made a difference. Based on student opinions, the course material got divided into more courses, into a beginner course for second year, and an expert course for fourth grade students.

G.6. SWOT analysis of issues related to the educational sector, labour force supply, and training in IST-related subjects

Strengths	Weaknesses
– Schoolnet – Diversified school types – Contents on the web – Academic infrastructure – ICT, IST research at the leading edge – NIIF – Tertiary education enrolment – ICT-related education	– Educational finances (high costs, low wages, tensions) – Rigidities of institutions – Few firms adopting innovations – Position of SMEs – Wage differentials leading to brain drain and contra selection
Opportunities	**Threats**
– Responding to the needs of businesses – Co-operation of academia and business, channelling funds into R&D and education – Improved infrastructure stops brain drain – Bologna process in upper education, labour market needs fulfilled at lower costs	– No changes in education finances and organisational structure – Functional illiteracy of youth, "mentality" of the education system – Lack of capital of innovating firms – Brain drain – Attitudes of government – Lack of distance learning

Strengths

Secondary and tertiary education faced several changes in the past decade. Some crucial and positive developments were made. Along with its minor problems, the Schoolnet project is a success of integrating schools into the information highway. With institutional reforms in education, new school-types emerged, the choice has widened for students and parents, and the competition between schools increased. Larger freedom in shaping curriculum improves the flexibility of education. Educational and cultural contents are available on the web, and widely used by students in generale education.

Enrolment levels in tertiary education grew considerably. The academic infrastructure is improving continuously in the frameworks of the NIIF programme, and research in ICT related subjects is still at the leading edge in spite of lack of appropriate funding. IST-related research is also developing fastly.

ICT-related education is available at all levels of the educational system, at a very good quality. ICT is also increasingly used in general education.

Weaknesses

The general situation of educational finances is in a great crisis nowadays in Hungary. While the schools and their operators, the local governments claim that there are no funds to cover the most necessary costs; the whole system is too expensive due to inefficient structures. Low wages of teachers lead to selection of the unfit test and reduction in the quality of ICT-related

education, too. Institutional rigidities and the lack of recognition of the important tasks by the government are also serious threats. Schools do not have sufficient funds to spend on software, hardware acquisitions are more necessary these days.

Enrolment quantity grew in tertiary education, but quality-oriented changes are still needed. Low is the enrolment into post-secondary vocational training. Distance learning could not develop yet due to the lack of infrastructure and qualified teaching material. International and international wage differentials can lead to brain drain and selection of the unfit test.

On international average, only few firms adopt innovations, and the differences between large and small firms are large: smaller firms are more likely to lose in the battle for market share when they have no means and intention to innovate. SMEs are also less likely to participate in further ICT-related education, or in any type of further education of their employees, so they would need support from government in several aspects.

Opportunities

In the education system responds to the needs of the business sector quickly enough, the Hungarian economy will be able not to miss its new chances and to grow at a greater pace. Innovative initiatives to channel business funds into academia, innovation, and into research and development can solve the problems of lack of capital of the innovators and improve their market positions, and can motivate further research. Improved access and higher wages to information can stop the outward mobility of the best-educated experts.

In fulfilling the obligations taken in the Bologna process, tertiary education is likely to become less rigid, and with increased college-level training in ICT-related areas the needs of the labour market shall be satisfied in a cheaper way for the government.

The recognition of the increasing importance of education on the side of the government could lead to other successful measures addressing education. Schoolnet.type projects could promote ICT-related methods in teaching in tertiary education as well.

Threats

The main threat is that there shall be no changes in the near future in education finances, and the efficient functioning of the education system shall not be promoted. If the government does not recognise the needs for a reform in the regulation and finance of education, long-lasting distortions can develop the effects of which will place a great burden on the society, and not only in economic terms.

Prevailing wage differences can threaten with increasing brain drain of those educated to the highest levels after EU-accession. Brain drain caused by higher wages, greater profits from innovation and more up-to-date science deprives the Hungarian society of its biggest chances and of the fruits of its most costly investments.

Further neglect of distance learning opportunities can increase social tensions linked to the digital divide.

The threats of functional illiteracy - the signs of which appeared in the latest PISA report – need not to be described in a detailed way.

H. National and regional demographic data and prospective

1. Population indicators

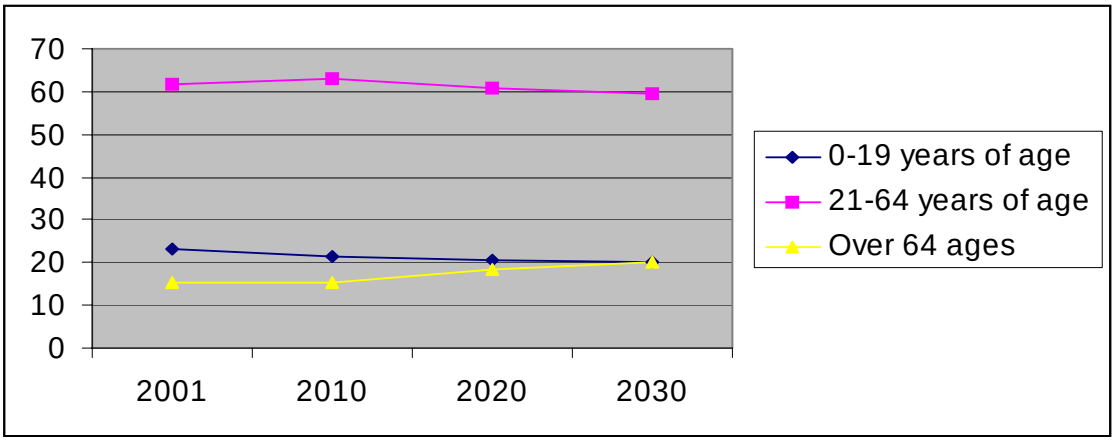
The population of the country was 10.2 million at the beginning of 2001. Population density is 110 inhabitants/square km, slightly lower than the EU average. The division of population has two characteristics features. On the one hand the country is relatively highly urbanised. In 2002 17.4 % of the population lived in the capital, a further 47% in other cities and 35.6% in villages. On the other hand the rural population is dispersed and lives in smaller villages, especially in the more densely populated areas: in 2002 around one-fifth of the village population lived in small villages of less than 1,000 inhabitants.

2. Changing age composition

The age composition of the country follows the EU trends. Nevertheless, both the ratio of those under 15 and those over 64 is slightly below the EU average. In 2002 the share of population of age above 64 years was 15,3% of the total, of those below than 14 was 16,3% and the 15-64 generations represented 68,4% of the total. For the last twenty years the population of Hungary has decreased by 500,000. While in the beginning of 2001 the population was 10,2 million, it declined to 10,14 million by the end of 2002. In the recent years the annual average decline of population was around 35.000 people. The main reasons for the decline include the low and decreasing birth rate and the high mortality-rate: in 2002 the birth rate was only 0,91%, while the mortality rate was 1,31% so the natural decline of population amounted to 0,36%. Life expectancy at birth is low compared to Europe – primarily due to the strikingly high death rate among the active male population.

This situation puts larger and larger pressure on the health care system and on the generations who work. The major demographic challenges beside the decrease in the population and low life expectancy are the ageing population and changes in the country's age-composition. Most of EU member states as well as Hungary is facing the problem of an ageing population. The younger age groups entering the labour market is decreasing and in the meantime the ratio in the age-group of 50-64 is significantly increasing.

Chart H1. Expected medium- and long-term changes in age distribution



Simultaneously to the ageing of the active population the ratio of those over 64 compared to the working population is also slowly but steadily increasing. This percentage of the "dependent

elderly population" was 22.2% in 2001 against the 24% EU average, and will not increase significantly until 2010. However, the ageing of the population will steeply accelerate after 2010.

There will be a fall in the number of the population of working age, and the rate of the elderly dependent population could even reach 31% by 2030. As a result of population ageing, not only the costs of pensions but also those of health care will increase rapidly. This trend places pressure on the health care system and social services.

When looking at the main demographic data at regional level, there are no significant differences between the regions and between the regional and national trends. The age distribution of the population is fairly similar between the NUTS-II regions. The only marked difference between them is that the younger generation represents slightly higher share of total in the less developed regions of Eastern Hungary, while the share of elderly generations (65 and above) is a bit higher than the national average in the more developed regions of the country.

Similar to the age distribution of the population there are only small differences in the regional data on birth and mortality rates. The birth rate has generally been low and declining for many years and it was only 0,95% in 2002. The birth rate was above the national average in the eastern part of the country and below it in the more advanced western regions. The birth rate varied between 0,86% in Western Transdanubian region to 1,06 in Northern Plain region. The differences concerning the mortality rate were in 2002 even less significant between the regions, as it varied between 1,22% in Central Transdanubian and 1,37% in Southern Plain and Northern Hungarian region. Within this small difference, the mortality rate was on average below in more advanced western Hungarian regions and above it in the eastern part of the country.

There are several important social trends which affect population dynamics and social security expenditures linked to them. The main, important from this respect, changes in the society include the longer periods of education for women which causes the progressive increase their average year of having the first child, the increasing trends of living outside marriage and the spreading singly culture, the increased employment of female labour force, which reduces the willingness to take 2 or more children. All these factors lead to the declining birth rates, and change the demand for public services, increasing the demand for child care and housing but reducing it for certain medical professions.

3. Migration

Migration is not particularly strong in Hungary, either internal or external one. As the table in Appendix shows the total number of internal migrants was around 220.000 people representing just 2,2% of the population. Moreover, the total number of migrants during the transition period did not change significantly as compared with 1990, the first year of economic and political changes. In recent years however the figure is on slight rise again both in absolute and relative numbers due to the increase in numbers of migrants and decline in total population. The reasons of low domestic migration are widespread and include among others the inflexible labour and housing markets, the importance of informal social networks, the high transactions costs related to migration.

While generally migration has remained low in Hungary, its internal structure has changed slightly in recent years. Prior 1990s in the previous decades the main directions of internal

migration of population were from less developed towards more advanced regions of the country, and in terms of type of settlements from villages to cities. During the 1990s the net balance of migration between the types of settlements changes slightly. Instead of cities, their surroundings and suburban areas and the progressively developing areas of the country, particularly the Central Hungary Region, have recently become the main destination of migration.

As a result the migration balance of cities and the capital became negative, and in villages adjacent to urban areas in the agglomeration turned positive. Budapest is the main net looser mainly because of the outflow of more affluent population towards the suburbs surrounding the capital. Other major cities are also net losers partly for reason similar to Budapest, but in their case the balance varies between the individual cities. The clear winners are the villages and smaller towns which have significantly increased the population and which have been the main recipients of internal migration in Hungary.

The loss of population due to migration is still the highest in the less developed regions, namely in Northern Plain and in Northern Hungary, though the trend is decreasing and immigration has been gaining greater significance. However, internal migration is still low in international comparison, and is not such that could create a satisfying balance in the labour market.

In the 1990s about 14,000-16,000 people immigrated to Hungary, while the number of those leaving the country was significantly lower. In 2002 the net national balance in foreign migration was around 4000 people, indicating that outward migration of Hungarians was less than 0,1% of the total population. The main sources of migration to Hungary have been the Hungarian speaking people leaving in the neighbouring countries and migrating either for social or cultural reasons. The main sources of outwards migration of Hungarians have been Western Europe and other parts of the world that were earlier also main destination parts of the emigration of Hungarians (USA, Australia, Latin-America).

The positive balance of international migration has somewhat contributed to counterbalancing the loss of population and may be the major source of slowing down the inevitable decline of population in Hungary. Besides that immigration has increased in several areas (both in certain professions (doctors) and regionally) labour supply.

Swot analysis on population dynamics in the Hungarian economy

Looking at the population dynamics it is difficult to say any strengths in the recent demographic developments. There are three weaknesses, which create problems both for economic growth and macroeconomic stability. One is the decline of Hungarian population and that the speed of this decline has only accelerated in recent years. This leads to lower labour supply, which can in the medium term be a significant impediment for high economic growth and catch up.

The second weakness is related to the ageing of the declining population. This process certainly resembles the trends in advanced economies, but the differences in economic development put additional strain on domestic public finances. The ageing of population requires significant changes in the health care and pension systems and these system reforms have certainly proceeded slowly in recent years.

Finally, the domestic migration capacity and ability has remained low. The low migration potential is explained by the problems in the housing market, by the high transaction costs of re-locating ones existence and by social norms and reasons.

One opportunity which may improve population dynamics in the near future following the EU accession may be the increased inflow of the mainly Hungarian speaking foreign citizens from the neighbouring non-EU member countries. This has already been observed in the 1990s and has mitigated the decline of domestic population and increased in several areas labour supply, but it may become more intense after the EU Accession is accomplished.

The main threat to population and migration dynamics could be the similar process the outward migration of the highly qualified domestic labour force to the EU member states. This could be a problem notwithstanding the restrictions in front of free labour movement imposed by many current EU Member States and notwithstanding the differences in growth and unemployment rates between EU-15 and Hungary. This brain drain of both highly skilled labour and blue collar workers could put significant pressures o the labour market and weaken the catch up potential of the country.

Summing up:

Strengths:	**Weaknesses**: Declining population Ageing population Low level of internal migration
Opportunities: Increasing inflow/migration from neighbouring countries	**Threats**: Brain drain in several professions

I. Cultural background

I.1. General trends in employment

After transition, labour markets faced major changes in many aspects. The main development was the mass appearance of unemployment due to quick restructuring of industrial production in the market environment. Between 1990 and 1992, million people lost their job, and in the second wave of shock, between 1992 and 1994, further 1,4 millions. Mainly physical workers, unskilled or older people found it increasingly difficult to find a job. This caused some people to retire at an early age, and others quitted for the black economy.

Jobs ceased to exist mainly in heavy industry and in agriculture: the three regions specialized in these areas were the main losers in transition. In Northern Hungary the socialist metal and machine industry struggled, and on the Great Plain the main driver of mass unemployment was the crisis of agriculture. Main regional differences in unemployment came to existence in the beginning of the nineties, and the relative positions of regions seem to be untouched since. After the first visible improvements in 1998 a slow trend of decreasing unemployment began. (Table I.7)

The positive developments after 1998 further increased regional differences: they favoured mainly the central region of Hungary. Jobs were created mainly in service and infrastructure sectors, which are concentrated geographically to Budapest and its surroundings. Larger firms also have settlements mainly in the middle of Hungary, while small and medium enterprises operate all over the country. The economic crisis of transition hit SMEs harder than larger firms. Investments and FDI did also influence strongly regional workforce patterns: 43% of all investments were realised in Central Hungary, and 60% of foreign firms chose it for their settlement. By the end of the nineties, Western Transdanubia managed to attract 10% of foreign firms. When investigating the amount of FDI, an even bigger concentration can be detected. (Adler 2002)

The patterns of otherwise low level of migration of the population are determined by the regional differences in wages and employment possibilities. The regions with not competitive industrial firms and the regions with dominantly agricultural profile faced the most serious unemployment problems. However, mobility of the unemployed was constrained by the price differences between the leading and the lagging regions, and also by the difficulty to get information on the jobs available in geographically distant regions. The mobility of Hungarian citizens is traditionally somewhat lower than the European average. Even considering these factors, it is interesting to note, that the population of Miskolc, of the once second biggest town with the highest unemployment problems decreased by fifty thousand inhabitants in the past decade.

The main directions in mobility are from declining regions to progressing ones: from east to west, and to Budapest. (Table I.18.) The number of inhabitants of Budapest is decreasing, because both new immigrants from the eastern part of the country and inhabitants of the inner city are moving to the suburbs.

In the western part of the country two tendencies were to be observed in employment in the past decade. Several workers were commuting to the near Austria, where in the same jobs they could receive larger salaries. Many entrepreneurs providing medical (mainly dental) services moved closer to the Austrian border, where they served the demands of the foreign clients.

While average working hours in a week tend to decrease in developed countries, this is not the case in Hungary. Hungarian middle and upper level managers, according to a recent study, are working more hours than their western counterparts, and 80% of them are regularly working excess hours on weekends and holidays (HCSO 2002). Among employees, average working hours have also increased. The forms of societal interaction widespread before transition faded away in the new world of growing uncertainties and market pressures. Therefore Hungarian workers have less time for leisure than they had before transition. This fact has also impacts on the activity of the civil sphere.

In line with rising unemployment the security of employed in the marketplace declined. The position of forced entrepreneurship emerged: because of high administrative (tax and insurance related) costs of fixed employment employees were forced to form small enterprises and sell their "services" to their employers. This resulted in shifting of several types of risks to the employees, in the reduction of their creditworthiness, and in decline of insurance payments for them. Besides, it generated wage tensions between the conventionally employed and the entrepreneurs. The government is now trying to solve this problem by means of changes in legislation concerning small entrepreneurs.

It is important to mention, that wages in Hungary are less than in comparable jobs in other CEE accession countries. This is the result of the lack of union organization and the lack of power of existing unions, and of the lax government regulations favouring multinational companies. Due to the recent wage increases and loss of wage competitiveness, Hungary aims at proving that the country can be attractive to investors not only because its cheap unskilled workforce. The policy of attracting foreign companies by cheap workforce and government subsidies is getting less and less successful, because companies interested in employing cheap unskilled labour are nowadays moving to the Far East, Romania, and Ukraine.

After 2001, real wages in Hungary started to increase. In 1995, public sector wages were frozen, and this caused tensions in labour market. To counterbalance it, public sector wages were increased significantly in 2001 and in 2002, and this contributed to the increase of real wages in the whole economy. While in the face of the above paragraph this process seems to be justified, now it causes severe macroeconomic tensions.

I.2. General changes in income distribution and consumption patterns

After 1990, per capita incomes were declining steadily. First signs of an improvement were visible in 1997, and significant increases occurred in 1998, 2000 and 2001. Real wages per capita dropped drastically after 1990 than per capita incomes. Wages rose first from 1993 to 1994, but the stabilization package stopped this procedure. In line with the recovery of the economy, real wages started to rise after 1997. Nowadays wages are rising at a faster pace than the improvement in productivity, and this macroeconomic threat shall stop the further increase in real wages. (Table I.1.)

Table I.2. and Table I.3. show trends in income distribution. In Table I.2., although inflation blurs the picture, it can be inferred, that the share of income of the highest deciles rose disproportionately, and also the share of population in the lowest deciles is rising, while the middle class is tapering off. The upper/lowest indicator shows that inequalities are increasing. The same conclusions can be inferred from Table I.3., only it makes the picture more transparent.

Some researchers claim, that the rise of interpersonal income inequalities stopped in the second half of the nineties, others state that the stop was only temporary, and in the late nineties inequalities started to rise again. The above data shows, that in 1999 and 2000 inequalities started to rise again. In the beginning of the nineties mobility of households across income deciles increased: this process was to be observed in other transition countries as well. After 1996, mobility of households in the distribution diminished, with the most evident rigidities in the tails of both distributions. In line with aggregate incomes, expenditures tapered off until 1996-97 as well. (Kapitány – Molnár 2002)

Household consumption follows the trends in household incomes. All type of consumption expenditures decreased in the middle of the nineties, caused by macroeconomic policy. Consumption started to recover around 1997. In Table I.5., trends in consumption of different groups of goods can be investigated. Expenditures on permanent consumption increased the most in recent years. In line with western trends, service consumption and expenditure on other industrial goods relatively increased. Expenditures on food and on household energy did increase only slightly: behind the process, agricultural crisis and the official price regulation in the energy sector can be detected. In household consumption, food and energy expenses play the largest role (Table I.6.).

Trends recently observable in western societies, which include the transformation of values concerning consumption, are about to start in Hungary: the value of health and security and the demand for related products is increasing. Transport and communication expenses are also growing.

As already mentioned, consumption of household appliances increased in the past decade. According to the Central Statistical Office, electronic household appliances like colour televisions, VCR players and cameras are most likely to be found at families with the head of family employed in a good job, and educated to a higher level. Middle aged (30-49) households' own significantly more electronic appliances than older people. The urban-village divide can also be captured in this aspect.

I. 3. Evaluation of access to basic infrastructures and services such as utilities, health and education

Infrastructure development was among the main goals of central and local governments since 1990. Except for highways, the development, funding and operation of main infrastructures and services is the responsibility of local governments, as is stated in the 1990 Act on Local Government.

It is useful to distinguish between human and physical infrastructural services. Among human infrastructural services, education and health are the most important.

In elementary education, there is rather an oversupply of schools, because even the smallest settlements aim at operating an elementary school - elementary education is regarded to be a settlement-preserving factor. When serious financial problems constrain a municipality to operate its school more scale-efficiently together with neighbouring villages, and the elementary school is located in another village, local governments provide means of transport for the children. In connection with information society goals, it can be argued, that more efficient operation of local schools could improve upon the financial situation of both the municipality and the school, creating greater possibilities of using computers and a good quality Internet access.

Secondary schools are mainly located in cities and county centres. A good network of dormitories supports children from distant settlements in studying. In secondary education one of the main aspects in school choice of the parents is the geographical proximity of the school, and all types of schools can be found in each part of the country. But, unfortunately, a capital-countryside divide exists in secondary education: those who study in Budapest are more likely to be accepted into tertiary education. Differences in educational achievements of institutions could be to some extent diminished with more proper funding of local governments and of schools.

Local governments provide health services, but funding is totally central responsibility. Health services are free for every insured person, and can be used everywhere in the country. Health sector reform is on agenda these days, since the whole structure and funding of it has to be changed radically. The direction and extent of the reform is still being discussed by the government, the health sector and the society.

Drinking water, the electricity and gas networks are almost fully developed by now everywhere in Hungary. (Table I.15., I.16.) Local road construction accelerated during the past ten years. However, on the national level, road infrastructure development is nearly in the same backward position, as it was in 1990. Although new highway sections were constructed, far more further improvements would be needed. Existing highways are mainly to be found in the western part of the country, thereby boost the economies of the prosperous regions. The lack of bridges and roads connected to bridges outside Budapest may have contributed to the fact that foreign direct investments stop at the Danube.

After 1990, these developments were subsidized by central governmental earmarked and addressed grants. Nowadays the most urgent priority is to develop the sewage networks (Table I.17.), and this process is also about to be finished soon. It can be stated, that access of Hungarian population to basic physical infrastructures is almost complete.

Fixed line and cable networks were developed by the privatised telecommunications companies. The development of fixed lines is a success story of the nineties; penetration rates approximate the European average. Cable coverage is far from complete yet. ADSL, ISDN are only available in certain areas, there are still large territories in Hungary, where inhabitants have to wait and are constrained to use dial-in types of Internet access, or are deprived of even that. Wireless microwave solutions could offer an alternative to ADSL, ISDN and cable networks, but the availability of this service depends on the initiative of the service providers.

I.4. Position of minorities and, most importantly, of the Roma population

There are 13 recognised minorities in Hungary. Based on both nationality and language, the largest minority is the roma population. The German, Croatian, Romanian, Slovakian, Serbian, Slovenian, Polish, Greek, Bulgarian, Ukrainian, and the Russian minorities are recognised as minorities by law.[92]

[92] The above list recites minorities according to their size, beginning with the largest one. The 1990 and 2000 census included questions about nationality and mother tongue of the population. Based on the results of the 1990 survey, 97.8% of the population in Hungary claim to be of Hungarian nationality, and 98.5% claim to speak Hungarian as their mother tongue. The social and economic integration of the minorities is complete in the sense that most minorities have similar statistical properties to the Hungarians living in the same region – but this statement is not true for the roma population. The Hungarian roma minority is the fourth largest in Europe, larger roma groups reside only in Romania, Bulgaria and Spain. The share of people with roma

The country has a well-developed institutional and legal framework for guaranteeing and protecting the rights of minorities. The Office for National and Ethnic Minorities is responsible for the policy framework for minority issues. Minorities are operating minority schools, are free to use their language, participate in local governmental decision making by choosing minority local governments. Since there are only significant differences between the situation of an average Hungarian citizen and its minority counterpart in the case of the Roma minority, the next paragraphs shall deal with their position.

There are approximately 550,000 – 600,000 Roma in Hungary.

