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

## REPORT ON SLOVAKIA

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The authors of this report are solely responsible for the content, style, language and editorial control. The views expressed do not necessarily reflect those of the European Commission.

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# Preface

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

The main objective of the project was to provide a series of national monographs studying the development of the Information Society (IS), including 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 Slovak Governance Institute, and aims to study the factors and impacts of the Information Society in Slovakia. 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 Slovakia's potential for IS developments, followed by a brief section on possible scenarios for the future and policy recommendations.

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

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# INTRODUCTION

For governments to support the transformation towards the Information Society (IS), it is essential to have a clear insight into the social and societal as well as economic impacts of Information and Communication Technologies (ICT). Existing statistics, data and methodology, however, are often inadequate to measure the effects. Nevertheless, OECD (1996) stresses an on-going need for public authorities to undertake an audit of the risks and opportunities posed by the IS development.

In the case of Slovakia, three important issues deserve to be highlighted here:

- There is a lack of data on access to and use of ICTs and their applications, particularly the socio-economic characteristics of groups and areas without access. Although the ICT industry has some of the data, this has not been made publicly available on the grounds of commercial confidentiality. Consequently, it is difficult to have an informed debate, for instance, about the problems of low levels of connection to the telecom network, and about the emerging information society in general.
- The data that are available are in aggregated form, only providing information on national and - occasionally - on regional penetration rates. There is at least a suspicion, that these figures mask important variations in the levels of spatial and socio-economic access to and use of ICTs.
- There has been very little academic or policy research focused on broader information society issues. On the one hand, the little work that is available tends to be narrowly expressed and is concerned primarily with technical and regulatory, rather than economic, social and societal issues. On the other hand, much of the published material is either unsupported 'blue sky' speculation, or promotional 'hype' by the industries trying to sell the new technologies and services.

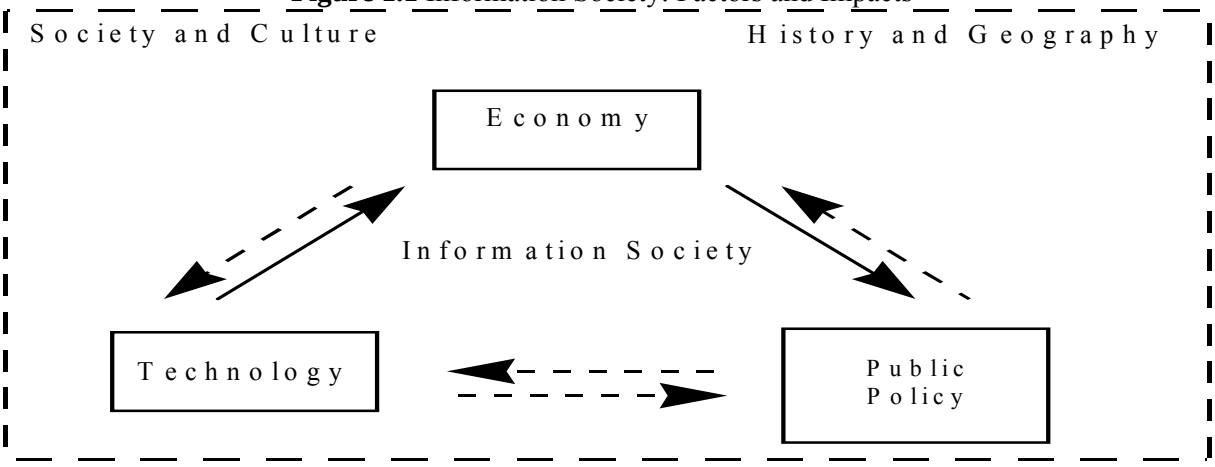
In the light of these points, the present analytical report compiles statistical information from a variety of domestic and international sources, supplemented by existing published and unpublished academic and business research on ICT industry and information society technologies (IST) in Slovakia. Various factors (economic developments, national/regional IS policies, industrial development and its geography, ICT infrastructures and applications, demography and cultural aspects) are reported and analysed in terms of their importance for IS development in Slovakia (see Figure 1.1).