The crisis after transition affected very seriously the Roma population. Their integration into the Hungarian society began quite late, in the second half of the century, and was not fully finished by the end of socialism. During socialism, the main goals were to improve the infrastructural conditions of Roma dwellings, to make them settle down, preferably into Hungarian settlements, mixed with the community. Even these goals could not be reached by 1990, and housing conditions did only worsen since: Roma dwellings often do not meet basic health and safety requirements.

During socialism, Romani were mainly working in the large factories as physical workers. After transition, they were the first to get fired. There is a strong correlation of being Roma and being poor. Now 70% of the Roma population in the working age are unemployed, only 33% of children start secondary education (in the Hungarian population this ratio is 90%). In higher education, the share of Romani is scarcely 1% of the total. The life expectancy of Roma population is by 15 years below the Hungarian average. Sociologists claim, that during the nineties Roma started to form an underclass group: (Ladányi 2001) the probability of their social integration decreased steadily. Discrimination in education, health system, and employment, in treatment by police forces and in the legal system is present, despite of several action plans of the government to change this situation. The vicious circle of worsening Roma economic and social positions and deepening preconceptions on the side of Hungarian population seems impossible to be broken. Government programs are addressing all areas of discrimination, try to provide aid for studying, organise public employment, create study materials in the native languages of this minority. Civil organizations give legal help to the Roma population.

The horizon of the governmental program is medium term; so far only small progress was achieved. In European comparison, the government devotes a low amount of financial sources to this goal: in 2002, EUR 49 million was spent on the Roma integration. There are problems in the efficiency of co-ordination of different Roma-oriented programs across ministries, and also, general policies need to be co-ordinated with minority policies.

I.5. Standard of living of the Hungarian population

Standard of living can be assessed by 'hard' and 'soft' indicators: the evolution of main hard economic and social indicators has already been described. This passage will outline main changes in other social and subjective indicators that influence the perception of the standard of living of the population. The emphasis in the assessment of the standard of living is usually on economic indicators, while other social indicators may play an even larger role in the determination of ones satisfaction with ones circumstances. In general it can be concluded, that

nationality in the total population is the largest in the Northern Hungarian Region, while the share of people with roma mother tongues is highest in Southern Danubia. (http://www.meh.hu/nekh/Magyar/4-6.htm)

in Hungary social indicators lag far behind economic ones, paths of economic and social development are divided. (Bogár 2000). In the near future social indicators can become more important in the economic success prospects of an economy as well.

Health conditions of the Hungarian citizens would need improvement: life expectancy is lower than in western countries, cardial and coronary system diseases, cancers are the two main causes of death. The health system is doing its best in treating the population, but prevention is not among the priority topics. Eating and working habits of the people in Hungary, and attitude towards prevention are risk factors from this perspective.

Dwelling possibilities were improved considerably during socialism. After transition, the evolution of incomes impacted on the dwelling possibilities: the social groups reduced to poverty find it more difficult to maintain their houses, or even to obtain a flat. Data on population per hundred flats shows no overall or regional changes in the past decades (HCSO 2002), but behind these macro-level data several problems may hide. One such problem is the deterioration of the condition of high-rise block of flats on housing estates built in the eighties.

In 1999 the government launched a preferential credit programme to support the population in buying a flat: however, in this programme the population in the biggest need was not able to participate because of lack of own source funding. There are no governmental programs that would build flats that could be rented by the citizens.

Havasi (2000) analyses income and consumption patterns, and points to the fact, that the main losers are families with more children, and lonely elderly people. The circumstances of these elderly people are socially inequitable, and the case of families should raise concerns about the future generations.

Time use patterns can also reveal some interesting facts. The Hungarian society is considered a work-centred one since long age, this did not change. Nevertheless, spare time of the population increased on the aggregate level (Table I.12.). Disaggregating the data it turns out, that free time has increased in those groups that were in a worse position during transition. Among unskilled workers, or skilled workers to a lower level, older people, families having children. Free time of the educated, of those who have jobs with responsibility decreased. Men have more free time on the average, than women. Free time of students decreased since 1986. Increasingly more spare time is available to labourers, than to white-collar workers.

Habits in free time transformed also since the eighties. Time devoted to reading, listening to music, talking to friends and relatives, visiting a cinema decreased. Culture consumption did not drop on the aggregate, structural changes in culture consumption appeared, these shall be investigate in detail in the paragraph on culture consumption. Other processes pointing towards individualization appeared: men spend 10% less on meeting with others, women by 20% less. These processes are the most visible in small settlements. People devote 60% of their spare time to watching television. Reading habits have changed mainly among the youth. In families, the share of time spent on sports and walking has increased. (Harcsa 2000, Vitányi 2000).

Subjective assessment of standard of living was evaluated in a study of Tóth (2000) and (Sági 2002). From the study it can be inferred (Table I.8.), that people are mainly satisfied with those factors that they can influence directly. Most people (87.9% in 2001) are satisfied with their family relationships. The share of people satisfied with their job is ranging between 60 and 70% during the last decade. Approximately the same amount of people are satisfied with their housing circumstances, and the district they live in. Past events are accepted as they are by 30%

of the population. In 1990, only 20% was satisfied with the future prospects, this number increased by 10% until 2001. In general, satisfaction with different indicators was increasing during the last decade. The factor most people are unsatisfied with is remuneration: majority of people consider being underpaid in their present jobs, for their present efforts. (Table I.9.)

Utasi (2000) groups subjective satisfaction indices into two groups: those concerning private sphere, and those that are related to the public sphere. Latter indices show that Hungarians are less satisfied with public processes, maybe because they do not see the direct link from their own actions to outcomes. Deterioration in the subjective assessment of public sector processes after transition may have resulted from the unbundling of social integration. Public policy was not able to deal with these problems due to macroeconomic problems and lack of financial sources. It remains a task for the future.

The recent rise in per capita incomes and real wages are reaching a continuously increasing share of the population, thereby improving their standards of living. Yet the rise of consumption is threatening the macroeconomic stability of the country, growing incomes are not accompanied by growing savings and investments. Fiscal policy is likely to slow this process down. Economic stagnation in the economic partner countries will also impact on these processes.

I.6. Patterns in culture consumption

As already mentioned in the paragraph on living standards, culture consumption did not loose ground in the past ten years, measured by aggregate time devoted to culture. However, structural changes occurred. The cultural life became more centred to Budapest. Also, generational changes occurred: cultural habits of the youth have changed significantly. The youth is reading less, and is visiting cultural events less frequently than it did in 1986. Those having a university degree also visit cultural events less frequently, in the group of men time spent on this activity dropped to the half of its 1986 amount. Interestingly, earlier these groups were the most active media consumers. Total time devoted to reading decreased. In towns, reading is still more important than in villages. Women read more than men. People holding a university degree read less, not only in the case of books, but also of newspapers and journals. (Table I.13.) These observations indicate, that traditional culture may have lost popularity. On consumption of new types of culture, another section shall refer. Aggregate processes can be illustrated with data in Table I10., culture consumption by social group is examined in Table I.11. Increase in television consumption can also be seen from increased subscription numbers (Table I.14.). (HCSO 2002a)

Past historical relationships do not impact strongly on everyday cultural life in Hungary. German culture did influence the Hungarian one by affecting its legal structure, terms used in legal communication, and its school system. Until the beginning of the nineties, more Hungarians spoke German, than English. This has changed rapidly, now English is the most popular language. Educational training can be obtained in English at all levels of the educational system, beginning from the nursery school. Bilingual schools are popular in Hungary, several English, French and German ones operate. In these schools students study several subjects in foreign languages, and are taught by foreign native teachers. Training in English, in French and in German is available at several universities (BMGE, BKAE, just to mention some examples).

Culturally, two further large German influences can be mentioned: the first is the fact that Vienna is near to Hungary, and cultural events are close for Hungarians to visit there, and the

second is the activity of the Goethe Institute. Nevertheless, the French Cultural Institute is also quite active in Hungary.

I.7. IST-related trends in employment

The spread of information and computing technology impacted several changes in Hungarian companies and thereby in employment structures. Company information systems are gaining more and more importance in competitiveness of firms, and this is getting recognized by managers as well. Outsourcing of information systems of the company is also quite popular. The stages of production can be organized independently of each other and coordinated by proper use of information systems, leading to cost reductions and increased efficiency. This is why the need for trained personnel is increasing rapidly year by year, and as noted earlier, the education system still cannot cope with this demand. Programmers, software developers are the most haunted workforce.

However, the traditional frameworks of job organisation seem to be still untouched by these developments: the supply of part-time jobs and distance working did not increase significantly in the last decade. Subcontracting is widespread in Hungary, but this fact does not increase the freedom of subcontractors, since they are mainly forced into this position, as it is mentioned above. Micro companies are also numerous, Hungary is the country of one million micro companies, but a part of these companies does not operate, and the overwhelming majority is a forced enterprise.

There is an important aspect to mention among the effects of internet on working life: nowadays the most promising way to find a job is via internet, and the use of internet-based agencies and of free advertisements lowers the costs of search significantly.

According to a recent survey of companies (ITTK 2003), 82% of them is not planning to use distance workers in the upcoming five years, even though 86% of the firms would have the infrastructure necessary to do so. The unbundling of stages of production would open the possibility of distance working, and several types of cost reductions on both sides could be obtained this way. 2.6% of the employed in Hungary are distance workers, and this is near the EU average. But considering the fact that part of this people has steady conventional jobs, too, and considering the opportunities of distance working left unexplored, this share could be even higher.

The demand for distance working would be large on the side of potential employees, as the short operation of Distance Working non-profit organization (Távmunka Kht) indicated: on its website thousands of people registered themselves into the distance working database, awaiting the employers. While the expensiveness of Internet access and of hardware cause some problems on the demand side, the problems of distance working are claimed to be on the supply side. (Bihari 1999)

Employers are not familiar with the terms of this new type of employment; the regulations do not contain elements settling conditions for telework. Employers do not have experiences, and they do not know how to control their subordinates this way. In general, there is a tradition of strict control of employees in the workplace. Some managers fear the collapse of teamwork caused by the more individualistic distance working. There are no professional advisor companies organizing this market, and the legal framework for distance working also needs improvements. Prospective employees are often also reluctant to take the initiative needed to

become distance workers, and costs of info communication infrastructure can prevent them to become one.

Government can play an active role in supporting distance employment. It could organise a distance working association. It could help lowering the prices of Internet access and hardware either by regulation or by price subsidies. Course participation in related topics could be supported for representatives of companies; PR methods could spread information on distance working. Disadvantaged people could be supported directly. Experiences on distance working could be exchanged with international professionals. But in the first place, legal obstacles should be removed.

Behind the above trends concerning distance working there are important attitudes of employees and employers hidden: and these cannot be changed from one day to another. It is likely, that new forms of employment are most likely to develop in those areas, where there are no traditions, which are emerging nowadays: in the areas of ICT and IST related employment.

I.8. Changes in ICT-related consumption patterns

Information-related consumption can be divided into the following subcategories: the consumption of telecommunications appliances, the consumption of conventional and electronic types of media, and the consumption of telecommunication and Internet itself. Since the latter ones hang closely together with cultural patterns, too, they will be discussed in the next section.

The number of subscribers and the amount of use of fixed lines is stagnating since the middle of the nineties, and meanwhile the number of mobile phones and time devoted to mobile conversations is increasing rapidly. By now, every second citizen owns a mobile phone. The popularity of this method of communication is the highest on the Hungarian Great Plain, where the telecommunication companies did not develop extensive networks in the sparsely populated regions with several homesteads. But mobile phones are widely used elsewhere too, and almost every teenager has one, despite the expensiveness of use: the sociologists Utasi Ágnes considers that this fact states that Hungarians (or at least the youth) regard mobile phones as prestige items.

As far as social position of phone owners is concerned, it can be seen that both fixed line and mobile phones are more likely to be used by households headed by an educated man in leading position or self employed. Mobile phones are more frequently owned by the youth, fixed line phones by the middle age group. Computers and Internet access show the same characteristics as phones: poor, unskilled, countryside people are the least likely to acquire them. PC's are mainly owned by the age group 30-49 living in the capital.

I.9. IST-related cultural patterns

The effects that are usually observed in western countries as caused by the spread of information technologies in culture can be observed in Hungary as well. Cultural information can be easily obtained from the Internet. Cultural heritage of the country is getting digitalized rapidly. Online communities are forming, which differ from usual communities in some aspects. Cultural habits of the population are changing; the directions shall be explored in the next paragraphs. Social changes may be also caused by the emergence of an information age, but these effects cannot be observed yet due to the short time that has passed.

The indicator of the number of people having access to Internet can be misleading. 20% of those having access are using the Internet every day, 50% is using it weekly, 25% even more rarely, and 15% never takes the opportunity. Most people are accessing the web regularly from their workplaces or schools (60%). 42% of the population with university degree, 26% of those who finished high school, and 16% of skilled workers have internet access. Young people are overrepresented on the Internet, albeit the number of middle aged on the web increased a bit in the past four years.

Percentage of age groups using internet			
15-24	25-34	35-44	45-
50%	30%	18%	10%

Source: Netsurvey.

Gender patterns are not clearly identifiable on the Internet: some more men are using the Internet, than women, but women are using it for the same purposes and in the same way. Women-oriented content is appearing nowadays on the Hungarian web. Men are using e-mails more frequently. (Nyíri 2001)

The most important cultural and social fact is the documented existence of digital divide structured by the following four main cleavages: wealth, the age and the type of employment and the place of residence of the individual.[93] The divide was not formed by information technologies, but ICT and IST developments clearly are likely to deepen it. This fact underpins arguments calling for increased government action in helping social groups likely to lag behind. But before discussing detailed action plans intended to bridge the divide, the underlying data is to be introduced.

Research of media consumption habits observed, that social cleavages determining Internet consumption differences coincide with the cleavages determining traditional media consumption.

The World Internet Project (WIP) examined the television watching patterns and the Internet consumption habits in seventy countries of the world. Hungarians were ranked into the fifth position among these seventy countries based on average time spent watching television a day: Hungarians sit in front of the television on average 251 minutes a day. From closer analysis of the data it turns out, that the groups of frequent consumers television and Internet can be taken to be distinct, and these groups differ in several other aspects beside consumption, too. (Pintér 2002)

Those, who are frequently using the internet, are in a better social position: most of them live in cities, are younger, are better off, have a university degree, have an intellectual occupation, or are self-employed. They consume on average less television weekly, by five hours, even though the number of owned televisions, cable accesses, and subscribed channels is larger in this segment. They are more likely to use the television to obtain text messages, for example via teletext. Among their preferred habits reading, listening to music, playing video games, and talking on phone are the main ones. They do not listen radios frequently. Internet is considered

[93] The discussion of different types of digital divide and the cultural habits related to the DD, the main source is Pintér, R. (2002): Relationship of traditional and new media: watching television, convergence and digital divide. This study uses the data of WIP (World Internet Projekt), a large panel database thoroughly examining IST use patterns.

by them to be a means to obtain information rather than an entertainment provider. They are more active media consumers: and they prefer to use interactive communication channels. However, even though based on the data these attributes can be attributed to this group, it is not certain, whether the attributes themselves are caused by the use of Internet, or are present independently of it.

The other group, the television audience consists mainly of older, unskilled, unemployed, or retired people, physical workers, singles, poor and romani population. They regard the internet to be a means to get entertained, but the access types and the hardware needed for this type of "internet-consumption" are even more expensive for these groups. This consumer needs have cultural roots, and the cultural and social capital of these people is difficult to be changed. Since this group also lacks social capital: not just in the common meaning of the phrase. These people cannot access Internet in their workplaces, because of the job type they are employed in. They are not surrounded by others who use Internet frequently: social pressures are not forcing them to start using the internet. This group is obviously in need of some type of outside help, most importantly in the forms of education, spread of information and positive Internet usage patterns. Also, cheaper access costs and hardware could help them. (Pintér 2002)

As communication technologies are spreading and more people spend their evenings sitting in front of the computer, concerns about alienation caused by Internet are emerging. A related research examined Internet usage patterns, and found that these concerns may not be justified on the basis of the data. (Krajcsi - Kovács - Pléh 2001) Electronic mails to friends and relatives differ in content and in intent from e-mailing with otherwise strangers, acquaintances known only from the Internet. E-mailing with friends and relatives replaced only a small part of fixed line conversations, and solely because it is cheaper.

The main reasons for using the Internet are the search for information, and browsing. Use is mainly expedient, 80% of users is looking for a predetermined piece of information, 58% is reading the news, 50% is using e-mails, only 40% is browsing, and 21% is chatting. Online shopping is not trusted in Hungary: only 6% of people are practicing it. (Nyíri 2001)

Most of the people "suffering" from internet-dependence can be found among the frequent chatters. There are chat-rooms in Hungary where thousands of people are regularly present each evening. New types of communities are forming this way: people sharing the same interests, reading the same books, travelling to the same places, suffering from the same disease can exchange information easily, can get in touch with previously unknown people. There are examples of small communities formed in chat-rooms or on topics still blossoming after several years of creation. Some of them are meeting each other not just on the Internet. One example is the community of developers of the popular thematic link collections of 'Startlap'[94]. Some researchers claim that the forum activity of Hungarian Internet surfers is strikingly above European average. Blogging is also becoming popular these days. A systematic research of web communities organised from below was started this year at the BMGE MOKK[95].

An interesting area of investigations is the connection of online and of traditional media, and their relationship. Fears of the end of the Gutenberg-galaxy seem to be unfounded: printed newspapers and magazines are flourishing, the number of publishing houses boosted in the past ten years. Reading habits seem to be unaffected by Internet, and online bookstores are among

[94] Startpage, http://www.startlap.hu/
[95] Media Education and Research Centre, Budapest University of Technical and Economical Sciences

the biggest successes of e-commerce in Hungary. There are 30 online radios in Hungary, and all Budapest radios can be listened to online.

As discussed above, Internet and television are popular in different subgroups of the society: and the contents are still quite different, too. It is forecasted, that with the spread of WWW, contents on Internet and in television will converge, and the two types of media will be used by the population in the same way for the same purposes. Online news-zines experienced a boom in page downloads in the late nineties, but the number of readers started to stagnate after 2001. This indicates stabilization in Internet consumption patterns, too. The market is too small for the existing news portals, and it will turn out in the following years, which portal shall survive.

Some researchers claim, that on the basis of western experiences, a saturation model of internet access and consumption habits can be formed: after the penetration of internet and PC's reaches a critical point, a boom in use will occur. (Elek et al 2002) Others state, that the situation of the digital divide is similar to the case of analfabetism, and the divide can be bridged only in 40-50 years. A similar process can happen these days in the information society: we are in the early phase where tensions are increasing, but if education and training is supported appropriately, these tensions could disappear. Meanwhile, other questions remain also open. What changes will be caused in cultural production and consumption, in health, in social sensitivity, and in the levels of knowledge in the society by internet and information technologies - answers can be given only later. (Budai 2002)

I.10. The role of NGO's and of other social partners in the development of the IS

Non-profit organizations did not exist in the socialist era: there is a whole generation without experiences of practicing democracy in a civil organization. The past ten years witnessed the revival of NGO's: by today, almost fifty thousand NGO's operate in Hungary, most of them in the traditional fields of charity, protection of rights and interests, leisure activities, minorities, environment and health. NGO's account for 3-4% of the GDP, and have three million members. Governmental subsidies to NGO's are small in international comparison; the organisations rely mainly on own resources and on support from businesses. The service role of the sector improved, and the share of own sources stemming from the main activity of the NGO's is increasing. Albeit the economic situation of NGO's is not stable yet.

The revival of NGO’s was strongly supported by international financial help. Foreign governments and private donators, the European Union, foreign religious organizations, donating individuals, and firms interested in the development of the region devoted funds for the democratization of the CEE societies, among them of the Hungarian one.

It is interesting to examine the composition of NGO sector in Hungary: most NGO’s rely heavily on private and business sector financial contributions, and this is because their profile is mainly service-oriented, and they can collect user charges in their services. This is the case with sport and recreational organizations, foundational schools, language teaching centres, and professional interest advocators: they are addressing the needs of a wide consumer audience.

A research project (ITTK 2003a) tried to identify those main areas, where the relationships of government and NGO's can be improved, and the possible forms of use of information technologies in this process. The goal of the research was to support the creation of a new division of the governmental portal for the NGO's.

The main problems in the relationship of the sectors are communication-related. NGO's perceive not to be partners of government; there is no consultation with them before decision-making. Governmental offices lack information on the civil sphere, but the NGO's lack information on governmental topics, too. Law implementations, interpretations are not unambiguous. Data of general interest cannot be accessed. These communicational problems could clearly be solved by a government - NGO interface, or by an NGO representation in government.

Information society and civil society are developing parallel in Hungary, and information technologies provide NGO's with the unique possibility of working off the drawbacks caused by the lack of experiences. NGO's can use the Internet to introduce their profile, goals and missions, to convince potential sponsors and supporters, and to acquire new relationships. Hungarian NGO's are mainly taking benefit from this opportunity. Also, NGO's can play a role in building the information society.

The NIOK (Non-profit Information and Education Center) was funded in 1993, to support the development of a civil sphere in Hungary. It started to create infrastructure and background support for non-profit organizations, and organized programs to improve the efficiency of civil work. Today, NIOK operates the site www.nonprofit.hu, which is a centre to provide information and education to the non-profit sectors. The Open Society Institute and the Soros Foundation are among the main sponsors of the site.

Civil organizations also created a portal to provide information on them: http://www.civilhirado.bppiac.hu/ offers complex information on NGO's, with foundation documentation, main aims, newsletters, programs, and all types of related information. Hungarian citizens have the possibility to transmit one percent of their personal income tax bills to a chosen NGO, and on this website, they find the information needed to the related administration procedure. The Court of the Capital City (Fővárosi Bíróság) also has a civil database on the twenty thousand organisations (www.complex.hu) that can be accessed freely.

NGO's can play an active role in the building of information society in several ways. In Hungary, each telehouse is operated by an NGO. There are NGO’s that are occupied with lobbying to decrease costs of Internet access.

The number of NGO' using the Internet for communication has been estimated, and the result seems to be unbelievably high (ca. 24.300 from 48 000 NGO's). This result is based on a telephone survey, and corrected for the effect of telephone access, and for the estimations of potentially non-functioning NGO's. This enormously high estimated value can be due to the above average education of the leaders of NGO's: 65% obtained a university degree, 33% has a high school degree. Education is the most influential factor, gender and place of residence seem to play no role in determining the use of internet. The estimated value of potential users of online solutions is even higher (ca. 30 000), 86% of the NGO's can imagine to obtain help via internet from a governmental office, 73, 6% agrees that the spread of internet and computers could increase the efficiency of official administration. All the above values state that NGO's consciousness in the information society is above the average of Hungarian society, and that thereby they can serve its development. (ITTK 2003a)

The main roles of NGO's in the support of the developing information society would be to create the need for the use of information infrastructure in the people, to be the providers of information and IST-education, to support small settlements, elderly people and disabled in

catching up. Some examples of NGO's active in this area are listed in a previous section. However, the results of their activity are not visible yet.

The Romani portal (www.romepage.hu) is a civil success story, and several (positive and negative) characteristics of the functioning of Hungarian civil sphere can be illustrated on its example. It is a link collection, provides legal, political, cultural and arts information and materials to the wide public. It aims to reach Romani and the majority of the society as well. When in the year 1997 the Kurt Lewin Foundation created the website, having a webpage was not common, some of the biggest NGO's and some ministries did not appear on the web. The need for the website was questioned by many: why operate a Romani site, when there are other, more important problems of the Romani population, and when the majority of them cannot even access a computer? Notwithstanding, the founders continued with their job, because in their opinion the possibility that one Romani student finds a scholarship opportunity on the site, or the possibility that a member of the majority falls in love with romani music was worth the work. Time justified their standpoint. For a long time the only supporter of the site was the Soros Foundation. The site had difficulties in collecting materials and putting it on the web because of bureaucratic barriers in the state administration: the site had to digitalize materials available in digital format elsewhere.

Funding of NGO's is a controversial topic in Hungary: it provides incentives for biasing and inflating costs, because NGO's usually receive only the half of money amount requested, and because they cannot list among operating expenses some real costs, like the phone bills of the organisation. The computer department of KFKI (Central Physical Research Institute) was the first market organization to support the Romapage. After the first operation years, the position of the page strengthened, the page started to ask for money from those who appeared on it, and the number of its supporters increased further. The content of the portal also grew, and it was visited regularly and by large numbers of people. It offered jobs for Romani students. In the end of 2002, a governmental portal appeared with a similar profile and a more abundant funding: since then, the Romapage offers an alternative to it.

I.11. Conclusion

The patterns of social and cultural processes of the country show a mixed picture. Some groups of the society fared well during transition, found their way in market economy, could remain or get employed, use their acquired skills, and achieve a good economic and social position. Others faced or are still facing difficulties in the market place; experience the uncertainties, the threats coming from several sources. Since economic position strongly determines a persons possibilities in the recent stage of information society, large subgroups of the economically disadvantaged are overlapping with the groups not using the Internet and other possibilities of information technologies, which otherwise could ease their living conditions in many ways. Government action to lower costs of Internet access for these groups and to persuade them about the advantages of the use of Internet would bring about the most benefits for the whole society.

I.12. SWOT analysis of cultural and social processes in Hungarian society, and of their relationship to IST

Strengths	Weaknesses
- NGO's - Habits of Internet users - Infrastructure - Web content - Infrastructure progress	- Rising income and expenditure inequalities, interpersonal and interregional - Social safety net - State of Roma population - Lack of interest representation power of employees - Black economy, forced entrepreneurs - Sewage, highway, rural telecom, broadband networks - Culture consumption patterns
Opportunities	Threats
- Rising consciousness of society through provision of information - Distance working - Decreasing interpersonal and regional inequalities - Further internet penetration	- Polarization of the society - Digital divide - Lack of changes in governmental policies, due to constraints, lobbies and other rigidities

Strengths

Although mainly weaknesses, problems and threats were discussed in the above paragraphs, several strength factors can be mentioned.

In infrastructure construction, water, gas and fixed line telecommunications networks cover almost all Hungary by now.

According to standard of living researches, the subjective attitudes of the population improved in almost every aspect from 1990 to 2001.

A great success is the development of the civil movement, in spite of financing difficulties and absence of traditions. The great number of NGO's in all spheres of Hungarian society represents that Hungarians do not lack the initiative to help each other and to act for their community. The pro-IST orientation of NGO's is an additional strength.

Secondly, the habits of those who are using Internet are the second strength. Internet usage habits are still forming but are changing little by now. Those, who are using the web frequently, are not developing habits that would alienate them; their family and friendship linkages are not loosening. Students mainly use the net to obtain even more information concerning their studies: Internet is mainly considered to be a source of information.

Thirdly, the amount of Hungarian contents is rising steadily with the digitalization of the national cultural heritage. In some years the claim that people are not using the Internet because they are not finding there the contents they would need will remain a cynical statement.

Weaknesses

Unfortunately, more weaknesses can be mentioned, than strengths.

Inequalities in incomes, wages and in expenditures rose almost continuously throughout the decade. Inequalities can be assessed in interpersonal and in interregional terms: both were increasing, and there are still no signs of a stop. The middle class is thickening, while mobility in the income distribution seems to have stopped, mainly in the tails. The social safety net cannot help to integrate the poor and the Roma into the society. Families and elderly people are most hardly hit by poverty.

Employees are facing more uncertainty, unions are weak, and wages are lower in Hungary than in similar accession economies. New forms of employment could not develop yet, distance working does not fulfil its main task, and it does not help disadvantaged people to find their way back to the labour market. Black economy did not lose in importance. Forced entrepreneurs are likely to remain in an unprominising position in spite of new regulations. ICT education cannot meet the demands of ICT employment needs.

Some types of infrastructure (sewage networks, rural telecommunication networks, broadband, highways, and roads in the Eastern part of the country) would still need improvement. The health indicators of the population raise concern, and even more so the health indicators of the Roma. There are no governmental programs aiming at construction of rental housing.

In culture consumption, unfavourable structural changes are happening: cultural life is increasingly concentrated in cities and in Budapest, spare time is increasing only because more people are unemployed, people read less, and visit cultural events less frequently. Television watching is spreading. A new, and continuously deepening cleavage is forming in the society across the main previous cleavages, and it is the digital divide. Government actions are not supporting enough those parts of the population who are lagging behind.

Opportunities

Some opportunities would need increased governmental activities; others depend on business actors and on society, too.

There are big reserves in distance working for businesses and households as well. Provided that government regulation creates the grounds for this type of employment, firms can exploit new efficiency reserves in the increasing competition, and those groups of the society, who were at a disadvantage in the traditional marketplace could get integrated back to work.

There are opportunities for which increased information provision is necessary, either by government or by the NGO's. Information could be submitted by education, training, or PR activities. Thereby people could recognize the importance of acquiring IST-related knowledge and skills, and the demand for the use of Internet would be created.

The opportunities comprise the further spread of Internet and of information technologies, the wider use of these technologies in every aspect of everyday life. Several social tensions could be relieved by these processes: inequalities could diminish impacted by the democratic effects of the WWW, regional disparities would disappear more easily, and the danger of the digital divide could be avoided.

Regulation and subsidization of Internet access could also improve upon the existing situation concerning digital divide. A good regulation removing excess market power from service providers and inspiring competition could also work for the benefit of the population.

Threats

Serious threat is the further polarisation of the Hungarian society, by income and by regional cleavages. Large scale focused and coordinated policy actions could only diminish these inequalities, or at least stop their development.

A further threat is the deepening of the digital divide. Dealing with income and with regional inequalities could also help this problem. However, without significant changes in education, in training and in the regulation of the telecommunications and informational technologies industry, the present situation may lead to whole groups of society becoming disadvantaged.

Lobby activities, and the general rigidities of government offices can hinder the creation and implementation of government policies in support of information society.

DIAGNOSIS OF FACTORS AND IMPACTS IN THE INFORMATION SOCIETY IN HUNGARY

1. Current situation

1.1. State of the art of the ICT/IST in Hungary.

The major feature of the ICT/IST sectors in Hungary is the mixed level of development of ICT production and IST consumption/access.

On the one hand the level of ICT development is high both compared to its level a decade or even five years ago and in international comparison. The country has established and developed strong, export-oriented and competitive production lines in these sectors.

While the ICT sector and the production of ICT equipments are well developed, the country has relatively low values for IST development: the level of access and penetration of IST is low compared to other accession countries. For example, in Internet penetration rates, Hungary is lagging behind all other accession countries. The level of e-commerce and B2B, B2C services is also relatively low; there are huge regional differences in access to these services, and the regarding broadband access, Hungary is in the lowest third of European countries.

1.2. Strong ICT production sector

Among the CEEC's Hungary is in a leading position regarding ICT production, based on the share of ICT sector in total production, in exports, and employment. The following factors reflect that the ICT industry and within that both the production and export segments are highly developed:

1. Consumption of ICT of total household consumption was 6%: it is very high, second among OECD, and made around 3.5 % of GDP.
2. Investment in ICT sectors made 22% of total business investments. Among the ICT investments 40% were office and data processing machinery, 30% were telecom and the remaining were precision instruments and software
3. ICT makes 10% of total value added in Hungary, high level among relatively well-developed countries. The share is equally high (10-12%) in ICT manufacturing and ICT services. In ICT manufacturing the main items are computer and office equipment (one third) and other ICT manufacturing (two thirds), while in services telecom (70%), computer (20%), other (10%). "Other ICT manufacturing" includes communication equipment, insulated wire and cable and precision instruments. "Other ICT service" includes wholesale and rental of ICT goods.
4. ICT trade made around 30% of total trade, and trade balance was slightly positive for Hungary except the last year in review. The trade surplus is due to the high share of export oriented ICT producers in industrial output, high FDI investments oriented at international sales, importance of export processing firms in this sector. Besides trade surplus, exports have a well developed structure: 40% of them are radio, TV communication equipments, and 50% computing machinery and 10% wires and cables.

5. Hungary has a very high export specialisation index[96] and also a high intra-industry trade index, which shows that there is a specialisation on ICT and that exports and imports are an important element of total trade. Export specialisation index tripled from 50% to 150% between 1995 and 2000 and import propensity doubled from 70% to 140%. Trade specialisation index was 75% in 1995 and 100% in 2000. Penetration ratio in 1999 was around 40%; today it is around 100% due to high mobile penetration.

1.3. Poorly developed IST, weak consumption and penetration patterns

The remarkable results of the Hungarian ICT sector cannot spill over to other spheres of the society. IST still needs several significant changes before it reaches maturity. The reasons of underdevelopment of IST in Hungary can mainly be found in the regulation of the information sector, in the distribution of power between the actors on the IT market, and also in economy and society-wide characteristics to be listed below. Before determining in detail how these factors result in a poorly developed IST, the main facts reflecting the underdevelopment of IST are the following:

1. Penetration rates for PC and especially Internet are very low among households, although other telecom services are more widely used. Penetration rates are somewhat higher at enterprises and Internet penetration numbers (11% of total households) do not mean that only these people use the Internet.
2. In the business sector, penetration at SMEs is much lower than at bigger companies and this can harm their catch-up. Partly because of these low penetration rates, small firms are less innovative, participate less in any type of e-business – B2B, B2C, B2A, e-finance, e-marketing.
3. Penetration rates are low in public services and administration: the number of public documents available for electronic access is low, electronic administration is limited, information of different ministries is not presented in a synchronized way, digitalisation of public administration is fragmented and not linked well. There are several pilot projects at municipalities that aim at e-administration, but the majority of municipalities are not able to participate because of financial problems, or lack of initiative and manpower.

   Electronic public procurement has been promoted to deal with corruption and to lower the expenses of government, but the system is still not implemented.
4. Primary and secondary schools are relatively well equipped with ICT tools due to the Schoolnet program. The program puts emphasis on the secondary education institutes.
5. ICT-use in general education should improve, even though ICT-related education is well developed, and a sufficient amount of students participate in it. This is mainly a need in tertiary education, where the use of information technologies is lower, than in secondary education.
6. The lack of distance learning programmes is related to the lack of teaching materials and to the need of a proper design of the frameworks within which distance learning could be organized.
7. Enrolment into ICT-related education is rising year by year, but the enrolment levels on the tertiary level are still low. Institutions are only partially interested in reshaping their profiles, and are slow to react due to rigidities in the system. The present system fails to

[96] The index shows how broad or targeted is the composition of exports and gives a picture about the dominance of either inter- or intra-industry trade.

meet the demand for IT professionals trained at college level. The dominance of university level training simultaneously causes relative overspending, and undersupply.

8. ICT-related training at firm level is present mainly at larger firms, which employ several hundred employees. The SME sector is lagging behind in this aspect as well.
9. While there are several actors in the NGO-sector in almost every field of the economy and society, not many NGO's have their primary activity in the IST sphere. The effective representation of citizens' interests is not solved, but this is not solely due to the lack of NGO's active presence in this field: the official channels of interest representation are weak, and unofficially, the tradition of taking into account civil interests in decisions is also weak.
10. Other initiatives like the telehouse program or the telework program slowed down in the past few years. In autumn 2003, a new policy was started promoting community access points. In telework, the main barriers impeding its spread are the attitudes of the population, and mainly the attitudes of the firm managers in this aspect. The supervision and the control of distance employees are not solved. Certainly, several formal regulations are missing in this area as well.
11. In line with economic cleavages of the country, IST-related cleavages are developing. The main factors affecting the digital divide in Hungary are territory (both east-west, and capital-city-village aspects), age, affluence, job and general cultural consumption patterns of the population.
12. Lack of quality content on Hungarian websites (of course, in some areas such as news and economics reviews, there are exceptions), large amount of abandoned, 'empty', unfinished web pages.
13. While main regulations related to the internet are passed, the use of e-signature is low, and the problems with intellectual property rights prevail.

2. Factors affecting the evolution of the ICT and IST in Hungary

There are several factors that explain this dual development of ICT/IST in Hungary:

1. Structure of economic growth in recent years
2. Structural changes and modernisation of manufacturing
3. Regulatory and IS policies
4. R&D and ICT activities
5. Societal developments

2.1. Macroeconomic and growth conditions

The high level of ICT production is explained by the growth structure of the Hungarian economy. First, economic growth and upgrading was built on the rapid development of manufacturing and establishment of strong manufacturing base during the last 10 years. While Hungary was not an industrialised country before 1990, during the 1990s significant up-to-date manufacturing capacity has been established based on the synergy between FDI and domestic human capital.

Closely linked to this the growth and structural changes have been based on the high and increasing share of intra-industry trade, which has been above the average of the other Central European countries, and shows both the presence of FDI and relatively sophisticated industrial structure.

Third, the growth, structural changes and upgrading of the economy has been based on the significant inflow of foreign capital. Foreign investors played a crucial role both in the privatisation of state owned corporations and green-field investments. The high penetration levels of FDI contributed to the emergence of strong industrial base. On the other hand it has also been a factor behind the emergence of the dual character of the Hungarian economy: the highly developed, export oriented and up-to-date foreign companies and production facilities are surrounded by less developed, mainly labour intensive domestic subcontractors. While the upgrading of the latter has been rapid, still in several areas the economy has a dual nature.

The growth of ICT sector has also been facilitated by the increasing symmetry of economic development between Hungary and the EU. The synchronisation of business cycles is very high, the share of EU trade as well as the openness of the economy is significant. As a result these factors create favourable conditions for the expansion of ICT sectors.

A weakening factor of ICT expansion from macroeconomic policy aspect is the fact that policy makers have traditionally been characterised by low respect of macroeconomic stability. Macroeconomic stability and prudent macroeconomic policies have not been the key priority, therefore the country has been exposed to periodical shocks and currently on the eve of EU accession also faces significant macroeconomic problems (twin deficits, exchange rate uncertainty and high inflation).

Finally, the dual nature of the ICT/IST development is also due to another macroeconomic phenomenon, the low progress with the reform of public finances, especially in the areas of pension, health care and education systems. Besides the well-known macroeconomic problems, this is an effective constraint in front of the expansion of IST in Hungary as weakens financial contribution and attention of the government to IST.

Further factors worth mentioning and affecting the IS developments have been the following:

- Regional differences in per capita GDP, in incomes and in wages influence the starting position of regions in the information age, and since the digital divide in Hungary is characterized by significant economic cleavages, these factors are crucial from this aspect, too.
- Although unemployment level has declined considerably and is low in European comparison, there are sizeable regional differences and several regions have double-digit unemployment rates. Moreover, activity rate is low in Hungary compared to the advanced economies and the Lisbon target.
- Financial constraints within the public sector appear in each segment, including public services and administration, education and health, pensions, social benefits.

2.2. Structural changes, industrial upgrading

The dual character of ICT/IST expansion and especially the robust growth of ICT were also determined by the main structural changes taking place in the economy. There are four major factors in the recent industrial development and competitiveness of Hungarian economy that affected ICT/IST development.

First, as a result of economic transition a strong and broad based industrial sector has been established, which had not existed prior the economic changes. The diversified industrial structure produces mainly medium and high value added products and the structural features of both production and export are better compared to the level of development of the Hungarian economy.

Second, as mentioned, these changes were driven by the huge inflow of foreign direct investments, which has a backward and forward-looking element. Looking backward it has contributed to the described structural, organisational and skill changes and upgraded the domestic productive sector and has been the main driver of growth and modernisation. Looking forward, the presence and synergies of multinational corporations allows for future new capital inflows, increase of FDI after recent two years of slowdown and change in its composition towards sectors with higher value added.

On the negative side this has contributed also to the productivity gap[97]between domestically owned and multinational companies, caused by the low level of capital accumulation, rising labour costs for qualified workers and low investments in new technology among the domestically owned firms, while foreign owned firms have a cutting edge in these respects.

The strong presence of foreign corporations in ICT production is also explained by the still insufficient links between multinational companies and domestic producers. Multinational firms are not willing to subcontract with firms lacking appropriate management, skills, product, and technology. As a result, foreign owned multinationals mainly import their parts and do not use domestic suppliers. This limits their spill over effects. The number of Hungarian suppliers within the motor industry and electronic engineering has risen, but multinationals still did not organically imbed into the Hungarian economy; their connections with the domestic small and medium-sized enterprises are weak.

[97] While the recent (2001-2003) slowdown in productivity growth affected equally domestic and foreign owned companies, the gap between them remained unchanged, even increased slightly.

Third, notwithstanding the recent short period of slowdown the productivity growth in recent 5-8 years has been spectacular and has been the main driving force behind output growth in manufacturing besides capital deepening. While output growth is certainly dependent on the output increase of manufacturing which hinges on export sales, these increases seem to be long-term phenomena and will drive up further industrial activity.

Fourth, business services are highly developed, especially the banking and financial services in general. This is true despite all weaknesses of financial intermediation and lack of certain forms of financing, and other business services (trade, transport, and logistics) are also well developed and integrated. Their level of development and the increasing demand towards services creates the background for the expected expansion of ICT and IST in these sectors.

2.3. Regulation and IS policies

The nineties were characterized by lax regulation that was not willing to harm the incumbent operator in any aspect: in the early years because the state did not want to risk its returns from privatisation, after privatisation due to lobbies and interest conflicts. Although regulation tried continuously to meet the needs dictated by the changing environment, besides its successes, it also made some significant mistakes. These were the construction of the concession system, the failure in application of price cap regulation, the tardiness in creation of the 2001 law on telecommunication and the implementation failures of the latter.

The concession system in the fixed market was designed to create frameworks for constrained competition, where the incumbent would be regulated strictly, and the alternative companies could gain resources and experience to compete later on the competitive market. Meanwhile, the main target of the state was the rapid improvement of the available infrastructure. This goal was accomplished, but others barely. Matáv managed to acquire more market advantages for the future than the concession companies[98].

By the time when the monopoly of Matáv seized to exist, only the law itself was created without the equally important executive decrees shaping practical implementation. Debates on interconnection offers, on revenue distribution between ISPs and telecom companies, and the further delay of related decrees shifted real market opening by more than a half year. Matáv is usually blamed for the abuse of its market power since, as the company itself claims; it needs high returns on its investments. After liberalization, prices started to decrease only in the business segment, and only a few entries occurred.

This lack of capital on the side of international investors is affecting the Hungarian market in another aspect as well: since the concession period, the competitors of Matáv are rather fragmented and weak, and a consolidation would be needed.

Some claim that the 2001 telecommunications law was only partly in conformity to European regulation. After 2001, experts agreed upon the fact that the 2001 law contained several deficiencies. The new law on electronic telecommunication accepted in November 2003 will hopefully deal with the previous problems, and through the increased competition-orientation

[98] As the time of market opening was approaching, the law creating the environment for upcoming competition was started to be prepared. During preparation, the institutional background in which the law was prepared, the persons shaping it and its main goals changed several times, because of changing political priorities, or the lack of such priorities. Lobby pressures were extremely hard in the parliamentary debate, and managed to change several parts of the new law.

and conformity with the European regulation, and through the creation of new institutional structure, it will lead to a faster spread of information society.

Partly owing to regulatory failures, prices of Internet access are very high in Hungary in international comparison. Prices of hardware are also somewhat higher than the international average, due to the VAT content, but in the last two years prices of equipment started to decrease. It is a question of regulatory philosophy, whether government has to intervene into the market of Internet access services. Some claim, that intervention is not needed, proper regulation can solve the problems, prices on the market need to reflect market conditions, and low prices have to be reached by competition. Albeit there is almost free competition today, no signs of decreasing prices or any other types of benefits are noticeable for the average citizen. The new law on telecommunications will remove government subsidies of making web access cheaper, but meanwhile, it intends to spread broadband access (via investment subsidies), or where it is not available, it ensures access to flat rate dial up packages. In the present environment, competition on the telecommunications market is likely to develop only slowly, and regulation can ensure, that the competition will remain stable and bring gains to the population.

Also seriously affecting IST penetrations is the ignorance of government. Awareness among policy makers is not high enough, most IS policies are not much more than a list of "things that would be nice to have" but operational programs, budget and appropriate monitoring system is missing in most cases. Unfortunately it seems that this kind of attitude is independent of political sides: neither the previous, middle-right government, nor the present socialist-liberal makes the efforts that would be needed.

2.4. R&D and ICT activities

The level of development and the structure of R&D activities in Hungary have several implications for the development of ICT and IST. Three factors stand out as factors influencing the performance in this area: the traditionally high level of academic and university research, the presence and increasing activity of companies with internationally recognised R&D activities and the integration of domestic research to international networks.

The first has traditionally been one of the comparative advantages of the Hungarian economy and as human capital a major source of economic growth. The second factor has emerged recently, when increasing number of well established international corporations started to move their research and development centres and networks to Hungary to utilise the presence of human capital, its price and the infrastructure and location opportunities.

Finally, research and development activities have recently been increasingly integrated to international research networks. This has been linked to the accession of the country to the EU and increased participation of Hungarian researchers in EU wide programs.

On the other hand several factors constrain the more robust spread of ICT in Hungary. First, the R&D expenditures are low both in relation to GDP and on per capita level, which limits its spill over effects. Second, the low level of private R&D and the dominance of the state funded R&D activity in Hungary. Finally, an important weakness, which has however so far only partially reduced R&D activities has been associated with the outdated R&D infrastructure and personnel.

2.5. Societal issues

While general societal trends are discussed in the main sections of the monograph the ones that had the biggest influence on the spread of the information society are the following:

- Wage differentials in the public sector and in education can prevent trained professionals to enter those sectors. Foreign and domestic wage differentials create brain drain, but the data suggests that the extent of brain drain is stable, and not too large.
- Education is of substantial importance in its relationship to IS. Due to financial problems, quality-oriented structural reforms of tertiary education got postponed, and so far only quantity-orientation of tertiary training increased. Teacher wages lag behind market sector wages in all areas of education. The lack of financial resources causes schools to postpone software investments, and to forget about applying ICT-methods in general education. In education, regional differences are also present, showing the same pattern as economic regional inequalities.
- Besides financial problems there are structural ones in education, which lead to mismatch on the labour markets. Structural reforms are required to address the current problems of the secondary and especially tertiary education in Hungary.
- Trends in income distribution show, that inequalities rose steadily, and are not likely to become smaller in the near future. The amount of people having below average incomes increased in line with the share of income owned by the upper deciles, which indicates that the middle class lost both its constituents and the share of its income. This may have contributed to the fact that the Hungarian telecommunications market is regarded to be small: it is considered to have low purchasing power. But more importantly, these trends show, that social security, welfare expenses and general economic policies fostering development of a more equal society have to become a policy priority goal, and this also has implications for information society policy.
- Functional illiteracy in schools is high according to the PISA-report; the most important skills of the students (creativity, imagination, innovation ability) are not improved by the education system.
- It is true for both the public administration and public service – and especially sad in the case of educational personnel – that ICT literacy skills are low. One reason to this could be the phenomenon relevant also from the Digital Divide's aspect: administrators and teachers of middle age or older. Those, partly from the less-urbanised regions are not interested in use of PCs or Internet – they see it as complicated and really out of their world.
- Research in ICT is at the leading edge in Hungary, while in IST it is following the western ideas, but it is catching up quickly. Academic infrastructure is of a very good quality, and relationships between business and academia are good.
- There is a danger of the society splitting into two parts: those who live in disadvantaged areas, who are less affluent, who have jobs in traditional sectors, which have particular patterns of cultural consumption described in section I, are significantly more likely not to participate in the "information society".
- Many of the SMEs are struggling with lack of capital, therefore neither can they invest in ICT tools, nor is their will high to try out new forms of business activities (and by this risking their money). New forms of employment are not present, telework is not applied.
- The civil sphere is not seriously involved in IS promotion. There are a couple of NGOs trying to lobby for consumer protection, but unfortunately their lobby position is much weaker than those in the telecom industry (among them the biggest is Matáv) and therefore

achieving lower access prices is not really successful. Interestingly the civil sphere is present in Hungary, but most of the organisations target other activities.

SCENARIOS FOR FUTURE DEVELOPMENT

The future development of the ICT sector and the spread of IST in Hungary will depend on four major sets of variables. The first are macroeconomic conditions, among them mainly the expected speed of catch up and convergence of the country to the European Union average level of development. The speed, sustainability and structure of economic growth will determine both the supply- and demand side circumstances of ICT expansion and progress with the development of IST.