Today, the question uppermost in EU policy-makers' minds is how the potential of ICTs might be harnessed to turn Europe into “the most competitive and dynamic knowledge-based economy in the world” in accordance with the objectives set at the 2000 Lisbon Summit. At the same time there is a strong recognition, that it is not the ICTs per se which create employment and economic growth but the context within which these technologies are deployed and developed. Therefore, an integrated approach to IS development is needed to increase competitiveness and cohesion in Europe. This implies a number of interrelated policy measures with regard to infrastructural provision and support, human resources development, organisational and institutional innovation, etc.

The Slovak Republic is in need of an honest assessment of the design and outcomes of its policies in its own right, regardless of its commitments to the European Union. It is the responsibility of policymakers to evaluate whether the policies implemented over the past decade and a half of transition have met their objectives and adjust future policies accordingly to meet the country’s own goals and needs.

This report was compiled between March 2003 and March 2004, therefore some of the data used are from 2003.

**Figure 1.1** Information Society: Factors and Impacts



# COUNTRY PROFILE

**Population** 5.4 million people

| **Main Cities** | | | | |
|---|---|---|---|---|
| | Bratislava | 428,672 | Banska Bystrica | 83,056 |
| | Kosice | 236,093 | Nitra | 87,285 |
| | Presov | 92,786 | Trnava | 70,286 |
| | Zilina | 85,400 | Trencin | 57,854 |

**Area** 49 036 $km^2$
**Language** Slovak
**Currency** Slovak crown/Slovenska koruna (SKK)
SKK 1 = EUR 41.49 (2003)
SKK 1 = USD 36.77 (2003)

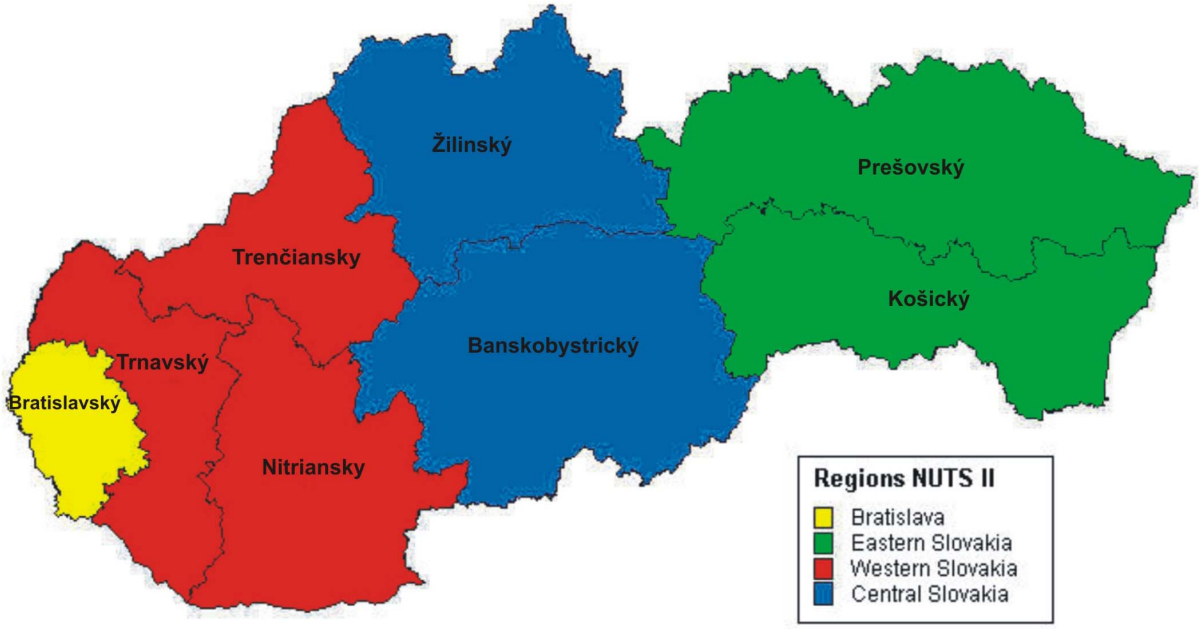
| **Macroeconomic indicators (2003 figures, rates and shares in %)** | | | |
|---|---|---|---|
| | in millions of SKK | in millions of EUR | change from 2002 |
| GDP (current prices) | 1 195 812 | 28 472 | 4,2 % |
| Export | 933 235 | 22 220 | 18,5 % |
| Import | 951 121 | 22 646 | 9,9 % |
| Trade deficit | 17 886 | 426 | -77 % |
| Inflation rate | | | 8,5 % |
| Unemployment rate | | | 17,4 % |