The second major factor is related to the regulatory and sector effects of the EU accession. The entry of Hungary to the EU may change the competitive pressures affecting the country, the division of comparative advantages, the access to funds (both domestic and external) needed to finance the expansion of these sectors. EU entry may have a strong effect on the adjustment of ICT and related sectors, which will shape their development.

The third factor affecting the expansion of ICT and IST is linked to government policies, which play a central role in both influencing directly the growth of these sectors and indirectly by determining the conditional for their development.

Finally, societal trends should also be considered, as they modify the demand for IST goods and services, and on the other hand the penetration of ICT/IST in the society/economy.

The scenarios are prepared in such a way that the first, second and last factors are forecasted and extrapolated assuming the most likely scenario and considering the factors that will have an effect on the ICT and IST development (which appear also in the SWOT analyses). The macroeconomic, the EU related and the societal factors can be determined with relatively high precision and their effect will be quite similar under alternative policy scenarios. What is more uncertain is the direction of policies, and therefore the alternatives are presented along their variance.

Therefore the only factor chosen to change was the orientation of government IS policy. Main government policies may promote the interests of the consumers, or of business actors including the SME sector. Also, policies may focus on promotion of IS tools and solutions in government, or policies may be influenced by the IT lobby.[99]

Based on the content of policies, government can promote access to IS, or can support content development that may eventually attract consumers, and convince them that it is worth participating in the information society. The orientation is partly a policy choice by the government and is partly determined by the other three conditions exogenous for policy makers. The difference in the preferences, policies and policy measures in these three alternatives allows us to determine the likely scenarios of ICT/IST development.

[99] As mentioned earlier, among the IT market actors, the former incumbent operator has still the biggest lobby power.

1. The main elements of the scenarios

1.1. Macroeconomic outlook:

a) Poor short-term prospects (in terms of GDP, export and investment growth) until 2005 due to slowdown in Euro-zone and to domestic imbalances,

b) Real convergence in the medium term accelerating from 2005, in all areas, mainly in terms of productivity and income levels,

c) Further strong FDI inflows but in modified structure as revealed comparative advantage changes with accession,

d) Short-term competitiveness problems, which may weaken growth and macroeconomic stability,

e) Repeated measures and efforts at establishing macroeconomic stability and pursuing reforms in the public sector, which is continuously threatened by political factors and uncertainty.

1.2. Regulatory and sectoral effects of EU accession

a) Adoption of *acquis* and further deregulation is a key issue and will gradually expose sectors to growing competition,

b) Further rapid increase of demand for services is likely, driven both by supply-side and demand-side factors, including income growth, changes in consumption preferences and increasing prices of non tradable goods,

c) Increasing use of external funds may also be associated with streamlined and more efficient use of domestic public resources,

d) Certain sectors can play a lead role in the medium term: logistics, wholesale, transport, tourism and biotechnology among others based on natural and human capital and resources,

1.3. Societal trends:

a) The gaps between generations increase, and Digital Divide develops further,

b) The public redistribution systems (pension, health care, tax, etc.) cannot develop in their current structure and therefore they block further development,

c) SMEs are endangered by not catching up with IS issues and competitiveness,

d) Increasing standards of living, gradual strengthening of the middle class,

e) Need to deal with the problems of the Roma population,

f) Need to deal with increased poverty,

g) Slightly increasing mobility after EU-accession.

1.4. The policy-driven scenarios

The potential policy actions can be grouped in three different ways:

A. Policy focusing on one or more of the following groups:

- Consumers/households/citizens,
- Public administration and service,
- Business entities in general, special attention at SMEs,
- IT sector interests (based on lobby activity).

B. Policy focusing on one or two of the following goals:

- Access,
- Content.

C. The level of policy design:

- central
- regional

The scenarios shall be drawn up taking into account the mentioned classifications. For each group of the society a strategy can be designed with the goal of increasing access or providing better content. A strategy can focus on granting access to the citizens or the public sector. Supporting the web-presence of NGOs or SMEs is an effort that improves content. The task is to determine which combination of policies is likely to happen in the near future.

1.4.1. Scenario A – content promotion

In this scenario policy-makers focus on content, primarily improving content presence of state and governmental institutions, secondarily supporting content prepared by other actors of society: NGOs, SMEs, others. These developments add to the quality that can be found on, or managed through the Internet.

Recently, both the government and the incumbent argued, that IS could be most effectively promoted via content development. In their opinion today the main barriers to IS participation are not access prices any more, rather the lack of concern of large groups of the society. This standpoint - while it may not fully hold in our opinion – indicates the high probability of this scenario, but current policies need to improve seriously.

As described in earlier chapters, the elements of content support are already present in current policies, but in the public sector a better content on government services could be provided, these services could be digitalised to a bigger extent, more sources and in a less fragmented way could be provided for content development and the development of eGovernment could be accelerated and linked to the reform of public services, which could also result in a cheaper and more efficient government.

Another area could be a more coordinated and better managed support for the content provision by the private actors, including a better monitoring of the effectiveness of these programs. Literature, scientific and educational contents already digitalized and financially supported by the government could be spread free of charge via Internet. In a content-based scenario, the government could provide more assistance to the private actors, which would mean significant help for SMEs, NGOs, and civil organizations and to other groups, which cannot afford their presence on the Internet.

Recently, significant attention was given to the digitalization of the national cultural heritage, arts and literature. This strategy would need to be promoted further, but in our opinion, the present argumentation of the government does not hold, and does not justify this policy orientation. Those groups, who are not interested in the Internet, are on the less educated side of the digital divide, and for promoting their access, cultural content improvements may not suffice.

Altogether if this scenario materializes, than one may expect a continuation of present policies and approaches. The likelihood of this scenario is high also because this allows the government to avoid conflicts with IT interests and business lobby. This may also explain why decision-makers have chosen content-development over access so far: and the applicability of EU recommendations is not the sole reason.

1.4.2. Scenario B: consumer access oriented government policies

In Scenario B, the government realises that content without access affordable to large groups of society is unsustainable. It aims at increasing access, primarily among the citizens and in public services, but also gives aid to SMEs and other organisations.

Raising access levels can be achieved in two different ways. First, if government subsidizes in one way or another the purchase and the use of ICT tools and/or Internet access (like tax cuts that are given in the present Schoolnet program to families where a student buys a computer). Second, if government confronts the IT business lobby: makes the necessary effort to create and regulate a really liberalised market, where regulation protects mainly users, not certain IT players. Also, the promotion of e-government services will facilitate increased access.

Present measures of Internet access support had mixed results. Extensively subsidizing the purchase of ICT equipment was not the aim of the government, it gave some tax cuts to families with school age children, and eased the burdens of employers providing the employee with a home computer. Further needs-based subsidies would flow to the population under this scenario. Past Internet access subsidies were claimed to also largely support the incumbent operator. Direct subsidies to users shall be abandoned in the future, based on the philosophy that increasing competition on the market should guarantee cheaper access, and government shall remain neutral in this process. Therefore wide range direct support of ICT tools purchases and Internet access are not likely to occur in the future – and the general financial stringency of the budget points also to this fact.

The scarce government resources will more likely be spent on broadband penetration support, on subsidizing infrastructure investments. Policies already indicate that this will be the main area of future actions. The government under this scenario would provide subsidies that are technologically neutral, and promote broadband mainly in those areas, where returns on investment would be less likely profitable. Promoting community access points would be also of great importance under this scenario, and this should utilize the experiences of the existing telehouse network, it should revive the movement.

The recently accepted new telecommunication law is theoretically able to promote further competition, but there are still exogenous factors influencing whether this would happen or not. For real competition to develop, strong players are needed on all related markets. On the fixed market, a consolidation of actors confronting Matáv would be the most favourable development from the standpoint of competition. The executive decrees of the new law are still under preparation. The real implementation capacities of the new institutional structure will

turn out only after it starts to function. It takes further time till the real introduction of carrier selection and number portability, and also the implementation of accounting separation. Also, real competition for private consumers on the fixed market is likely to develop only after broadband penetration reaches a high level.

During this process, the real commitment of government for competition will turn out. Under this scenario, this commitment will remain strong: whether it is EU and/or other international pressure that achieves a more consumer-friendly regulation, or other, non IT business lobbies (who are users in this content) raise their voice, or the competitors of MATAV could create a stronger lobby position for themselves, a change is needed in order to realise Scenario B.

The ongoing process of providing broadband access to all municipalities by 2005 is likely to support access in all settlements of Hungary: the infrastructure created by this initiative can be used by service providers to grant access to citizens, and the municipalities themselves may support and facilitate citizen access. The present situation in Hungary points to the fact that individual access is the dominant way of private access to the internet, but it may well happen that regions having diverging economic development paths will be characterised by diverging types of access: some may be characterised by the increasing use of community access points. These are developed steadily, and this increases the likelihood of this scenario.

This scenario could have the most positive and widespread effect on the realisation of the Lisbon indicators. Under this scenario the business investment rate and labour productivity would increase due to increased demand and replacement of ICT equipment and assuming a positive long-term relationship between productivity and GDP per capita this scenario would result in a more rapid catch up in terms of incomes and wage levels. It is not likely that government polices under this scenario could significantly alter the realisation of Lisbon indicators in terms of employment, as except some very narrow employee groups who could be employed in telework and distance work programmes, this alternative would not have any meaningful impact on employment and unemployment (both its level and structure).

1.4.3. Scenario C – the baseline scenario

Scenario C is the „pessimistic", although not that unlikely version among these scenarios. In this version both access and content questions are left mainly for the market and for the society to solve, the attitude, commitment and strategic orientation of government do not change significantly compared to the present practice. Content policies remain vague, unfocused and will henceforward lack the critical mass. As far as access is concerned, the implementation of the new telecommunications act will be burdened with the usual problems observed in the past in Hungary. Implementation capacities of institutions will not change significantly.

In this scenario government finances the IT equipment of the public administration and public service, and the content created by these institutions. The access of households and enterprises depends on how the activists and lobbies of these groups can negotiate with the IT group, and content other than the previously mentioned is left for the citizens, civil organisations and enterprises to create.

In this scenario the importance of wage levels, living standards and consuming habits is very high. Access can be raised to a certain point by the marketing activity of the IT companies and Internet providers. If consumption patterns are changed, and even with the same earnings people would sacrifice more money for being part of the Information Society and save money

on something else, the IT lobby has achieved its main goal: access created while prices are kept high.

This strategy would presumably have less effect on the increase of GDP per capita and also on the productivity level. On the other hand this program could be implemented together with increased public expenditure on education to reap the benefits fro the spread of the use of ICT in the society. This scenario could also have some effect on the employment similarly to Scenario A, especially if the government subsidies allow an increased access to ICT and IST by certain groups of employees. Altogether the employment effect would be much weaker than in the A scenario, but it could have some positive impacts among more mobile employees.

References

Bakonyi, P. (ed.) (2001): Az információs társadalom. (The Information Society.) MTA (HAAS)

Baksa, Sarolta Dr. - Rácz, Zsolt Dr. (2001): Az (egységes) hírközlési törvényről. (On the (common) law on telecommunications. In: Enyedi et al (2001).

Bágер, Gusztáv – Kovács, Árpád [2004]: Conclusions of the study – Pivatisation in Hungary. Hungarian State Audit Office, Research and Development Institute.

Bihari, G. (ed.) (1999): Teleházak és távmunka Magyarországon. (Telehouses and distance working in Hungary.) Teleház Kht.

Bodoky, Tamás [2004]: Internetes tartalomszabályozás: búcsú a korlátlan szabadságtól? (Internet content regulation: farewell to complete freedom?) Magyar Narancs, 09. 01. 2004.

Bognár, V. - Fehér, Zs. - Varga, Cs. (1998): Mi a jövő? Tudástársadalom? Információs társadalom? Telekommunikációs társadalom? Kultúratársadalom? Az információs társadalom és magyar kezdeményezések. (What's the future? Knowledge society? Telecommunication society? Culture society? The information society and Hungarian initiatives.) OMFB, ORTT, HÉA.

Bozzay, Gyöngyi Dr. - Csiszár L., Pál (2001): A hírközlés jövőbeni szabályozása Magyarországon. (The future of telecommunications regulation in Hungary.). In: Enyedi et al (2001).

Budai, Balázs Benjámin (2002): E-government. Aula.

Bugya, T. (2002): Az informatikai felsőoktatás országos megoszlásának területi egyenlőtlenségei. (Regional differences of higher education of computer sciences in Hungary.) Conference on Informatics in Tertiary Education, Debrecen University of Technical Sciences, 2002. August. (www.date.hu/if2002)

Buzás, Ottó (2001): Távközléskultúra (Telecommunications Culture). Presscon Press.

Czeglédi János (2002): Lisszabonus. In: Elek et al (2002).

Csepeli, Gy. (2002): Magyarország legjobb választása: az információs társadalom. (The best choice of Hungary: information society). In: Enyedi et al (2002).

Csorba, József (2002): Az információgazdaság információ- és gazdaságtana. (The informatics and economics of information economy) In: Elek et al (2002).

Dessewffy, Tibor (2002): Az információs társadalom lehetőségei Magyarországon. (The possibilities of an information society in Hungary). Médiakutató (Media Researchers), No. 6.

EC [2001]: European competetitiveness report, 2001. European Commission, Brussels.

ECSC – EC – EAEC, Brussels – Luxembourg (2002): 3rd Report on Monitoring of EU Candidate Countries (Telecommunication Services Sector).

Elek, A. - Juhász, J. - Kiss, E. - Varga, Cs. (2002): A tudás társadalma I-II. (Knowledge Society I-II). Stratégiakutató Intézet, Nemzeti Ifjúságkutató Intézet, Ipargazdasági Kutató és Tanácsadó Kft. (Institute for Strategy Research, National Research Institute of Youth, Industrial Research and Advisory Institute) Budapest.

Engloner, Gy. et al (eds) (2003): Kutatás és fejlesztés a felsőoktatásban 2000-2002. (Research&Development in Tertiary Education, 2000-2002.) Ministry of Education.

Enyedi et al. (2001): Magyarország médiakönyve (The media book of Hungary) 2000-2001. ENAMIKÉ.

Enyedi Nagy, M. - Polyák, G. - dr. Sarkady, I. (eds.) (2002): Magyarország Médiakönyve 2002 I-II. (The Media Book of Hungary). ENAMIKÉ.

eEurope+, 2003: eEurope+ progress report, February, 2004

Fábri, György (2002): Magyar tudomány és infokommunikációs változások. A magyar kutatásszervezet kihívásai az információs és kommunikációs technológiák szempontjából. (Hungarian science and changes in info-communication technologies. Challenges facing the Hungarian research organisations from the viewpoint of information and communication technologies.) Világosság (Brightness), 2002. Issues 8-9. pp. 17-24.

Ferge, Zsuzsa (2001): A magyarországi szegénységrõl (On poverty in Hungary). INFO-Társadalomtudomány (INFO-Social Science) No. 54.

Gálik, Mihály (2000): Médiagazdaságtan (Economic of Media). Aula.

Gáspár, Mátyás (2002): Nemzeti Teleház Stratégia és Program, 2000-2006: Összefoglaló áttekintés (National Telehouse Strategy and Program, 2000-2006: Summary) In: Elek et al (2002).

GKI Rt. (2001): Az IKT elterjedtsége a gazdaság, az egészségügy és az oktatás világában. (ICT penetration in the economy, health sector, and in education in Hungary.). Virtuális Térfigyelő Rendszer (Virtual Monitoring System) No. 2., October 2001.

GKI Rt. (2002): Jelentés az internet-gazdaságról. (Report on the internet-economy). Virtuális Térfigyelő Rendszer (Virtual Monitoring System) No. 18., January 2002.

Gróf, Imre (2002): Infopark - A magyar tudás üzenete a jövő évezrednek. (Infopark - the message of Hungarian knowledge to the next century) In: Elek et al (2002).

Hahn, Csaba (2000): A területfejlesztés feladatai az ezredfordulón és az információs társadalom. (The tasks of territorial development policy on the turn of the century and the information society.) Hazai Térségfejlesztő Kft. Budapest

Harcsa, István (2000): Új tendenciák a népesség idõfelhasználásában (New tendencies in time consumption of the population.) INFO-Társadalomtudomány (INFO-Social Science) No. 50.

Havasi, Éva (2000): Jövedelmek, fogyasztás, megélhetés és szegénység Magyarországon (Incomes, consumption, subsistence and poverty in Hungary). INFO-Társadalomtudomány (INFO-Social Science) No. 50.

HCSO (Hungarian Central Statistical Office) (2002): Cultural Data. Budapest.

HCSO (Hungarian Central Statistical Office) (2002): Data of Education 2001/2001. Budapest.

HCSO (Hungarian Central Statistical Office) (2002): Data of Higher Education 2001/2001. Budapest.

HCSO (Hungarian Central Statistical Office) (2002): Main Data on Workplace Trainings. Budapest.

HCSO (Hungarian Central Statistical Office) (2002): R&D and Tertiary Education. 2001/2001. Budapest.

Heller, Krisztina (2002): A távközlés szabályozásáról az információs társadalom fényében. (On telecommunications regulation in light of information society). In: Enyedi et al. (2002)

Herman, Ákos (2002): Tudományos információk hálózatos hozzáférhetõsége (The network accessibility of scientific information.) In: Elek et al (2002).

Holl András (2002): Az információs társadalom magyar stratégiája: Gondolatok. (The Hungarian strategy of information society: Thoughts.) In: Elek et al (2002).

Horváth, János (2002): Elõzetes elgondolások a regionális információs központok létrehozására (Preliminary thougths on the creation of regional information centres) In: Elek et al (2002).

Hrubos, Ildikó (2000): A felsõoktatás fõbb modelljei és azok módosulásai a huszadik század második felében. (Main models of tertiary education and their modifications in the second half of the twentieth century.) INFO-Társadalomtudomány (INFO-Social Science) No. 49.

IMD (2001): The World Competitiveness – Yearbook 2001. Institute for Management Development. IMD, Lausanne.

Ipargazdasági Kutató és Tanácsadó Kft. (2001): Az információs és tudásgazdaság fejlôdése, a gazdaság informatizálása, a termelés és a szolgáltatások informatizálása, korszerû információ- és tudásmenedzsment eszközök megjelenése a vállalatoknál. (The evolution of information and knowledge economy, the informatization of economy, the informatization of production and services, the appearence of up-to-date information and knowledge management methods at companies). Virtuális Térfigyelő Rendszer (Virtual Monitoring System) No. 17., December 2001.

ITTK (2003b):Internethasználat és online ügyintézéssel kapcsolatos attitűd a vállalati és a civil szektorban. (The use of internet and attitudes toward online administration in the business and the civil sphere.) In: ITTK (2003a).

ITTK (BME-Unesco, Információs Társadalom és Trendkutató Központ, Center Research of Information Society and Trends) (2003a): Kutatási jelentés 19, February (Research Report 19.)

Kacsukné, B. L. – Kiss, T. (2002): Az elektronikus kereskedelem oktatása a Nemzetközi Üzleti Főiskolán. (Teaching e-commerce at International Business School Budapest). Conference on Informatics in Tertiary Education, Debrecen University of Technical Sciences, 2002. August. (www.date.hu/if2002)

Kapitány, Zs. – Molnár, Gy. (2002): Egyenlőtlenség és társadalmi mobilitás a magyar háztartások jövedelmében, kiadásaiban, és tartós fogyasztási cikkeinek állományában. (Inequality and social mobility of Hungarian households in the incomes, expenditures and consumption of permanent household items.) Közgazdasági Szemle, Vol. XLIX, December, pp. 1015-1041.

Kelen András (2002): Gazdaság és szociálpolitika az információs társadalom korában (Economic and social policy in the information age) In: Elek et al (2002).

Kiss, Ferenc - Major, Iván - Valentinyi, Pál (2000): Információgazdaság és piacszabályozás (Information economy and market regulation). Akadémiai kiadó (Academy Press).

Kleinheincz, Ferenc (2002): A nemzeti innovációs rendszer vizsgálata, mint új elméleti-módszertani megközelítés. (The investigation of the national innovation system, as a new theoretical-methodological approach.) In: Elek et al (2002).

Kovács, Árpád [2001]: Privatisation in Hungary 1990-2000. State Audit Office, Hungary.

Kovács, T. - Biernaczky, Sz. (2001): A magyar modell. Gondolatok egy ország jövőjéről. (The Hungarian Modell. Thoughts about the future of a country.) Mundus Egyetemi Kiadó.

Kozma, Tamás (2000): Negyedik fokozat. (Fourth stage). INFO-Társadalomtudomány (INFO-Social Science) No. 49.

Krajcsi, Attila - Kovács, Kristóf - Pléh, Csaba (2001): Internethasználók kommunikációs szokásai. (The communication patterns of the users of internet.) In: Nyíri (2001).

KSH, 2003: A távbeszélő-forgalom főbb jellemzői, 2002

KSH, 2004: Kábeltelevízió szolgáltatások Magyarországon, 2003

KSH, 2003: A központi államigazgatás informatikai eszközei és információs tevékenysége, 2002

KSH, 2003: Internetszolgáltatók és internetszolgáltatások, 2002

KSH, 2004: Távközlés, Internet, 2003 IV. Negyedév, gyorstájékoztató

Kuti, É. (2001): Döntéshozók és döntési mechanizmusok a nonprofit szektor finanszírozásában. (Decision makers and decision procedures in the finances of the nonprofit sector.) Közgazdasági Szemle, Vol. XLVIII. December, pp. 1039-1063.

Ladányi, János (2001): Szegények és cigányok Magyarországon a piacgazdaságba való átmenet idõszakában. (The poor and the Romani in Hungary during transition) INFO-Társadalomtudomány (INFO-Social Science) No. 54.

Ligeti, György (2002): Romák az infosztrádán és a civilitás nyűgjei. (Romani on the information highway and burdens of civil organisations). In: Enyedi et al (2002)

Macher, Ákos [2001]: The future management of state assets. Speech to the VIII meeting of the INTOSAI Privatisation Monitoring Working Group, Budapest, June 11-12 2001.

Magyar Akkeditációs Bizottság (2002): A magyar akkreditációs bizottság és a felsőoktatás minősége. (The Hungarian Accreditaion committee and the quality of upper level education in Hungary.) 1992–2000. Parlamenti beszámoló. Jelentés az országgyűlés oktatási bizottságának. (Parliament Report to the education committee of the parliament) May - July 2002

Magyar Gallup Intézet (2003): Internethasználat az iskolákban és az önkormányzatoknál mint iskolafenntartóknál. (Hungarian Gallup Institute: The use of internet in schools and by the municipalities, the operators of the schools.) In: ITTK (2003a)

Magyar, Gábor (2002): Alkotó alkalmazkodás: Lehetõségeink és teendõink az információs társadalom felé vezetõ úton (Creative adjustment: Our possibilities and tasks on the road leading to the information society.) In: Elek et al (2002).

Majtényi, László [2004]: Az Internettel összefüggő adatkezelések egyes kérdéseiről szóló adatvédelmi biztosi ajánlás. 17. 06. 2004. (Recommendations of the data protection commissioner on questions of data management related to the Internet.) Source: www.infomediator.hu

Matolcsy, János (2002): Megkezdődött a finanszírozási rendszer reformja projekt. (The reform of financig system has been started.) Magyar Felsőoktatás (Hungarian Higher Education), 2002. 1-2.

Nagy, Gábor (2001): Az információs ágazatok területisége - oldja-e a kínálati piac az öröklött területi egyenlőtlenségeket? (The territoriality of information sectors - does the supply market solve the inherited geographical inequalities?) In: Horváth, Gy. - Rechnitzer, J. (2001): Magyarország területi folyamatai az ezredfordulón. (Territorial processes of Hungary on the turn of the century.). MTA RKK.

Nemzeti Hírközlési Hatóság (National Telecommunications Authority, NTA) [2003]: Tulajdonosi viszonyok a távközlési piacon. (Ownership structures on the telecommunications market)

Nyíri, Kristóf (ed.) (2001): A 21. századi kommunikáció új útjai. Tanulmányok. MTA Filozófiai Kutatóintézete, Budapest. (The new roads in 21. century communication. Studies. The Philosophy Research Institute of Academia).

OECD (2002): Hungary, IT Policy Profiles. In: Information Technologies Outlook. http://www.oecd.org/pdf/M00033000/M00033728.pdf

OKI (Országos Közoktatási Intézet, NIPE - National Institute of Public Education) (2000): Jelentés a közoktatásról. www.oki.hu

Pálmai Zoltán (2002): Technológiai adalékok az információs társadalom magyar stratégiájához. (Technological additions tothe Hungarian strategy of information society.) In: Elek et al (2002).

Pápai, Zoltán (2002): Törvényhozás után - piacnyitás előtt: az új hírközlési törvény. (After legislation - before liberalization: the new law on telecommunications). In: Kurtán et al. (2002): Magyarország politikai évkönyve 2001-ről. (The political yearbook of Hungary on 2001.) Demokrácia Kutató Központ Magyarország. (Centre on Democracy Research Hungary).

Pethõ, Bertalan (2002): Az információs társadalom és Magyarország jövõje (The information society and the future of Hungary). In: Elek et al (2002).

Pintér, R. (2002): A hagyományos és az új média kapcsolata: tévénézés, konvergencia és a digitális szakadék. (Relationship of traditional and new media: watching television, convergence, and digital divide). In: Enyedi et al (2002).

Pintér, Róbert - Z. Karvalics, László (2001): Információ és globalizáció: Az infrastruktúrától a társadalomig (Information and globalization: from infrastructure to society). In: Földes, Gy. - Inotai, a. (eds) (2001): A globalizáció kihívásai és Magyarország (The challenges of globalization and Hungary). Napvilág Kiadó.

Polonyi, Gábor (2002): Info-kommunikációs társadalom: hozzáférési és használati indexek. In: Tárki (2002)

Polónyi, I. – Timár, J. (2001): A tanárok keresete és a tudást fejlesztő felsőoktatás. (The earnings of teachers and upper level education generative of knowledge.) Közgazdasági Szemle, Vol. XLVIII. October, pp. 883-890.

Polónyi, István (2000): A felsõoktatás finanszírozásának jellemzõi. (Properties of higher education finances.) INFO-Társadalomtudomány (INFO-Social Science) No. 49.

Pongrácz, László Dr. (2002): Foglalkoztatást elősegítő munkaügyi kutatások. OFA Kutatási Évkönyv 2. Országos Foglalkoztatási Közalapítvány.

Radnóti, Éva (ed.) (2002): Az államháztartásról és humánpolitikai feladatairól. (About the governmental budget and its tasks in the areas of human policy). Kormányzati Stratégiai Elemző Központ, Miniszterelnöki Hivatal (Governmental Strategic Analysis Centre, Prime Ministers Office)

Rakusz, Lajos (2002): Ipari parkok Magyarországon az információs társadalom küszöbén. (Industrial parks in Hungary on the treshold to information society). In: Elek et al (2002).

Rátonyi G., Tamás [2004]: Távközlési fogyasztóvédelem Magyarországon I-II. (The protection of consumer interests in telecommunication in Hungary.) www.hwsw.hu, 31. 03. 2004.

Révész, Gábor (2001): Törvény viharokkal. (A law in storms). In: Enyedi et al. (2002).

Rózsás, Péter - Zsidai, Tamás (2002): Az információs társadalom finanszírozása: Öngerjesztõ piaci mechanizmusok és állami szerepvállalás (Financing the information society. Self-enforcing market mechanisms and national roles) In: Elek et al (2002).

Sebestyén, György (2002): Légy az információs társadalom polgára! (Become a citizen in the information society!). ELTE Eötvös Kiadó.

Selény, E (2002): Egy doktori felmérés tanulságai. (Experiences from a doctoral survey.) Conference on Informatics in Tertiary Education, Debrecen University of Technical Sciences, 2002. August. (www.date.hu/if2002)

Setényi, János (2000): A magyar felsõoktatás minõségérõl (On the quality of tertiary education in Hungary). INFO-Társadalomtudomány (INFO-Social Science) No. 49.

SIBIS, 2002/03: SIBIS Pocket Book, 2002/03

Siposné, Németh M. (2002): Informatikaoktatás: lehetne jobban is? (Teaching informatics: could we do it better?) Conference on Informatics in Tertiary Education, Debrecen University of Technical Sciences, 2002. August. (www.date.hu/if2002)

Stark, Antal (2002): A nemzetgazdaság és az államháztartás. (National economy and governmental budget.) In: Radnóti (2002)

Sükösd, Mihály - I. László, János (2001): Az M-kormányzat (h)őskorszaka. Hogyan használják a mobilt a magyarországi önkormányzatok, és ki fizeti a számlát? Egy empirikus kutatás első eredményei. (The stone age of M-government. How are Hungarian municipalities using mobiles, and who pays the bills? The first results of an empirical investigation.) In: Nyíri (2001).

Szántó, Borisz (2002): A fejlesztési stratégia elvi kérdéseirõl. (On the theoretical questions of a development strategy) In: Elek et al (2002).

Szívós, Péter - Tóth, István György (2001): Tíz év. (Ten years.). Tárki Monitor Jelentések (Tárki Monitor Papers), Tárki, December 2001.

Tamási, Péter (2000): A kutatói brain drain helyzete Magyarországon (The state of researcher brain drain in Hungary). INFO-Társadalomtudomány (INFO-Social Science) No. 48.

Tárki (2002): Az információs társadalom helyzete Magyarországon. (The state of information society in Hungary.) Tárki Rt., Információs Társadalom Monitoring Sorozat (Information Society Monitoring Series) No. 20.

The Global Competitiveness… [2001]: The Global Competitiveness Report 2001. World Economic Forum, Harvard University, Oxford.

Tóth, István György (2003): Jövedelemegyenlőtlenségek: tényleg csökkennek, vagy csak úgy látjuk? (Income inequalities - are they really increasing, or it only seems so?). Közgazdasági Szemle (Economic Review), Vol. 50, No. 3.

Török, Imre (2003): A felsőoktatás finanszírozása (Higher education finances.). BMEU Konferencia, 2003. 01. 22-23.

Utasi, Ágnes (2000): Életminőség és társadalmi integráció. (Standard of living and social integration.) INFO-Társadalomtudomány (INFO-Social Science) No. 50.

Varga, Csaba - Csörgõ, Zoltán (2002): A magyar információs társadalom kiépülésének regionális feltételrendszere, stratégiája és e-gazdasági projektjei (The regional possibilities, strategies and e-economy projects of the building of Hugarian information society.) In: Elek et al (2002).

Víg, Zoltán, BMGE (2003): Internetes attitűdök kérdőíves vizsgálata műszaki szakoktató hallgatók körében. (Survey investigation of internet-related attitudes of technical education students.) In: ITTK (2003a).

www.niif.hu

Zinnes, C.–Eilat, Y.–Sachs, G. [2001]: Benchmarking competitiveness in the transition economies. The Economics of Transition, Vol. 9. No. 2.

IHM, 2003: The Hungarian Information Society on the Eve of the Accession to the European Union, snapshot and strategic objectives
BellResearch, 2003: BellResearch, Magyar Infokommunikációs Jelentés, 2003 in Jakab Áron: Trendek az Információs és Kommunikációs Technológiák Használatában, Infinit Kutatási Jelentés, 23. szám
Homoki, 2003: Homoki Máté, a világháló kockás füzete, Infinit Kutatási Jelentés, 23. szám
MITS, 2003: Magyar Információs Társadalom Stratégia, 2003 November, IHM
IHM, 2004: Az információs társadalom helyzete Magyarországon, 2003 végén., Tárki, GKI, BME-ITTK, IVSZ, Kopint-Datorg,
GKI-Westel-Sun, 2003: Internethasználat a pénzügyi szektorban, Infinit Kutatási Jelentés, 23.szám

ANNEX – TABLE OF CONTENTS

A. NATIONAL AND REGIONAL ECONOMY

Table A1.: Summary indicators on Hungary

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Growth	-3.5	-11.9	-3.1	-0.6	2.9	1.5	1.3	4.6	4.9	4.2	5.2	3.8
Unemployment	2	8.2	13.9	14	12	11.7	11.4	11	9.6	9.6	8.7	8
CPI	28.9	35	22.69	22.5	18.8	28.2	23.6	18.3	14.3	10	9.8	9.2
Fiscal balance	-0.1	-4.6	-6.7	-5.6	-8.1	-5.5	-1.9	-4	-5.5	-3	-2.8	-2.8
Current account	0.4	0.8	0.9	-9	-9.4	-5.6	-3.7	-2.1	-4.9	-4.3	-2.9	-2.1
Exchange rate HUF/EUR average	80.5	92.7	102.1	107.5	124.8	162.5	191.1	210.9	240.9	252.8	260.4	256.7

Table A2.: Contribution of sectors to GDP

	CZ	HU	PL	SLO
Agriculture	3.8	3.7	3.5	2.7
Industry	30	25.1	23.5	27.2
Construction	6.6	4.1	7.7	5.2
Transport. telcom	7.5	8.4	5.9	6.9
trade	15.6	11.1	19.1	13.1
other.fisim	25.9	32.8	27.1	31.6

Table A3.: GDP per capita at European Union average=100

	1990	1995	1998	2000	2002
Czech Republic	69	62	60	59	63
Hungary	49	45	48	50	53
Poland	31	35	38	39	42
Portugal	64	71	73	73	74
Greece	60	66	68	68	70
Spain	79	78	82	83	87

Table A4.: Changes in gross value added and its contributing factors

	1990	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Gross value added	-3.8	-4.1	0.3	2.9	1.5	3.1	5.1	5.2	4.2	5.4	3.8
Agriculture		-16.4	-7.9	-0.4	2.7	4.2	-0.5	-1.5	0.9	-7.9	
Industry total		-6.7	3	6	6.9	3.2	11.4	8.3	7.2	9.6	1.2
mining		-63.2	-43.2	-12.5	0.5	-2.9	3.5	-24.5	-12.6	-5.6	
manufacturing	1.6	5.9	6.7	8.2	4	13.4	10.3	8.3	11	1.3	
electricity		-0.7	2	4.8	-0.1	-1.2	-2.3	-3.5	1.5	1.4	
construction		1.9	-5.5	4.7	0.2	-7.2	8.2	5.8	4.3	6.9	7.9
Wholesale trade	-18	-3.3	-3.9	-2.8	-0.5	6.2	5.8	0.2	2.5	4.1	
Transport		-4.3	-5.4	1.2	12.3	3.1	9.3	3.3	5.5	2.3	4.2
Financial services	-14.6	13.8	28.1	-17.6	-0.3	-5.2	-4.9	-0.5	5		
Real estate		3.4	3	5.6	-2.3	8.2	-3.7	6	5	8.5	
Public administration	3.6	1.4	2.6	0	2.3	1.8	5.1	1	1.2		
education		4.2	1.5	4.1	-3.4	0	4.5	3.8	3.8	5.3	
health		4.3	4.3	3.5	-3.5	3.2	5.1	1.7	4.6	5.8	

Table A5.: Structure of GDP

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Gross value added	100	100	100	100	100	100	100	100	100	100	100	100
Agriculture		7.8	6.5	5.8	6	5.9	5.8	5.2	4.9	4.2	3.7	
Industry total		26.7	24.4	23.2	22.8	23.2	23.1	24.9	24.8	24.2	25.1	
mining		3.3	1.1	0.6	0.5	0.4	0.4	0.3	0.2	0.2	0.2	
manufacturing	19.8	19.8	19.4	19.4	19.8	19.7	21.1	21.2	20.5	21.7		
electricity		3.6	3.5	3.3	2.9	2.9	3	3.3	3.4	3.4	3.2	
construction		4.9	5.2	4.7	4.6	4.1	3.8	4.1	4	4.1	4.1	
Wholesale trade	12.3	9.7	10	9.6	9.9	9.9	10.1	10.2	9.6	9.6		
Transport		8.4	8.3	7.8	7.6	7.6	7.9	8.1	8.6	8.7	8.9	
Financial services	4.1	3.7	4.1	5.6	4.6	4.5	4	3.6	3.5	3.5		
Real estate		9.4	10.8	11.6	12	12.6	14	12.9	13.1	14.1	14.7	
Public administration	5.9	6.4	6.6	6.7	6.3	6	6.2	6.3	6.3	6.2		
education		4.4	4.8	5	5.1	4.5	4	4.1	4.1	4.2	4.1	
health		3.8	4.2	4.3	4.3	4.1	4	4	3.9	3.9	4	

Table A6.: GDP by kind of expenditure

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Final consumption	72	80.5	84.2	88.2	84.3	77.3	73.9	72.3	72.4	74	72.9	74.9
Household consumption	50.1	54.2	56.8	58.1	56.3	52.7	50.8	49.2	49.5	51.1	50.9	51.2
Government consumption	21.9	25.7	26.5	28.6	26.2	23.6	22	21.9	21.7	21.5	20.8	23.7
Gross capital formation	25.4	20.5	169.1	20	22.2	23.9	27.2	27.7	29.7	28.5	31.1	27.3
Fixed capital formation	19.3	20.9	19.9	18.9	20.1	0	21.4	22.2	23.6	23.9	24.2	23.4
Changes in inventories	6.1	-0.5	-3.8	1.1	2.2	3.9	5.8	5.5	6	4.6	6.9	3.8
Balance of goods	2.6	-1	-0.3	-8.2	-6.5	-1.3	-1.1	0	-2.1	-2.5	-4	-2.1
exports	31.1	32.8	31.4	26.4	28.9	36.9	38.9	45.5	50.6	53	61.2	60.5
imports	28.5	33.7	31.7	24.6	35.4	38.2	39.9	45.5	52.7	55.5	65.3	62.6

Table A7.: Growth of demand components of GDP

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Final consumption	-2.7	-5.1	0.6	5.4	-2.3	-6.6	-3.5	2.3	4.1	4.2	3.7	2.5
Household consumption	-3.5	-6.4	0.9	2.2	-0.2	-6.4	-4.3	1.9	4.8	5.4	4.4	5.1
Government consumption	-0.7	-2.2	-1.1	9.8	-7.4	-5.7	-2.3	3.1	1.8	1.5	1.8	
Gross capital formation	-4.2	-21	-20.4	32.3	19.8	8.2	13.9	8.78	17.1	3.3	8.6	-1.4
Fixed capital formation	-7.1	-11.4	-2.6	2	12.5	-4.3	6.7	9.2	13.3	5.9	7.7	3.1
exports	-5.3	-13.9	2.1	-10.1	13.7	13.4	8.7	26.4	16.7	13.1	21.8	9.1
imports	-4.3	-6.1	0.2	20.2	8.8	-0.7	6.2	24.6	22.8	12.3	21.1	6.3

Table A8.: Price indices

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
GDP deflator	25.7	25.4	21.6	21.3	19.5	22.5	21.2	18.5	12.6	8.4	9.7	9
CPI	28.9	35	23	22.5	18.8	28.2	23.6	18.3	14.3	10	9.8	9.2
export prices	10.2	30.7	9.3	11.9	18.1	33.9	18	14.8	12.9	3.8	9.9	2.2
Import prices	9.8	45.9	9.9	9.4	15.5	32.2	20.8	13.4	11.4	55	12.9	2.5
TOT	0.3	-10.4	-0.5	2.3	2.2	1.3	-2.3	1.2	1.3	-1.6	-2.7	-0.3

Table A9.: Employment data

	Employment rate	Unemployment	Youth unemployment	Long-term unemployed/active population		
Czech Republic	65.1	7.3	17.3	4.3		
Hungary	56.5	5.6	10.9	2.5		
Poland	55	20	42.4	7		
Portugal	68.7	5	9.2	1.5		
Spain	57.7	11.4	21.4	3.9		
Greece	55.4	10.3	28.1	5.4		
EU-average	64.1	7.5	14.6	3.1		
AC-average	56.7	15.1	31.3	7.6		

Table A10.: Changes in employment by major sectors

	1990	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total Employment		-6.3	-2	-1.9	-0.8	0	0.7	3.1	1	0.3
Agriculture		-24.1	-6.2	-9.9	2.5	-4.8	-5.1	-3	-6.9	-4.9
Industry total		-10.6	-4.5	-5.3	-0.9	1.7	3.5	0.9	-1.2	1.7
mining		-19.9	-7.1	-13.3	-3.5	-17.1	-4.5	-5.1	-21.3	-32.3
manufacturing		-11	-5.2	-4.3	0.1	1.6	3.3	1.8	0.3	2.6
electricity		-2.7	2.9	-10.6	-8.1	9.7	7.1	-6.9	-10.8	-0.7
construction		-4.5	-2.9	8.1	0.2	0.7	4.41	10	5.8	1.8
Wholesale trade		-2.3	-0.4	-1.6	5.9	2	-5.3	9.6	4.5	1.4
Transport		-2.9	-6.5	1.6	0.5	-3.5	-3.4	2.1	1.1	-0.3
Financial services		5.7	0.4	12.8	1.3	0	1.1	-1.1	3.5	-5.7
Real estate		-1.9	-8.7	4	-1.8	14.1	11.9	12.8	11.3	7.3
Public administration		2	6.9	-0.7	-3.6	-4.2	2	2.6	-1	-3.4
education		9.9	-1.2	0.9	-4.7	-7.1	2	0.5	3.6	-2.5
health		2.2	-1.1	-3.2	-2.5	2.9	2.6	0.6	1	-2.8

Table A11.: Employment by major sector

	1990	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total Employment		100	100	100	100	100	100	100	100	100	100
Agriculture		11.3	9.1	8.7	8	8.3	7.9	7.5	7.1	6.5	6.2
Industry total		29.7	28.4	27.6	26.7	26.7	27.1	28	27.4	26.8	27.2
mining		1.3	1.1	1	0.9	0.9	0.7	0.7	0.6	0.5	0.3
manufacturing		25.8	24.5	23.7	23.1	23.1	23.7	24.7	24.4	24.2	24.8
electricity		2.6	2.7	2.9	2.6	2.4	2.8	2.6	2.4	2.1	2.1
construction		5.3	5.4	5.4	5.9	6	6	6.2	6.6	7	7.1
Wholesale trade		11.8	12.3	12.5	12.5	13.3	13.6	12.8	13.6	14.1	14.5
Transport		8.5	8.8	8.4	8.7	8.8	8.5	8.2	8.1	8.1	8.1
Financial services		1.7	1.9	1.9	2.2	2.3	2.3	2.2	2.1	2.2	2
Real estate		3.4	3.6	3.3	3.6	3.5	4	4.4	4.8	5.3	5.7
Public administration		7.2	7.8	8.5	8.6	8.4	8.1	8	7.9	7.8	7.5
education		7.6	9	9	9.1	8.8	8.1	8.3	8.1	8.3	8
health		5.8	6.3	6.4	6.3	6.2	6.4	6.4	6.3	6.3	6.1

Table A12.: Changes in employment by major sectors

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total investments growth rate	-9.6	-12.1	-1.5	2.5	12.3	-5.3	5.2	8.5	12.7	5.3	7.4	3.5
Agriculture		4.3	2.9	3.1	2.9	3	3.4	3.6	3.6	3.3	2.7	3
Industry total		30.5	32.7	29.4	28.7	31.5	30.8	30.2	33.7	36.4	35.7	30.8
mining		0.9	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.5	0.3	0.2
manufacturing		21.3	24.8	20.4	19.63	22.1	23.4	23.2	25.7	28.7	28.6	24.8
electricity		8.3	7.2	8.4	8.9	9	7.1	6.4	7.6	7.2	6.7	5.8
construction		1.7	1.8	1.8	1.9	2.4	2.4	1.7	1.9	2	2.1	2.4
Wholesale trade		5	5.3	5.8	5.2	4.7	7.9	6.4	6.8	7.9	7.9	7.1
Transport		18.6	15.9	18.3	21	19.3	16.2	18.9	16.6	14.9	13.8	16
Financial services		3.9	4.5	4.7	4.2	3.8	3.3	2.5	2.8	2.2	2	1.9
Real estate		23.1	20.6	21.1	19.8	22	24.2	22.6	18.4	19.4	21	24.1
Public administration		3.4	4.3	4.2	4.5	3.3	3.9	6	4.6	5	5	5
education		2	2.8	2.8	2.4	2.2	2.2	2.1	2	2.2	2.2	2.1
health		2.8	3.8	3.8	3.8	2.9	2.4	2.6	2.4	2	1.9	1.8

B. NATIONAL AND REGIONAL INFORMATION SOCIETY POLICIES

Table B1. List of IS-related subprogrammes in Szechenyi Plan

5 subprogrammes were defined under the IS part of the Plan. [1]

1. *Governmental Subprogramme*
2. *Improving Internet Accessibility in the Society Subprogramme*
3. *Creating the Basic Framework for e-Business Subprogramme*
4. *Culture of Information and Content Providing*
5. *Improving Quality of Life and Awareness*

The *Governmental Subprogramme* has three programme-parts:

1. Strategy-making and monitoring
2. e-Government, e-democracy
   - designing an informatic system for public administration,
   - collecting and digitalising data and materials used in public administration,
   - broadband and effective data-network, electronic signature, e-public tenders, providing public service to the citizens through Internet
3. Legal framework
   - e-signature,
   - regulation of e-commerce and e-work,
   - standardisation,
   - harmonisation with international regulation

The *Improving Internet Accessibility in the Society* subprogramme has four programme-parts:

1. Public and institutional access
   - creating more telehouses,
   - public institutions – offices, schools, libraries – shall have Internet-access and the necessary infrastructure,
   - urban telehouses shall be created,
   - public-private partnership in operating Internet-cafes and other Internet access solutions,
   - aiding SMEs in Internet-access
2. Raising the number of PCs andInternet-access in private homes
   - for example through re-selling business computers on the second-hand market, lowering Internet prices
3. e-local government, e-city, e-village
   - aiding local governments in building infrastructure and Internet sites
4. Promoting free software and by this helping NGOs and low-income families

[1] http://www.europa2002.hu/5th/5thm3.pdf

The *Creating the Basic Framework for e-Business Subprogramme* has two programme-parts:

1. e-business
    - digital signature,
    - regulations,
    - smart cards,
    - creating regional networks that would allow companies from the lagging regions to catch up and do business with more partners,
    - content providing on information important for business actors – regulation, tax measures, etc.,
2. Telework, telecommuting
    - labour regualtions
    - support of training programmes for doing telework,
    - electronic public-utility work (for those whore are registered unemployed and are supposed to do public utility work)

The *Culture of Information and Content Providing* subprogramme has two programme-parts:

1. E-literacy, life-long learning
    - Support of programmes for teaching e-literacy both in the schools and for adults as well
    - creating teaching materials, curriculums for e-literacy trainings and life-long learning programmes
2. The content „industry", digitalising culture, support of digitalised (mass)culture
    - digitalising the general knowledge in a form of an „information treasure"
    - digitalising the national heritage of Hungary, including minority cultures as well
    - support of special software that works in Hungarian since the relative small size of Hungarian-speakers make it hard to sell it profit-based

The *Improving Quality of Life and Awareness* subprogramme has three programme-parts:

1. Support of NGOs
    - Support of NGOs in forming their *consultung* activities – so they can teach the smaller communities to use the Internet and be part of e-society
    - Creation of a databank for allowing people/organisations to find partners for activities that they cannot carry out alone
2. Aiding disadvantaged people to be part of the e-society
    - this programme is not only for creating social cohesion but also for utilizing, for exploiting (in a positive sense) the capabilities and potential knowledge of those people
3. Building forward-looking social awareness
    - Information society campaigns in the media
    - Creating a „news agency" for information society issues to help the media in formulating IS news
    - Support for books and publications on IS

Table B2. Programmes of the National Information Society Strategy (NITS)

1. *Infrastructure Development Programme* • creating regulations and legal environment that leads to competition on the market of infrastructure of information • highlighted areas: regulation and standardisation
2. *Economic Policy Programme* • creating regulations and legal environment that helps business actors to catch up with current trends of informatics • highlighted areas: regulation, support the R&D of innovative enterprises, telework
3. *Cultural Programme* • adequate legal environment in order to allow civil and non-profit organisations to take advantage of the new media, and special oriented programmes for certain areas like the digitalisation of Hungarian culture and heritage • highlighted areas: regulation, digitalisation of Hungarian culture, support of non-profit content providing
4. *Education Programme* • raising the level of e-literacy among all age groups of society, support of e-learning programmes • highlighted areas: raising the level of knowledge in the use of ICTs
5. *Society Policy Programme* • helping certain significant groups of the society to learn the use of ICTs • the significant groups: 1. disabled people, roma minority and unemployed people, 2: inhabitants of small towns and villages, civil organisations, elderly people, urban communitiess • highlighted area: raising the level of need among these groups, providing infrastructure for them, education on ICT literacy
6. *E-government Programme* • based on ICT use, creating an administration that acts efficiently both in its inner communication and work, and in its relations with the public, developing public service • highlighted areas: digitalising the work of the administration, taking steps toward a serving-state
7. *Local Government Programme* • based on ICT use, creating local administration that acts efficiently both in its inner communication and work, and in its relations with the public, developing local public service • highlighted areas: digitalising the work of the local administrations, taking steps toward a serving- local administration

Table B3. Operational Programmes of the National Development Plan

Hungarian acronym	Hungarian title	English translation
GVOP	**G**azdasági **V**ersenyképesség **O**peratív **Programme**	Economic Competitiveness Operational Programme
KIOP	**K**örnyezetvédelmi és **I**nfrastrukturális **O**peratív **Programme**	Enviromental Protection and Infrastrucure Operational Programme
AVOP	**A**grár- és **V**idékfejlesztési **O**peratív **P**rogram	Agriculture and Rural Development Operational Programme
HEFOP	**H**umán **E**rőforrás **F**ejlesztési **O**peratív **P**rogram	Human Resources Development Operational Programme
ROP	**R**egionális **O**peratív **P**rogram	Regional Development Operational Programme

Table B4. Important programmes of the Hungarian Information Society Strategy (MITS)

Priority	Programme	Linkages to other programmes or development goals (Community, national)
Economy	e-work	eEurope 2005, GVOP*, sectoral development
	e-business	eBusiness, GVOP*, sectoral development
	e-transport (intelligent transport)	KIOP*, sectoral development
	e-agrarium (e-agriculture)	AVOP*, sectoral development
Public Administration	e-government	eEurope 2005, sectoral development
	e-local government	eEurope 2005, GVOP*, sectoral development
Culture	NDA, National Digital Archives	eContent, GVOP*, sectoral development
Education	e-education	eContent, HEFOP*, sectoral development s
Health	e-health	eEurope 2005, HEFOP*, sectoral development
Environment Protection	e-environment protection	KIOP*, sectoral development
Broadband	Közháló (PublicNet)	GVOP*, sectoral development
	NIIF (Nemzeti Információs Infrastruktúra Fejlesztés, National Information Infrastructure Development)	eScience, GVOP*, sectoral development
Access	eHungary points	PIAPS, eInclusion
Infrastructural services	Infrastructure of information of public interest	GVOP*
Knowledge, skills	digital literacy	eEurope 2005, eLearning
Legal and societal environment	e-security	eEurope 2005, eSecurity
	e-democracy	eEurope 2005,
Research and Development	IT R&D	IST, FP6, eTEN, eContent, GEANT, GRID, GVOP*
Equal opportunity	e-umbrella, combating Digital Divide	eEurope 2005, eInclusion

*: for details of acronyms see Table B3. in this annex.

C. INDUSTRIAL DEVELOPMENT AND COMPETITIVENESS

Table C1.: Gross investment by type

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Investment total	100	100	100	100	100	100	100	100	100	100	100	100
Construction	54	53.8	50	50.7	51.3	51.1	52.2	52	47.6	49.1	49.4	54.5
Machinery	36.8	38	40.7	10.4	39.7	40.4	38.9	38.7	43.9	49.9	49.6	44.4
Other	9.2	8.1	9.3	9	9	5.4	8.9	9.2	8.5	1	1.1	1.1

Table C2.: Exports by commodity groups

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Food and live animals	19.8	22.1	20.3	16.8	16.5	17.9	15.9	11.6	9.5	7.4	6.5	7.1
Beverages and tobacco	1.3	0.9	1.5	2.3	2	2.4	2.5	1.4	1	0.6	0.4	0.4
Crude materials	4.7	6	5.4	5.7	5.2	4.8	4.5	2.9	2.3	2	2.1	1.8
Mineral fuels	3.1	2.7	3.4	4.1	4	3.2	4.1	2.6	1.9	1.6	1.8	1.9
Animal and vegetable oils	1.2	1.2	1.2	1	0.9	0.7	0.8	0.9	0.6	0.4	0.3	0.2
Chemicals	12.4	12.8	10.9	12.1	11.2	11.8	11.1	8.6	7	6.2	6.6	6.6
Manufactured goods	18.5	17.4	17	16.1	16.4	17.4	17.7	13.4	12.4	11.5	10.7	10.6
Machinery and transport equipment	25.6	22.5	21.2	24.1	25.6	25.6	25.5	45.2	52	57.3	60	57.6
Miscellaneous manufactured articles	10.7	14.2	18.9	17.8	17.9	16.2	17.9	13.4	13.2	12.9	11.5	12.8
Not classified	2.6	0.6	0.1	0.1	0	0.1	0	0	0.1	0	0	0

Table C3.: Imports by commodity groups

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Food and live animals	6.3	4.8	4.8	5	5.7	4.7	4.4	3.7	3.3	2.7	2.5	2.7
Beverages and tobacco	0.8	0.7	0.7	0.6	0.6	0.5	0.6	0.5	0.4	0.4	0.2	0.3
Crude materials	5.3	4.3	3.7	3.7	4.1	3.7	2.8	2.5	2.1	2	1.8	1.8
Mineral fuels	14.2	15.3	15	13.3	11.8	11.8	13.6	9.6	6.6	6.1	8.4	8.2
Animal and vegetable oils	0.1	0.1	0.1	0.2	0.3	0.3	0.5	0.5	0.2	0.2	0.2	0.2
Chemicals	14.9	12.5	12.9	11.9	12.7	14.2	13.9	11.3	10.6	9.5	8.8	9
Manufactured goods	15.5	20.7	21.2	18.2	19.8	23	22.2	19.8	19.2	17.78	16.5	16.3
Machinery and transport equipment	34.6	30.8	29.6	36.6	34.1	30.8	30.5	42	46.6	50.2	51.5	51.6
Miscellaneous manufactured articles	7.8	10.7	12	11.1	11.3	10.6	8	9.9	10.6	11.1	9.8	9.5
Not classified	0.4	0.2	0	0	0	0	0	0	0	0	0	0

Table C4.: Trade with regions

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
exports												
Total	7.5	8.2	8.2	7.6	9	9.9	10.5	16.9	20.5	23.4	30.5	34.1
developed countries	4	5.6	5.8	5.2	6.5	6.9	7.3	13.1	16.5	19.7	25.5	28
EU	3.2	4.8	5.2	4.4	5.8	6.3	6.5	12	14.9	17.9	22.9	25.3
CEEC				0.6	0.8	1.1	1.1	1.5	1.9	1.9	2.5	3.1
Other countries			1.7	1.6	1.9	1.9	20.2	2.1	1.9	2.5	2.9	
Imports												
Total	6.7	9.2	8.6	10.8	12.3	11.9	12.9	18.8	22.9	26.3	34.8	37.6
developed countries	3.6	6.1	6	7	8.7	8.3	8.9	13.4	17.1	19.7	24.4	26.2
EU	2.9	5.2	5.2	5.9	7.5	7.3	7.7	11.8	14.6	16.6	20.4	21.7
CEEC				0.7	0.9	0.9	1.1	1.3	1.6	1.9	2.6	2.9
Other countries			3	2.6	2.6	2.8	3.7	4.2	4.8	7.9	8.5	

Table C5.: Structure of production in manufacturing industry

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Food products. beverages and tobacco	24.2	25.4	29.1	28.1	28.3	25.9	25.6	21.5	18.9	17	15.3	16.2
Textiles and textile products	6.2	5.6	5.4	5.3	4.9	4.5	4.2	3.6	3.7	3.6	3.3	3.2
Leather and leather products	1.7	1.7	1.3	1.3	1.2	1	0.9	0.8	0.8	0.8	0.6	0.6
Wood and wood products	2.4	2.6	1.6	1.6	1.7	1.7	1.7	1.5	1.4	1.2	1.1	1.1
Pulp. paper. publishing and printing	3.58	3.8	4.8	5.1	4.6	5.2	4.5	4.3	4	4.3	4.3	4.4
Coke. refined petroleum	6.7	7.7	10.5	9.4	8.1	7.4	7.6	6.7	5.8	4.9	6.2	5
Chemicals. chemical products	10.7	11.1	11.1	10.9	10.7	11	10	9.7	8	7	7.2	6.8
Rubber and plastic products	2.6	2.9	2.8	2.9	3.4	3.7	3.8	3.6	3.5	3.3	3.3	3.7
Other non-metallic mineral products	3.9	3.8	3.6	4	3.9	3.7	3.6	3.3	3.2	2.9	2.7	2.8
Basic metals and metal products	14.8	12.2	10.5	10.8	11.6	12.1	11	10	9.3	8.1	8.1	8
Machinery and equipment	7.3	7.8	6.5	6	5.9	5.8	5.6	5.2	4.8	4.7	4.1	4.3
Electrical and optical equipment	10.3	9.3	6.9	7.2	8.4	8.5	11.3	16.7	19.5	23.6	27.2	27.4
Transport equipment	4.7	5.2	4.1	5.4	5.7	8.1	8.7	11.7	15.7	17	15.5	15
Manufacturing n.e.c.	1.1	1	1.8	1.9	1.6	1.5	1.4	1.2	1.3	1.2	1.2	1.3

Table C6.: Structure of employees in manufacturing

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Food products. beverages and tobacco	17.8	19.1	21.4	20.7	20.9	20.1	19.5	18.3	18.1	17.4	16.3
Textiles and textile products	12.4	11.7	13.7	14.4	15	14.6	14.7	14.7	15.4	14.5	13.5
Leather and leather products	3.4	3.9	3.9	4.1	3.5	3.5	3.6	3.9	3.5	3.3	3
Wood and wood products	1.3	1.8	2.6	2.4	2.6	2.7	2.5	2.4	2.2	2.8	3
Pulp. paper. publishing and printing	3	3.3	4.4	4.7	4.7	4.7	4.3	4.1	3.5	4.3	4.6
Coke. refined petroleum	0.5	0.6	2.6	2.8	2.7	2.7	2.6	2.4	2.3	2	1.7
Chemicals. chemical products	5.6	5.8	6.1	6.6	6.8	6.9	6.8	6.2	5.8	5	4.7
Rubber and plastic products	2.3	2.6	2.6	2.7	2.9	3.1	3.4	3.6	3.9	4.1	4.2
Other non-metallic mineral products	4.9	5	4.6	4.7	4.7	4.8	4.8	4.7	4.78	4.2	4
Basic metals and metal products	10.2	9.6	10.3	10.6	10.5	10.8	10.4	10.1	8.9	10.1	10
Machinery and equipment	12.2	12.4	10.1	8.8	8.3	8.2	8.5	8.1	7.8	7.6	7.6
Electrical and optical equipment	14.7	12.9	9.8	9.4	9.8	10.69	11.5	13.1	14.3	15.6	18.4
Transport equipment	6	6.1	4.3	4.5	4.3	4.2	4.4	5.1	6.1	5.4	5.4
Manufacturing n.e.c.	5.6	5.3	3.5	3.5	3.4	3.3	3.3	3	3.1	3.7	3.7

Table C7.: Labour productivity in manufacturing industry

	1993	1994	1995	1996	1997	1998	1999	2000
Food products. beverages and tobacco	13.7	15.1	11	6	-0.8	-1.2	5.4	12.1
Textiles and textile products	12.3	10.1	5.9	-1.1	-0.8	3.1	12.3	22.1
Leather and leather products	12.4	32.1	-7	-7.7	8.8	12	1.7	7.4
Wood and wood products	28	20.5	0.2	5	6.4	13.5	-7.6	6.7
Pulp. paper. publishing and printing	16.7	8.9	13.6	1.6	20.5	27.4	4.4	13.2
Coke. refined petroleum	3.5	16.5	5.9	3.3	3.9	15.4	-12.6	11.1
Chemicals. chemical products	6.7	9.6	0.7	-2.5	16.5	-3.7	-4.7	16.5
Rubber and plastic products	24.6	31.5	3.2	-3.4	7.8	-1.1	8.1	9.9
Other non-metallic mineral products	25.2	15.3	7.2	4.2	4.3	10.6	3.4	12.9
Basic metals and metal products	26.8	33.8	21.1	-0.7	-3.2	13	8.3	11.7
Machinery and equipment	27.1	27.3	21.1	-0.7	-3.2	13	8.3	11.7
Electrical and optical equipment	31.4	40.6	9.9	37.1	60.7	34.2	44.8	21.9
Transport equipment	41.9	31	63	22.9	41.4	19.4	25.6	14.1
Manufacturing n.e.c.	22	10.2	11.9	-6.3	11.8	13.5	-6.8	19.7
Manufacturing total	18.1	19.8	11	6.7	15.5	15	16.7	21.3

Table C8.: Wages In Euro by industrial branches

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Food products. beverages and tobacco	169	187	207	252	267	245	250	271	280	289	331
Textiles and textile products	124	135	147	164	167	156	16	179	180	188	208
Leather and leather products	129	132	136	154	165	150	156	169	169	183	206
Wood and wood products	152	156	169	192	201	183	187	201	193	183	206
Pulp. paper. publishing and printing	202	217	276	320	337	306	306	348	357	339	378
Coke. refined petroleum	293	370	374	451	477	449	476	553	558	611	725
Chemicals. chemical products	208	236	269	324	357	341	366	418	434	481	541
Rubber and plastic products	193	191	218	250	262	247	253	281	290	303	341
Other non-metallic mineral products	168	183	211	250	263	249	258	289	303	329	362
Basic metals and metal products	182	196	213	249	274	256	261	293	293	293	328
Machinery and equipment	167	179	199	237	254	238	246	275	288	311	344
Electrical and optical equipment	162	187	216	252	266	248	261	286	294	328	370
Transport equipment	159	174	215	271	289	278	306	350	356	391	444
Manufacturing n.e.c.	125	135	183	191	196	173	181	202	207	211	224
Manufacturing total	163	179	207	245	260	243	252	279	286	302	341

Table C9.: Division of FDI in manufacturing in 2001 (%)

	CZ	HU	PL
Food products. beverages and tobacco	1 125.6	918.2	4 961.2
Textiles and textile products	203.6	142.3	254.1
Leather and leather products	4.1	22.1	17.2
Wood and wood products	89.5	40.2	240.2
Pulp. paper. publishing and printing	587.7	159.2	1 470.1
Coke. refined petroleum	210.6	215.1	
Chemicals. chemical products	386.5	300.6	1 285.1
Rubber and plastic products	104.5	176.7	591.5
Other non-metallic mineral products	1 467.1	213.4	2 785.1
Basic metals and metal products	624.1	194.1	403.2
Machinery and equipment	218.5	199.4	317.2
Electrical and optical equipment	662.2	680.1	1 575.1
Transport equipment	989.5	366	5 167.4
Manufacturing n.e.c.	100.2	36	393.5
Manufacturing total	6 786.7	3 688	19 462.1

Table C10.: Export structure of manufacturing in Hungary

	1995	2000
Mainstream	20.8	17.4
Labour intensive	22.5	13.7
Capital intensive	20.7	13.2
Marketing	14.1	7.7
Technology intensive	21.3	48.1

Table C11.: Comparison to others in export structure

	Cohesion-3 average		CZ		SK	
	1995	2000	1995	2000	1995	2000
Mainstream	20.4	13.3	29.2	29.7	20.3	22.8
Labour intensive	23.8	13.4	25.8	19.7	24.9	19.9
Capital intensive	20.6	20.8	23.6	19.3	37.8	24.9
Marketing	20.1	18.6	9.4	7.1	7.6	7.6
Technology intensive	21.5	28.6	11.5	24.1	9.2	25.1

Table C12.: Export structure of manufacturing in Hungary according to skill intensities

	1995	2000
low skill	38.8	19.8
medium skill/blue collar	22.4	29.9
medium skill/ white collar	30.7	32.7
high skill	9.1	16.4

Table C13.: Comparison to others in export structure

	Cohesion-3 average		CZ		SK	
	1995	2000	1995	2000	1995	2000
low skill	42.2	40.1	35.9	23.6	42.1	27.8
medium skill/blue collar	21.3	19.8	26.9	36.1	24.3	39.8
medium skill/ white collar	20.5	25.8	24.9	25.1	26.6	26.1
high skill	5.5	14.8	12.3	13.7	6.1	11.1

Table C14.: Division of GDP in 2001 by %

	Agriculture	Manufacturing	Construction	Services	Altogether
Central Hungary	57	1 080	288	4 321	5 747
Central Transdanubia	64	547	68	663	1 343
Western Transdanubia	57	520	69	695	1 342
South Transdanubia	81	247	49	584	962
North Hungarian region	50	376	56	612	1 094
Northern Plain region	114	346	74	795	1 331
Southern Plain region	137	309	60	761	1 268
Country	562	3 426	666	8 434	13 090

Table C15.: Share of individual regions from the sector output in 2001

	Agriculture	Manufacturing	Construction	Services	Altogether
Central Hungary	10.1	31.5	43.2	51.2	43.9
Central Transdanubia	11.4	16.0	10.2	7.9	10.3
Western Transdanubia	10.1	15.2	10.4	8.2	10.3
South Transdanubia	14.4	7.2	7.4	6.9	7.3
North Hungarian region	8.9	11.0	8.4	7.3	8.4
Northern Plain region	20.3	10.1	11.1	9.4	10.2
Southern Plain region	24.4	9.0	9.0	9.0	9.7
Country	100	100	100	100	100

Table C16.: Share of items in the regional GDP

	Agriculture	Manufacturing	Construction	Services	Altogether
Central Hungary	0.99	18.79	5.01	75.19	100
Central Transdanubia	4.77	40.73	5.06	49.37	100
Western Transdanubia	4.25	38.75	5.14	51.79	100
South Transdanubia	8.42	25.68	5.09	60.71	100
North Hungarian region	4.57	34.37	5.12	55.94	100
Northern Plain region	8.56	26.00	5.56	59.73	100
Southern Plain region	10.80	24.37	4.73	60.02	100
Country	4.29	26.17	5.088	64.43	100

Table C17.: Division of GDP in 1999 by %

	Agriculture	Manufacturing	Construction	Services	Altogether
Central Hungary	54	840	198	3 173	4 267
Central Transdanubia	50	435	47	498	1 030
Western Transdanubia	60	481	49	530	1 122
South Transdanubia	65	213	37	437	752
North Hungarian region	42	289	39	464	836
Northern Plain region	97	252	46	572	969
Southern Plain region	112	245	44	590	993
Country	483	2 757	463	6 267	9 973

Table C18.: Share of individual regions from the sector output in 2001

	Agriculture	Manufacturing	Construction	Services	Altogether
Central Hungary	11.18	30.47	42.76	50.63	42.79
Central Transdanubia	10.35	15.78	10.15	7.95	10.33
Western Transdanubia	12.42	17.45	10.58	8.46	11.25
South Transdanubia	13.46	7.73	7.99	6.97	7.54
North Hungarian region	8.70	10.48	8.42	7.40	8.38
Northern Plain region	20.08	9.14	9.94	9.13	9.72
Southern Plain region	23.19	8.89	9.50	9.41	9.96
Country	100	100	100	100	100

Table C19.: Share of items in the regional GDP

	Agriculture	Manufacturing	Construction	Services	Altogether
Central Hungary	1.27	19.69	4.64	74.36	100
Central Transdanubia	4.85	42.23	4.56	48.35	100
Western Transdanubia	5.35	42.87	4.37	47.24	100
South Transdanubia	8.64	28.32	4.92	58.11	100
North Hungarian region	5.02	34.57	4.67	55.50	100
Northern Plain region	10.01	26.01	4.75	59.03	100
Southern Plain region	11.28	24.67	4.43	59.42	100
Country	4.84	27.64	4.64	62.84	100

Table C20.: GDP/capita in regional division

		GDP/capita			GDP/capita in EU average	
	1999	2000	2001	1999	2000	2001
Central Hungary	15 960	17 555	19 389	75.1	77.7	83.5
Budapest	20 152	22 792	25 060	94.8	100.8	107.9
Central Transdanubia	9 906	10 938	11 445	46.6	48.4	49.3
Western Transdanubia	12 142	12 794	12 779	57.1	56.6	55.0
South Transdanubia	8 212	8 346	9 231	38.6	36.9	39.8
North Hungarian region	7 006	7 211	8 042	33.0	31.8	34.6
Northern Plain region	6 773	7 103	8 143	31.9	31.4	35.1
Southern Plain region	7 870	7 999	8 794	37	35.4	37.9
Country	10 561	11 245	12 268	49.7	49.8	52.8

Table C21.: Regional division of GDP in between the NUTS-II regions

	1999	2000	2001
Central Hungary	42.8	43.4	43.9
***Budapest	34.6	35.2	35.1
Central Transdanubia	10.3	10.7	10.3
Western Transdanubia	11.2	11.2	10.2
South Transdanubia	7.5	7.2	7.4
North Hungarian region	8.4	8.2	8.3
Northern Plain region	9.7	9.7	10.2
Southern Plain region	10	9.6	9.7
Country	100	100	100

Table C22.: Employment and unemployment in the NUTS-2 regions

		Employment rate		**Unemployment rate**	
	1995	**2001**		**1995**	**2001**
Central Hungary	58.8	60.9		12.4	4.3
Central Transdanubia	55.6	59.9		8.9	4.2
West Transdanubia	60.9	63.3		9.8	4.2
South Transdanubia	53.3	52.6		12.7	7.8
North Hungary	49.6	49.7		15.9	8.5
Northern Plain	48.6	49.7		14.6	7.8
Southern Plain	53.8	56.2		12.2	5.4
National average	54.8	56.6		11.9	5.7
EU average	60	63.9		10.2	7.4

Table C23.: Output structure in the NUTS-2 regions

	Agriculture		**Industry**		**Services**	
	1995	**2001**	**1995**	**2001**	**1995**	**2001**
Central Hungary	1.9	1.2	25.7	23.9	72.3	74.9
Central Transdanubia	8.9	5.9	44.8	48.2	46.5	45.0
West Transdanubia	9.9	4.8	42.7	47.2	47.4	48.2
South Transdanubia	13.9	8.4	32.9	35.2	53.3	56.1
North Hungary	6.3	3.9	41.8	40.1	51.3	56.0
Northern Plain	9.7	6.4	37.9	36.5	55.1	57.0
Southern Plain	11.6	8.0	36.3	37.0	52.0	55.0
National average	7.2	4.4	34.4	34.9	58.4	60.7

Table C24.: Regional differences and trends

	Per capita GDP		Gross income/capita		FDI/capita		Companies /1000 inhabitants	
	1995	2001	1995	2001	1995	2001	1995	2001
Central Hungary	145.6	152.3	120.7	116.3	241.2	243.3	136.5	166.3
Central Transdanubia	86.7	100.5	97.7	104.7	73.5	85.0	96.9	94.0
West Transdanubia	100.7	113.9	92.1	99.6	83.9	76.2	93.8	100.0
South Transdanubia	84.0	74.8	89.6	90.8	35.3	17.9	112.5	91.6
North Hungary	69.6	64.6	89.7	86.7	32.4	48.2	63.5	69.9
Northern Plain	73.9	63.4	87.4	88.1	20.6	22.8	68.8	72.3
Southern Plain	83.3	71.9	87.9	95.4	33.8	29.3	90.6	85.5

Table C25.: The number of enterprises in the ICT sector

	1996	1997	1998	1999	2000
Total number of corporations	2 214	2 594	2 035	2 743	6 307
with 0-10 employees	2 027	2 399	1 785	2 435	5 900
with 11-21 employees	97	106	141	172	210
with 21-50 employees	62	61	76	94	94
with more than 51 employee	28	28	33	42	52
The number of employed in the companies	11 220	11 794	13 861	18 010	20 190

Table C26.: The information technology (IT) and telecommunications market in Hungary in million Euro

	1998	1999	2000	2001	2002
Total ICT	3 638	4 219	4 805	5 456	5 946
Total IT	1 216	1 336	1 485	1 665	1 857
Total CT	2 421	2 883	3 320	3 791	4 089

Table C27.: The value of hardware and IT services in million Euro

	1998	1999	2000	2001	2002
Hardware	480	500	520	580	610
IT Services	400	470	530	650	750

Table C28.: Certain data representing the development of domestic computer market

	1995	1996	1997	1998	1999	2000
PC per 100 households	6	6	8	9	11	14
Computers in central government administration	50 487	54 882	63 130	75 075	93 360	111 150
PC	49 554	53 700	61 401	72 639	90 705	105 056
medium sized computers	1 239	1 125	1 624	2 287	2 314	5 374
big computers	50	57	105	149	287	720
Number of information technology experts in public administration	4 259	4 130	63 252	73 667	88 714	145 647
Investments of public administration institutions in information technology	8 412	5 289	15 320	15 928	26 498	32 710

Table C29.: The share of major participants in the total IT market in the first half of 2002

Company	**Share**
HP	15
IBM	8
KFKI	6
SYNERGON	5
SIEMENS	5
ALBACOMP	4
Debis	3
Sun	3
Other	51

Table C30.: The share of the major participants in the IT Service market

HP	16
IBM	10
KFKI	6
SYNERGON	4
SIEMENS	3
Gedos	2
Unisys	3
Oracle	4
ICL	3
Other	49

Table C31.: The value of market services in million Euro

	1999	2000	2001	2002
Wire	1 200	1 250	1 350	1 400
Mobile	900	1 100	1 400	1 700

Table C32.: The share of mobile producers world-wide

Nokia	36
Motorola	16
Samsung	10
SIEMENS	8
Sony-Ericcson	5
Other	25

Table C33.: The division of companies on the corporate sector Internet market

Axelero	43
PSInet	15
Datanet	15
Euroweb	3
V-net	2
Other	22

Table C34.: Hardware producer companies

	Revenue 2000	Revenue 2001	Employees 2001	Established
Compaq	33 000	40 000	260	1990
Albacomp	10 800	11 500	280	1985
Human Soft Ltd.	3 762	3 871	85	1989
Systrend Ltd.	3 720	3 700	53	1989
Bull Hungary	3 500	4 700	50	1990

Table C35.: Software developers and traders

	Revenue 2000	Revenue 2001	Employees 2001
Graphisoft	8 000	7 500	180
Debis IT Services	4 258		130
MÁV Informatika	3 554	4 500	550
Online Businessinformatics Ltc.	1 580	1 500	120
Mikro Volán Electronics	1 327	1 200	101

Table C36.: Systems integrators

	Revenue 2000	Revenue 2001
Compaq	33 000	40 000
Synergon	14 250	21 500
KFKI	15 700	21 500
SAP Hungary Ltd.	5 687	7 120
Montana Ltd.	4 200	6 845
HP Hungary Ltd	11 554	13 205

Table C37.: Producers of wire phones

	Revenue 2000	Revenue 2001	Employees 2001
SIEMENS	72 036	71 013	1 040
Panasonic	16 000		45
Alcatel Hungary	3 007		80

Table C38.: Producers of mobile phones

	Revenue 2000	Revenue 2001	Employees 2001
Nokia	63 000		1 500
Ericsson	45 000	29 000	700
Alcatel SIEMENS	3 007		80
	72 036	71 013	1 040

Table C39.: Wire phone service providers

	Revenue 2000	Revenue 2001	Employees 2001
Matáv	445 945	547 852	14 380
Hunagro Tel	8 669		390
emitel	6 663	7 000	316
Monor	6 382		201
GTS Hungary	5 495	7 609	86
Vivendi	40 200		1 250
Pantel	5 000	10 000	180

Table C40.: Mobile phone providers

	Revenue 2000	Revenue 2001	Subscribers 2000	Subscribers 2001
Westel	153 350	193 598	1 600	2 500
Pannon	98 400	132 800	1 217	1 953
Vodafone	11 100	19 900	184	477

D. PRESENCE OF THE MOST RELEVANT ECONOMIC ACTIVITIES FOR IST APPLICATIONS

Table D1.: R+D statistics

	R+D institution	High education institution	Corporate R+D	Other rsearchinstitution	Altogether
Employees	11 931	8 843	13 017	2 593	36 384
Expenditures. HUF Million	8 704	4 806	9 528	1 442	24 481
Employees	6 194	7 210	4 682	2 672	20 758
Expenditures. HUF Million	17 138	14 198	22 283	3 383	57 184
Employees	5 012	7 561	4 939	2 803	20 315
Expenditures. HUF Million	20 515	17 283	25 655	4 167	67 621
Employees	7 978	7 452	5 889		21 329
Expenditures. HUF Million	25 247	17 472	314 558		74 177
Employees	8 204	8 859	6 471		23 534
Expenditures. HUF Million	27 494	25 311	46 703		99 508
Employees	7 766	8 397	6 779		22 942
Expenditures. HUF Million	36 391	36 193	56 773		128 957

Table D2.: The division of public and private R+D

	1995	2000
Public	55.1	49.5
Private	36.2	37.8

E. INFORMATION SOCIETY TECHNOLOGIES (IST) PENETRATION

No data is presented for this section.

F. INSTITUTIONAL CAPACITIES AND REGULATORY BACKGROUND

No data is presented for this section.

G. EDUCATIONAL SECTOR AND LABOUR FORCE SUPPLY

Table G1.: The education system in Hungary

<table>
<tr><td colspan="3">crèche
age: 0 - 3</td></tr>
<tr><td colspan="3">nursery school
age: 3 - 6</td></tr>
<tr><td>elementary school
age: 6 - 14</td><td>elementary school
age: 6 - 14</td><td>elementary school
age 6 - 10 or 12 or 14</td></tr>
<tr><td>vocational training school
age: 14 - 18</td><td>vocational –grammar school
age: 14 - 18</td><td>grammar school
age: 10 or 12 or 14 - 18</td></tr>
<tr><td></td><td colspan="2">tertiary education:
special colleges (1-4 years) or
regular colleges (3-4 years) or
universities (5 years)</td></tr>
<tr><td></td><td colspan="2">post degree programmes. PhD</td></tr>
</table>

Graph G2.: Enrollment rates by level and type of education

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
nursery school	100.0	100.8	100.8	101.6	101.4	102.2	100.9	101.7	96.0	93.6	90.5	87.3
elementary education	100.0	95.4	91.9	88.5	85.9	84.7	83.7	83.5	83.5	83.2	82.1	81.0
vocational training	100.0	100.2	96.0	90.6	84.9	79.0	72.7	66.2	58.9	54.0	56.5	59.1
grammar schools	100.0	107.3	113.1	117.4	121.9	127.7	132.8	135.8	139.2	142.8	144.1	145.4
tertiary education	100.0	108.6	120.5	135.4	151.9	169.1	185.5	199.6	212.9	224.0	229.8	240.3

Source: HCSO (2002)

GRAPH G3.: ENROLLMENT IN SECONDARY EDUCATION BY SCHOOL TYPE

	1990	1991	1992	1993	1994	1995
Vocational training	222 204	221 720	211 833	198 859	185 751	172 599
Vocational-grammar school	217 787	225 265	235 019	246 135	254 678	261 838
Grammar school	142 247	154 051	165 314	172 751	182 448	186 671
	1996	1997	1998	1999	2000	2001
Vocational training	158 407	143 911	128 203	117 038	122 070	127 101
Vocational-grammar school	272 207	279 801	289 259	296 753	294 388	292 023
Grammar school	189 963	194 841	201 802	208 570	216 070	223 571

Source: HCSO (2002)

Table G4.: Number of teachers. 1990-2001

%. 1990=100	1990	1995	1999	2001
In nursery schools	100.0	96.1	94.1	96.1
In elementary schools	100.0	96.1	92.4	93.3
In vocational schools	100.0	90.7	67.5	67.3
In secondary schools	100.0	125.2	143.4	158.5
In higher education	100.0	104.6	122.2	132.1

Source: HCSO (2002)

Table G5.: Higher education

	1990/91	2000/2001	2001/2002	2002/2003
Institutes	77	62	65	66
Teachers	17 302	22 873	22 863	23 151
Students	108 376	327 289	349 301	381 560
Students in:				
- vocational training	-	3 464	4 475	6 128
- universities	47 498	113 513	117 947	124 606
- regular colleges	54 889	181 527	195 291	216 581
- postgraduate vocational courses	5 989	22 033	24 558	26 815
- doctoral studies (PhD. DLA)	-	6 752	7 030	7 430
In university and college level education:				
Full time student	76 601	176 046	184 071	193 155
In evening. correspondence. distance learning	25 786	118 994	129 167	148 032
From full time students:				
- first course student	22 662	52 578	56 709	57 763
- foreign student	3 310	7 751	8 088	8 184
- woman. %	48.8	53.6	53.8	53.8
- in state funded education. %	..	93.6	90.6	88.1
- in dormitories. %	46.8	26.9	25.5	24.6
Graduates in:				
- full time education	15 963	29 843	29 746	30 785
- evening. correspondence and distance learning courses	8 140	17 135	17 690	19 720

Source: HCSO (2002)

Table G6.: Life long learning. by education levels. 1990-2001

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Elementary school	100	101.6	94.9	77.9	56.8	45.1	35.5	27.4	26.1	27.3	25.5	23.8
Secondary school	100	105.8	114.3	120	124.8	119.4	122.1	136.7	159.6	175.8	195.3	214.8
Tertiary institution	100	92.6	97.5	117.3	148.5	194	220.7	313.2	369.3	416.4	461.5	500.9

Source: HCSO (2002)

Table G7.: Number of graduates (full-time and part-time education together)

In thousands	1990/1991	1995/1996	1999/2000	2001/2002
Pupils completed 8th grade	172.9	128.5	119.1	119.3
Students passed final examination	67.9	84.2	89.6	88.9
Of which:				
in secondary general school	27.3	34.6	36.3	38.0
in secondary vocational school	40.6	49.6	53.3	50.9
Students graduated from higher education	24.1	26.2	42.3	47.2

Source: HCSO (2002)

Table G8.: Students applied and admitted to third level education. by area of training

Institutions. faculties	1990/1991	1995/1996	2000/2001	2001/2002
Students applied	46 767	86 548	82 957	84 380
Students admitted	16 818	35 081	45 546	49 874
Students admitted as a percentage of those who applied. in:				
Technical universities	52.1	65.3	75.7	75.7
Technical colleges and high school faculties	63.7	57.3	80.1	83.1
Universities for agricultural sciences	43.3	48.3	66.3	72.8
Agricultural colleges and high school faculties	37.0	42.5	44.5	72.5
Faculties of economic sciences	34.3	35.2	40.4	41.4
Economic colleges	29.4	47.9	39.4	58.1
Law	27.8	27.5	32.2	34.3
Academy of State Administration	30.2	20.2	22.8	28.0
Liberal arts	20.2	31.7	49.5	47.2
Natural science	39.5	47.1	75.4	77.3
Teachers' training colleges. higher grade	30.9	37.6	73.7	66.6
University of Physical Education	27.0	36.2	54.3	48.6
Teachers' training colleges. lower grade	35.9	48.2	78.4	84.5
Nursery school teachers' training colleges	44.2	56.6	89.8	90.3
Medical universities	44.6	36.7	43.0	44.8
Medical colleges	43.0	53.1	65.0	75.8
Fine arts	17.4	13.0	19.9	21.6
Other		13.4	24.3	32.1
Total	36.0	40.5	54.9	59.1

Source: HCSO (2002)

Table G9.: Students of university and college level education by ISCED fields of training. 2001/2001

Field of training	University level	Of which: in full-time form	Colleges level	Of which: in full-time form
Engeneering and computing	20 294	18 913	34 285	16 928
Agriculture. veterinary. enviromental protection	6 528	6 132	8 158	3 268
Humanities	19 189	17 465	4 007	1 645
Social sciences	20 724	15 526	9 089	4 739
Business and administration	6 579	4 675	60 364	20 887
Health and welfare	9 685	9 339	15 571	7 351
Law	17 612	9158		
Sciences	5 351	5 350	54	54
Teacher training end education science	8 259	5 613	39 127	20 377
Arts	3 170	3 035	1 447	1 059
Personal service			9 219	4 760
Security service	556	234	13 970	7563
Total	117 947	95 440	195 291	88 631

Source: HCSO (2002)

Table G10.: Number of students of university and college level education in full-time form by region

Regions	1990/1991	1995/1996	2000/2001	2001/2002
***Budapest	17 498	28 801	36 515	36 180
***Pest	4 233	8 884	12 871	14 176
Central Hungary	21 731	37 685	49 386	50 356
***Fejér	2 380	4 552	6 042	7 029
***Komárom-Esztergom	2 008	3 226	4 542	4 822
***Veszprém	2 571	4 535	6 655	6 808
Central Transdanubia	6 959	12 313	17 239	18 659
***Győr-Moson-Sopron	3 458	5 218	7 644	7 729
***Vas	2 047	3 222	4 319	4 554
***Zala	2 265	3 803	4 992	5 110
Western Transdanubia	7 770	12 243	16 955	17 393
***Baranya	2 895	4 677	6 650	6 981
***Somogy	2 031	3 302	4 529	4 282
***Tolna	1 604	2 877	4 317	4 335
Southern Transdanubia	6 530	10 856	15 496	15 598
***Borsod-Abaúj-Zemplén	5 809	9 508	12 504	12 855
***Heves	2 536	4 094	5 484	5 552
***Nógrád	1 324	2 236	3 498	3 815
Northern Hungary	9 669	15 838	21 486	22 222
***Hajdú-Bihar	4 235	6 861	9 888	10 325
***Jász-Nagykun-Szolnok	2 881	4 937	6 635	6 949
***Szabolcs-Szatmár-Bereg	3 876	6 533	9 463	9 867
Northern Great Plain	10 992	18 331	25 986	27 141
***Bács-Kiskun	3 484	5 951	8 033	8 390
***Békés	2 466	4 312	5 823	6 192
***Csongrád	3 385	5 712	7 605	7 855
Southern Great Plain	9 335	15 975	21 461	22 437
Foreign	3 310	6 300	7 751	8 088
Unknown	305		286	2 177
Total	76 601	129 541	176 046	184 071

Source: HCSO (2002)

Table G11.: Governmental educational expenses. % of GDP. 1991-2002

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Education. total	6.1	6.3	6.2	6.2	5.2	4.8	4.7	4.8	4.7	4.6	4.5	4.4
-preparatory and elementary	2.7	2.7	2.6	2.4	1.9	1.7	1.5	1.5	1.6	1.5	1.5	1.5
-secondary	1.1	1.1	1.1	1.2	1	1	0.4	0.4	0.5	0.4	0.4	0.4
-upper level	1.7	1.8	1.6	1.7	1.5	1.3	1.4	1.5	1.4	1.4	1.4	1.3
-other types	0.7	0.7	0.8	0.9	0.8	0.7	1.3	1.3	1.3	1.2	1.2	1.2

Source: Stark (2002)

Table G12.: Public support of education. 1990-2000*

	1990	1994	1998	2000
Public support of public education**. total (million HUF)	95 269	92 892	334 492	417 131
Public support per student (thousand HUF):				
- on current prices	45.8	99.1	175.7	222
- in 2000. HUFs	286.5	256.7	212.2	222
Students in tertiary education financed by the state (thousand)***	76.0	121.0	157.0	169.1
Public support to tertiary education (million HUF)	23 785	53 485	91 264	125 248
Normative support. per capita (thousand HUF)				
- on current prices	313.0	442.0	583.6	740.7
- in 200. HUFs	1 956.0	1 145.1	704.8	740.7

Source: Stark (2002)
* from central and local governmental funds
** public education = elementary and secondary education
*** full time = 1 student. evening = 1/3 student. correspondence = 1/4 student

Table G13.: Mobility of scientific personnel. 1989-1997*

	1989	1990	1991	1992	1993	1994	1995	1996	1997
Mobile researchers	57	42	53	24	21	24	20	22	25
Returning researchers	13	26	35	39	18	17	14	15	18
Total. researchers	691	996	865	911	853	839	829	845	806

Source: Tamási (2000)
*representative sample drawn by area of research. academic researchers

Table G14.: The frequency of using informatical solutions in teaching the following subjects

Subject	Frequency of use		
Numbers are in %	frequent	rare	never used
Hungarian grammar and literature	5	41	54
History	5	40	55
Mathematics	14	46	40
Physics	13	41	45
Chemistry	7	36	57
Biology	7	41	51
Geography	6	39	55
Drawing/Arts	6	31	62
Philosophy	2	9	89
Foreign languages	21	42	37
Vocational studies	21	16	63

Source: GKI Rt. 2001. 3. Quarter

Table G15.: The start of ICT-related education by school types and grades. % (obligatory and facultative)

		1	2	3	4	5	6	7	8	9	10	11	12
Elementary school	class	4	2	3	8	47	12	23	1				
	facultative class	11	3	11	8	27	5	33	2				
	study group	8	8	18	17	36	6	6	1				
Secondary schools (4 year)	class									94	1	4	0
	facultative class									33	5	59	3
	study group									89	3	8	0
New types of secondary schooling (6. 8 year long training)	class	4	0	27	3	27	12	38	2	9	2	1	0
	facultative class	0	0	4	0	4	0	12	0	7	5	71	1
	study group	3	2	37	5	37	4	29	1	8	0	3	0
Total	class	3	1	29	5	29	8	18	1	33	1	0	0
	facultative class	6	1	13	4	13	2	17	0	12	3	34	1
	study group	5	5	25	11	25	4	7	1	28	1	2	0

Source: GKI Rt. 2001. 3. Quarter

Table G16.: Obligatory and facultative opportunities of ICT-related studies by types of schools

Is it obligatory (possible) to study in ICT-related courses?			
		Yes	No
Elementary school	class	86	14
	facultative class	34	66
	study group	70	30
Secondary schools (4 year)	class	98	2
	facultative class	49	51
	study group	66	34
New types of secondary schooling (6. 8 year long training)	class	95	5
	facultative class	58	42
	study group	72	28
Total	class	89	11
	facultative class	39	61
	study group	70	30

Source: GKI Rt. 2001. 3. Quarter

Table G17.: ICT-related further education of educational employees

	employees	teachers
Elementary schools	13	29
Grammar and grammar-vocational schools	12	27
Vocational schools	11	26
Total	12	28

Source: GKI Rt. 2001. 3. Quarter

Table G18.: Doctoral students in ICT-related studies

	First Year	Number of enrolled	Students with absolutorium	Recently students	Received PhD
BME-VIK	1993	174	48	86	19
ELTE-TTK	1993	182	(no abs.)	63	5
ME-GÉK	1994	94	10	40	3
VE-MK	1997	40	3	33	3
PPKE-ITK	2002				
Total		490	61	222	30

Source: Selényi 2002

Table G19A.: R&D indicators from the innovation tables. 1998-99

	Cyprus	Czech Rep.	Estonia	Hungary	Poland	Slovenia	EU-average
R&D expenditures from governmental budget. ratio to GDP	0.18	0.47	0.48	0.37	0.44	0.64	0.62
R&D expenditures of businesses. ratio to GDP	0.03	0.82	0.12	0.26	0.3	0.75	1.14
Patents*/population	0	0	0	2.08	0	1.52	11.65
Total number of indicators	5	7	5	7	10	9	
Number of indicators above EU-average	0	2	1	2	2	3	

Source: EC

Table G19B.: The ratio of firms introducing product and procedure innovations

Enterprise types	EU	Hungary
Small	44	19
Medium	58	38
Large	79	64
Total (weighted average)	51	31

Source: Eurostat. KSH

Table G20A.: Main data on research and development by territory

Area	All research places	Real employment		Calculated employment		Total R&D		Investment
		total	researchers	total	researcher	expenditure	cost	
Total	1 574	26 543	18 271	8 397	5 938	36 193	32 321	3 872
Of which:								
Budapest	638	11 359	8 229	3 439	2 577	16 948	15 601	1 347
countryside	936	15 184	10 042	4 958	3 361	19 245	16 720	2 525
By regions								
Central Hungary	748	12 791	9 174	3 973	2 904	19 094	17 555	1 539
Central Transdanubia	92	1 499	1 040	510	370	3 063	2 224	839
Western Transdanubia	101	1 328	1 027	364	304	1 467	1 242	224
Southern Transdanubia	153	2 778	1 751	895	540	3 660	3 231	429
Northern Transdanubia	83	1 464	1 101	445	351	1 465	1 351	114
Northern Plain	200	3 352	2 113	1 260	807	4 380	3 962	419
Southern Plain	197	3 331	2 065	950	662	3 064	2 756	308

Table G20B.: Main data on research and development by territory

Area	Number of ongoing research projects in 2001	Of which			
		general	applied	development	int. co-op.
Total	9 796	4 661	3 647	1 488	794
Of which:					
Budapest	3 599	1 673	1 259	667	346
countryside	6 197	2 988	2 388	821	448
By regions					
Central Hungary	4 275	1 903	1 558	814	397
Central Transdanubia	679	230	352	97	58
Western Transdanubia	638	230	279	129	54
Southern Transdanubia	996	538	432	26	57
Northern Transdanubia	681	316	274	91	35
Northern Plain	1 395	756	445	194	97
Southern Plain	1 132	688	307	137	96

Table G21.: R&D expenditures by area or research

Science:	Natural	Technical	Medical	Agricultural	Social	Humanities	Total
Research institutions	79.0	28.2	74.5	66.7	83.5	88.6	67.4
Real employment	59.7	28.3	84.3	49.6	85.1	65.0	58.1
Of which researchers	62.8	33.4	88	62.2	86.4	76.1	64.4
Calculated employment	40.9	13.8	66.7	36.5	67.2	42.2	36.6
Of which researchers	42.3	15.1	72.5	43.1	69.8	51.7	40.5
R&D expenditure	36.8	9.1	32.9	30.8	71.1	51.9	28.1
R&D costs	37.2	10.3	34.5	33.4	70.3	53.2	30.7
R&D investment	34.6	5.7	23.8	17.7	80.6	34.7	16.3
Ongoing research projects in 2001	53.8	19.0	67.7	51.8	57.0	68.7	44.8
general	60.3	49.6	82.7	50.2	63.2	62.8	61.2
applied	40.5	32.7	70.9	55.4	53.6	78.0	51.2
experimental	60.3	10.8	41.5	46.2	36.4	71.8	20.9
int. co-op.	57.0	25.2	38.8	40.0	60.9	81.7	45.5

Source: HCSO

Table G22.: IST in municipalities and their schools

	All	Cities	Villages
Municipality does not use e-mail in official communication with the school	90%	69%	93%
Municipality does not have action plans to improve the informatical infrastructure of schools	75.0%	67.1%	76.2%
Municipality budget does not contain earmarked funds to provide the schools with Internet access	75.2%	78.3%	74.7%
No schools of the municipality have Internet-access	25.7%	2.1%	29.2%
Less than half of the schools of the municipality have internet-access	1.2%	3.5%	0.8%
More than half of the schools of the municipality have Internet-access	4.9%	22.4%	2.3%
All schools of the municipality have Internet-access	61.7%	71.3%	59.6%

Source: Gallup

Table G23.: Enrolment into tertiary ICT-related education by institutions. 21/22

Institution	Specia-lization	Full time	Evening	Corres-pondence	Distance learning	Total
Budapest						
University level						
BMGE	Informatics	4390		21		4411
BMGE	technical informatics	1916				1916
ELTE	informatics		156	224		25
	programming mathematics	178	316			494
ZMNE	technical informatics	87				87
PPTE	IT	83				83
College level						
GDF	economical informatics	592			2826	3418
	technical informatics	1761			9259	11020
BDF	computer teacher	131		232		
PSZF	economical informatics					198
BMF	informatics	892	186			178
BMF	economical informatics	218			357	
BMF	technical informatics	1243				1243
EKF	computer teacher	57	231			
Countryside						
Eastern Hungary						
Debrecen						
University level						
DE	technical informatics	308				38
DE	informatics	303		223		526
DE	programming mathematics	288	205			
DE	programming mathematics	388				388
College level						
DF	technical informatics	857		181		1038
DF	technical manager	429		45		474
Miskolc - University level						
ME	technical informatics	451		226		677
	technical manager	401				401
	programming mathematics	73				73

Institution	Specialization	Full time	Evening	Corres-pondence	Distance learning	Total
Gödöllő -						
SZIE	technical manager	17		29		
SZIE	Inform. technologies engineer	139		123		262
SZIE	technical informatics	729				729
SZIE	technical manager	564			304	868
Szeged - University level						
SZTE	computer teacher	76		157		233
	informatics	148		24		172
	programming mathematics	380		94		474
Nyíregyháza - College level						
NYF	computer teacher			327		327
Kecskemét - College level						
KF	technical informatics	812				812
	technical manager	562				562
Western Hungary						
Veszprém - University level						
VE	health sector informatics	14				14
	technical informatics	646				646
	technical manager	525				525
	informatics	185		106		291
Győr - University level						
NYME	geo-informatics	529		298	42	
Pécs - University level						
PTE	technical informatics	684			153	837
PTE	computer teacher			51		51

H. NATIONAL AND REGIONAL DEMOGRAPHIC DATA AND PROSPECTIVE

Table H1.: The age composition of the Hungarian population

	Hungary	Eu-15
Below 15	16.6	17.2
15-64	68.2	66.4
Above 64	15.2	16.4

Table H2.: Main demographic indicators

	1995	**2001**
Birth rate	11.0	9.5
Mortality rate	14.2	13.0
Life expectancy at birth. male	65.2	68.2
Life expectancy at birth. female	74.5	76.5

Table H3.: Changing demographics

	2001	**2010**	**2020**	**2030**
Population	10 198.3	9 685.3	9 372.7	9 001.7
0-19 years of age	23.2	21.5	20.7	20.3
21-64 years of age	61.6	63.0	60.9	59.7
Over 64 ages	15.2	15.5	18.4	20.0

I. CULTURAL AND SOCIOLOGICAL ASPECTS

Table I1.: Real income - real wage indexes

Year	Per capita real income		Real wage per capita employed	
	1990=100	previous year=100	1990=100	previous year=100
1990	100.0	98.2	100.0	96.3
1991	98.3	98.3	93.0	93.0
1992	94.9	96.5	91.7	98.6
1993	90.4	95.3	88.1	96.1
1994	92.8	102.7	94.4	107.2
1995	87.9	94.7	82.9	87.8
1996	87.0	99.3	78.8	95.0
1997	87.8	100.9	82.7	104.9
1998	91.0	103.6	85.6	103.6
1999	91.8	100.9	87.7	102.5
2000	95.5	104.0	89.0	101.5
2001	98.9	103.6	94.7	106.4

Source: HCSO

Table I2.: The evolution of interpersonal income distribution

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
lowest decile	5 200	5 994	6 566	7 309	8 637	10 463	12 206	13 706	5 200	5 994
2.	7 855	8 932	10 047	11 385	13 428	16 259	18 266	22 018	7 855	8 932
3.	9 311	10 591	12 292	14 103	16 202	19 757	22 294	26 641	9 311	10 591
4.	10 445	12 021	14 075	18 046	21 016	25 523	28 782	34 634	10 445	12 021
5.	11 525	13 356	15 752	18 046	21 016	25 523	28 782	34 634	11 525	13 356
6.	12 708	14 720	17 143	19 770	23 328	27 976	31 629	38 436	12 708	14 720
7.	14 284	16 498	19 070	21 812	25 817	30 827	35 321	43 020	14 284	16 498
8.	16 638	19 116	21 606	24 771	29 391	35 272	40 819	48 455	16 638	19 116
9.	20 577	23 984	26 793	30 283	35 146	44 036	50 222	58 494	20 577	23 984
upper decile	36 631	42 087	46 251	57 257	62 475	84 515	91 730	108347	36 631	42 087
Mean	14 511	16 722	18 940	22 091	25 384	31 729	35 675	41 368	14 511	16 722
Upper/lowest	7.04	7.02	7.04	7.83	7.23	8.08	7.52	7.91	7.04	7.02
N	1 952	1 898	1 844	1 815	1 879	2 020	2 013	1 940	1 952	1 898

Source: Tárki

Table I3.: Interpersonal income inequalities measured by several inequality indexes

	1987	1992	1995	1996	1999	2000	2001
S1	4.5	3.8	3.3	3.2	3.4	3.3	3.2
S5+S6	17.9	17.4	17	17.5	17.3	17.3	..
S10	20.9	22.7	24.7	24.3	24.9	24.8	24.3
S10/S1	4.6	6.0	7.4	7.5	7.2	7.6	7.7
Frigyes Éltető index	2.00	2.13	2.39	2.32	2.33	2.37	2.34
Gini-coefficient	0.244	0.266	0.304	0.3	0.302	0.306	0.304

Source: HCSO. Tárki
S1. S10: the share of incomes received by these deciles from total income
Frigyes Éltető index: the proportion of above average incomes to below average incomes

Table I4.: Tax data on regions

Tax payers by regions. 1992-2001 (thousand)										
Region	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Central Hungary	2 215 331	2 182 832	2 148 665	2 136 300	2 082 382	2 004 872	2 036 824	2 060 927	2 028 281	2 034 520
Northern Hungary	500 431	500 082	500 366	489 829	512 173	498 751	510 453	514 696	516 165	524 096
Northern Plain	470 325	468 020	466 717	461 804	477 792	463 523	471 564	473 660	477 043	479 846
Southern Plain	417 118	426 112	423 377	415 155	413 501	397 275	407 311	412 201	411 665	417 731
Western Transdanubia	530 338	516 782	507 730	497 356	498 747	488 831	493 223	496 811	496 034	494 994
Central Transdanubia	605 399	586 909	580 106	565 733	581 932	561 710	547 087	579 322	570 597	595 983
Southern Transdanubia	614 870	582 887	574 056	568 006	580 200	560 940	559 620	563 322	562 956	588 202

Total pre-tax income by regions. 1992-2001. thousand HUFs										
Region	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Central Hungary	68983611	118596690	136643371	161570226	177170088	1450390595	266158604	320522551	372851933	111426830
Northern Hungary	41277391	135297360	164386095	178434146	217111970	263910399	318485365	371989283	424367948	114377982
Northern Plain	41525654	122428989	148679934	165469061	197643878	237997749	284721709	333258916	381834101	98885083
Southern Plain	46947906	108958990	129306837	139800396	159443468	190156986	225874248	261632721	291753951	72081089
Western Transdanubia	62730183	132338172	159381684	172912476	196589142	238607162	283487797	331630051	367495479	90137412
Central Transdanubia	65168560	143851667	172853297	186917306	218027131	256320749	292146217	359378387	395355816	96820240
Southern Transdanubia	47778394	141468860	169891299	185274679	213090796	252330427	293475713	341016543	382092968	93834969

Personal income taxes per region. 1992-2001. thousand HUFs

Region	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Central Hungary	16446790	194400652	221047639	35347730	42071728	372173370	60155617	74115391	93247611	457898623
Northern Hungary	16343711	25251429	28571671	36864672	48576590	55088332	66757693	78640103	97134363	509961765
Northern Plain	13610439	22264424	25171906	33253931	43021197	48410754	58350481	69759099	86274851	446958731
Southern Plain	11575064	19630990	21332212	27100912	33592130	37593545	44216353	51443196	60903711	350762369
Western Transdanubia	15435277	23675814	26425181	34391810	41720496	46928023	55079645	65742430	78169416	434369298
Central Transdanubia	7870525	25361319	28308063	36011057	44938977	49296182	56636158	69667873	81325113	484297081
Southern Transdanubia	12268953	25057433	27769566	35474604	44253753	48676465	56802742	66964599	80014025	460771951

Number of inhabitants of regions. 1992-2001

Region	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Central Hungary	2970535	2967959	2962515	2905359	2894044	2882989	2869602	2858467	2844739	2831107
Northern Hungary	1316418	1312800	1308014	1321546	1318314	1315941	1312913	1308638	1305112	1302835
Northern Plain	1547132	1546906	1545682	1566686	1568344	1568927	1569050	1568125	1564436	1563714
Southern Plain	1395991	1394932	1393241	1395946	1395526	1393687	1391325	1387331	1383635	1380433
Western Transdanubia	1009682	1009492	1008873	1010835	1010864	1009516	1008256	1006130	1004734	1003854
Central Transdanubia	1117102	1117308	1117095	1123295	1123508	1122267	1123013	1122037	1119215	1120730
Southern Transdanubia	1016788	1015638	1014590	1013035	1010631	1007921	1005566	1002689	999772	997671

Per capita income by regions. 1992-2001. thousand HUFs

Region	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Central Hungary	23.223	39.959	46.124	55.611	61.219	503.086	92.751	112.131	131.067	39.358
Northern Hungary	31.356	103.060	125.676	135.019	164.689	200.549	242.579	284.257	325.158	87.792
Northern Plain	26.840	79.144	96.191	105.617	126.021	151.695	181.461	212.521	244.071	63.237
Southern Plain	33.631	78.111	92.810	100.147	114.253	136.442	162.345	188.587	210.860	52.216
Western Transdanubia	62.129	131.094	157.980	171.059	194.476	236.358	281.166	329.610	365.764	89.791
Central Transdanubia	58.337	128.748	154.735	166.401	194.059	228.396	260.145	320.291	353.244	86.390
Southern Transdanubia	46.990	139.291	167.448	182.891	210.849	250.347	291.851	340.102	382.180	94.054

Source: National Tax Office. HCSO and Hungarian Academy of Sciences

Table I5.: Evolution of per capita consumption. 1993-2001

Year	Comestibles	Drinks. tobacco products	Clothing products	Permanent consumption items	Heating. household energy	Other industrial products	Services	Total
				1990=100				
1993	96.0	91.1	89.8	120.3	85.8	90.7	96.3	93.2
1994	93.5	90.0	88.3	111.8	87.4	88.4	100.3	93.3
1995	87.4	80.1	81.9	102.8	82.6	84.7	95.3	86.9
1996	86.3	76.5	75.6	101.9	86.4	81.7	96.5	84.5
1997	86.1	78.7	77.2	114.1	81.8	84.7	99.1	86.1
1998	87.3	84.6	75.3	133.2	79.5	89.1	102.7	90.3
1999	91.8	85.0	78.2	148.5	83.2	92.3	105.8	94.8
2000	93.6	89.5	81.2	169.8	81.0	96.1	112.7	99.8
2001	94.5	93.9	88.7	183.6	83.2	104.6	117.7	105.0
				Previous year=100				
1993	97.1	98.6	102.2	108.8	99.5	100.5	102.9	102.0
1994	97.4	98.8	98.3	93.0	101.9	97.5	104.2	100.0
1995	93.5	89.0	92.7	91.9	94.5	95.8	95.0	93.2
1996	98.7	95.5	92.4	99.2	104.6	96.4	101.3	97.2
1997	99.8	102.8	102.1	111.9	94.7	103.7	102.7	102.0
1998	101.4	107.5	97.6	116.7	97.2	105.2	103.6	105.0
1999	105.1	100.5	103.8	111.5	104.6	103.6	103.0	105.0
2000	102.0	105.3	103.8	114.4	97.4	104.1	106.6	105.0
2001	101.0	104.9	109.2	108.1	102.8	108.8	104.5	105.0

Source: HCSO

Table I6.: Structure of current consumption expenditure. %

2001. first half	
Food	34.1
Maintenance of dwellings	21.9
Food and maintenance of dwellings	56.0
Other current consumption expenditure	44.0
Of which:	
clothing	5.2
health. personal care	6.4
transport and communication	15.1
education. culture. recreation. entertainment	5.4
Total current consumption expenditure	100.0

2002. first half	
Food	33.4
Maintenance of dwellings	22.1
Food and maintenance of dwellings	55.4
Other current consumption expenditure	44.6
Of which:	
clothing	5.0
health. personal care	6.0
transport and communication	15.6
education. culture. recreation. entertainment	6.2
Total current consumption expenditure	100.0

Source: HCSO

Table I7.: Unemployment rates by counties

Region	County	1992	1996	2001
Central Hungary	Budapest	5.7	5.0	2.7
	Pest	10.1	6.9	3.8
Northern Hungary	Borsod-Abaúj-Zemplén	18.6	18.4	17.7
	Heves	14.8	12.8	9.7
	Nógrád	19.0	16.3	13.8
Northern Plain	Hajdú-Bihar	14.4	15.7	12.6
	Szabolcs-Szatmár-Bereg	22.4	19.0	17.2
	Jász-Nagykun-Szolnok	17.4	14.4	10.7
Southern Plain	Bács-Kiskun	15.6	10.3	8.8
	Békés	16.4	13.6	11.4
	Csongrád	11.7	9.0	7.6
Western Transdanubia	Győr-Moson-Sopron	8.0	6.7	3.9
	Vas	8.4	7.1	4.8
	Zala	9.3	9.2	6.2
Central Transdanubia	Fejér	11.8	9.0	6.1
	Komárom-Esztergom	14.0	11.5	6.8
	Veszprém	11.7	9.4	6.9
Southern Transdanubia	Baranya	13.5	12.0	10.5
	Somogy	11.1	12.6	11.9
	Tolna	14.2	13.6	10.5

Source: HCSO

Table I8.: Percentage of people who are satisfied with:

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Past life events	38.7	36.0	38.9	34.9	37.0	34.9	34.0	-	45.9	46.1
Future prospects	20.3	20.4	26.8	19.6	22.2	22.6	24.5	-	31.5	32.6
Standard of living	20.5	20.6	23.8	19.5	19.1	17.6	19.2	-	25.1	28.4
Family relationships	85.3	84.3	84.1				81.7	-	84.5	87.9
Health	53.3	50.9	53.0		47.1	45.6	51.8	-	53.0	57.5
Job	69.5	67.9	66.7	54.5	60.2	58.2	65.7	-	67.6	69.4
Home	63.7	61.0	63.5	54.8	58.9	53.1	55.3	-	64.2	65.7
Home district	67.2	61.0	62.8	57.7	59.0	55.2	62.6	-	67.5	68.9
Earnings	16.0	14.5	16.8	11.8	11.4	10.5	12.7	-	14.3	16.8

Source: Tárki

Table I10.: Main indicators of culture per hundred inhabitants

Year	Published books. number of:		Libraries		Cinema	Theatre	Concert
	titles*	copies	registered users	library units lent			
1985	88.9	972	21.4	473.1	659.0	57.0	27.7
1990	80.4	1 217	17.9	414.9	349.4	48.2	7.2
1995	91.2	656	14.9	391.0	137.3	39.9	4.5
2000	94.1	363	14.1	354.3	140.2	39.3	4.2

Year	Educational lectures	Entertainment programme	Museum
	performances		
1985	28.5	78.7	181.8
1990	10.3	48.4	132.7
1995	8.4	51.1	88.6
2000	8.5	73.1	98.7

Source: HCSO
* Per 100 000 inhabitants

Table I11.: Spare time activities (minutes on an average autumn day)

	Men		Women	
	1986	1999	1986	1999
Time spent with other people				
Budapest	61	57	53	41
County seats	55	59	53	44
Other cities	54	50	51	38
Villages	55	46	43	39
Total	56	51	49	40
Participating in cultural and sports events				
Budapest	7	10	6	5
County seats	7	4	2	2
Other cities	7	3	3	2
Villages	5	3	2	1
Total	6	5	3	3
Reading				
Budapest	46	37	41	29
County seats	42	29	32	26
Other cities	38	22	30	19
Villages	31	20	21	16
Total	37	25	29	21
Watching television				
Budapest	111	155	105	156
County seats	109	165	102	149
Other cities	105	159	100	150
Villages	103	161	89	151
Total	106	160	97	151
Physical activities				
Budapest	23	19	12	10
County seats	17	17	7	10
Other cities	15	15	6	8
Villages	6	11	3	5
Total	13	14	6	8

Source: INFO-Társadalomtudomány (INFO - Social Science)

Table I12.: Time consumption pattern of the 15-74 age cohort on an average autumn day (minutes)

Main types of activity	Men		Women	
	1986	1999	1986	1999
Work and travel	535	491	565	528
Physiological needs	671	677	673	673
Free time	234	272	202	239
Total	1440	1440	1440	1440

Source: INFO - Social Science

Table I13.: Press products with higher circulation (average number of issued copies. thousands)

National daily papers	1990	1995	2000
Népszabadság - a left wing - liberal paper	353	287	222
Mai Nap - right wing: news. gossips. celebs	117	77	120
Nemzeti Sport - sports magazine	213	119	114
Magyar Hírlap - a liberal paper	95	73	50
Népszava - a left wing paper	208	90	47
Magyar Nemzet - a right wing. conservative paper	143	45	91

Source: HCSO

Table I14.: Number of television subscriptions

Year	Subscriptions. thousand			Subscriptions per 1000 inhabitants
	in Budapest	in the countryside	Total	
1990	572	2 358	2 930	283
1995	438	2 227	2 665	261
1996	403	2 132	2 535	248
1997	419	2 171	2 590	256
1998	413	2 287	2 700	268
1999	405	2 277	2 682	267
2000	391	2 258	2 649	264

Source: HCSO

Table I15.: Percentage of households connected to gas network. by counties

Region	County	1990	1995	2001
Central Hungary	Budapest	79.6	85.1	88.9
	Pest	27.0	64.0	78.8
Northern Hungary	Borsod-Abaúj-Zemplén	30.8	48.0	63.9
	Heves	28.2	62.5	75.0
	Nógrád	16.1	31.3	50.4
Northern Plain	Hajdú-Bihar	32.5	52.2	64.3
	Szabolcs-Szatmár-Bereg	15.6	50.8	63.5
	Jász-Nagykun-Szolnok	27.1	50.6	68.1
Southern Plain	Bács-Kiskun	39.9	56.5	69.1
	Békés	48.2	64.7	78.1
	Csongrád	66.7	75.2	83.1
Western Transdanubia	Győr-Moson-Sopron	36.7	45.4	66.1
	Vas	32.8	45.7	59.8
	Zala	53.0	57.1	72.4
Central Transdanubia	Fejér	43.5	71.9	81.8
	Komárom-Esztergom	0.4	21.8	38.7
	Veszprém	21.1	33.1	54.3
Southern Transdanubia	Baranya	27.6	35.2	46.8
	Somogy	40.1	52.4	64.5
	Tolna	9.8	20.1	43.6

Source: HCSO

Table I16.: Percentage of households connected to water network. by counties

Region	County	1990	1995	2001
Central Hungary	Budapest	99.8	99.0	98.4
	Pest	70.1	79.2	89.9
Northern Hungary	Borsod-Abaúj-Zemplén	71.4	79.5	84.8
	Heves	80.2	88.0	92.5
	Nógrád	63.8	83.7	89.2
Northern Plain	Hajdú-Bihar	92.0	93.7	93.4
	Szabolcs-Szatmár-Bereg	56.3	82.4	88.3
	Jász-Nagykun-Szolnok	84.0	87.9	93.8
Southern Plain	Bács-Kiskun	81.1	84.2	84.5
	Békés	83.7	86.5	90.0
	Csongrád	89.5	88.8	91.0
Western Transdanubia	Győr-Moson-Sopron	85.6	95.6	94.2
	Vas	90.8	95.1	96.9
	Zala	86.1	93.1	95.7
Central Transdanubia	Fejér	83.4	91.0	95.3
	Komárom-Esztergom	88.0	94.4	94.7
	Veszprém	89.6	93.7	98.1
Southern Transdanubia	Baranya	81.7	93.3	93.9
	Somogy	87.8	88.3	94.6
	Tolna	85.1	89.9	93.8

Source: HCSO

Table I17.: Percentage of household attached to sewage networks. by counties

Region	County	1990	1995	2001
Central Hungary	Budapest	87.5	90.0	92.6
	Pest	14.5	18.6	38.0
Northern Hungary	Borsod-Abaúj-Zemplén	37.5	38.1	44.1
	Heves	25.6	28.2	40.7
	Nógrád	27.5	28.1	35.2
Northern Plain	Hajdú-Bihar	32.2	32.4	38.9
	Szabolcs-Szatmár-Bereg	18.3	22.0	32.5
	Jász-Nagykun-Szolnok	19.6	25.3	34.2
Southern Plain	Bács-Kiskun	18.3	18.9	25.3
	Békés	18.9	21.2	30.3
	Csongrád	34.0	35.3	41.7
Western Transdanubia	Győr-Moson-Sopron	44.1	44.8	65.1
	Vas	41.0	44.3	55.2
	Zala	36.1	43.4	54.3
Central Transdanubia	Fejér	41.0	40.6	52.9
	Komárom-Esztergom	46.1	50.7	68.3
	Veszprém	40.6	42.2	58.3
Southern Transdanubia	Baranya	48.0	51.9	60.5
	Somogy	30.6	32.6	44.1
	Tolna	25.9	29.1	38.8

Source: HCSO

Table I18.: Main demographic and migrational data by regions and counties. 2002

Territorial entity	Number of inhabitants at the end of 2002	Number of births	Number of deaths	Natural growth or decrease of population	Domestic migration differential	Foreign migration differential	Real growth or decrease of population
Budapest	1 719 342	14 909	23 822	–8 913	–11 058	–256	–20 227
Pest	1 105 412	11 276	12 953	–1 677	16 544	1 067	15 934
Central Hungary	**2 824 754**	**26 185**	**36 775**	**–10 590**	**5 486**	**811**	**–4 293**
Fejér	428 409	4 001	4 909	–908	–62	457	–513
Komárom-Esztergom	315 515	2 987	4 149	–1 162	356	–789	–1 595
Veszprém	369 747	3 381	4 558	–1 177	129	175	–873
Central Transdanubia	**1 113 671**	**10 369**	**13 616**	**–3 247**	**423**	**–157**	**–2 981**
Győr-Moson-Sopron	439 046	3 990	5 199	–1 209	1 670	–629	–168
Vas	267 429	2 325	3 562	–1 237	–119	194	–1 162
Zala	297 853	2 342	3 944	–1 602	100	243	–1 259
Western Transdanubia	**1 004 328**	**8 657**	**12 705**	**–4 048**	**1 651**	**–192**	**–2 589**
Baranya	404 709	3 715	5 219	–1 504	–159	42	–1 621
Somogy	335 701	3 033	4 619	–1 586	208	280	–1 098
Tolna	248 998	2 237	3 282	–1 045	–387	93	–1 339
Southern Transdanubia	**989 408**	**8 985**	**13 120**	**–4 135**	**–338**	**415**	**–4 058**
Borsod-Abaúj-Zemplén	744 484	7 773	9 907	–2 134	–2 691	205	–4 620
Heves	325 029	3 018	4 651	–1 633	–283	145	–1 771
Nógrád	219 447	2 104	3 148	–1 044	–157	48	–1 153
Northern Hungary	**1 288 960**	**12 895**	**17 706**	**–4 811**	**–3 131**	**398**	**–7 544**
Hajdú-Bihar	551 837	5 805	6 676	–871	–239	469	–641
Jász-Nagykun-Szolnok	416 147	4 005	5 789	–1 784	–730	60	–2 454
Szabolcs-Szatmár-Bereg	586 193	6 643	7 078	–435	–2 228	862	–1 801
Northern Plain	**1 554 177**	**16 453**	**19 543**	**–3 090**	**–3 197**	**1 391**	**–4 896**
Bács-Kiskun	544 116	5 111	7 297	–2 186	122	191	–1 873
Békés	396 131	3 522	5 618	–2 096	–1 153	319	–2 930
Csongrád	426 817	3 824	5 860	–2 036	137	572	–1 327
Southern Plain	**1 367 064**	**12 457**	**18 775**	**–6 318**	**–894**	**1 082**	**–6 130**
Foreigner. unknown or unhaused	..	803	593	210	–	–210	–
Total	**10 142 362**	**96 804**	**132 833**	**–36 029**	**–**	**3 538**	**–32 491**

Source: HCSO