| **Components of GDP (2003 )**(%, current prices) | | **Origins of GDP (2002)** (%) | |
|---|---|---|---|
| Private consumption | 55,8 | Agriculture | 4,16 |
| Public current expenditure | 20,0 | Industry | 24,24 |
| Investment | 25,9 | Services | 71,61 |
| Export | 78,0 | | |
| Import | -79,5 | | |

| **Principal exports (top 6)** (% on total exports) | | **Main exports markets** (%) | |
|---|---|---|---|
| Motor vehicles | 27,7 | EU | 60,6 |
| Machinery and mechanical appliances | 9,8 | of which: Germany | 30,8 |
| Electrical machinery and equipments | 9,0 | CEFTA | 25,2 |
| Iron and steel | 7,6 | of which: the Czech Rep. | 12,9 |
| Mineral fuels and oils | 5,2 | Russia | 1,2 |
| Furniture, prefabricated buildings | 4,4 | USA | 5,3 |
| | | Japan | 0,4 |
| | | Other | 7,3 |

| **Age structure (2002)** | | **Sectoral employment (2002)** | |
|---|---|---|---|
| 0-14 | 18,01 | Agriculture | 6,2 |
| 15-64 | 63,4 | Industry | 30,1 |
| 64- | 18,59 | Services | 55,4 |
| | | Other | 8,3 |

**Figure 1.2** The four Slovak "macro-regions"



# A. NATIONAL AND REGIONAL ECONOMY

Slovakia became an independent country in 1993 following a negotiated "velvet divorce" with the Czech Republic. At the time, there were major concerns as to the ability of Slovakia to survive economically, in the view of the difficulties of the economic transition from plan to market, as well as the loss of net fiscal transfers it had been receiving from the Czech half of Czechoslovakia. The Slovak economy had inherited a highly unfavourable industrial structure – heavily tilted towards heavy machinery and armament productions, while most of Czechoslovakia's higher value-added industries were concentrated in the Czech Republic.

Slovakia's economic position was further complicated by murky politics. The government, which negotiated the split and was re-elected again in 1994 was seen from abroad as corrupt and having authoritarian tendencies. Between 1994 and 1998 the country underwent privatisation of large portions of industry, mostly in tenders closed to foreign bidders. Being viewed as a democracy laggard resulted in Slovakia being excluded from the first wave of expansion of NATO at the time its immediate neighbours joined and also being repeatedly criticized by the EU for failing to meet political criteria for accession. These factors seriously limited foreign direct investment inflows into the country.

Nonetheless, after overcoming the so-called transitional decline period of GDP contraction, Slovakia saw sizeable economic growth in the mid-nineties. Unfortunately, especially in the years the growth was not led by exports, expansion in domestic demand and investment led to high twin deficits – both fiscal and in the current account and thus to rising external debt.

The broad-based coalition government that came to power in 1998 implemented changes in economic policy leading to intensified liberalisation and privatisation of many assets that had remained in state hands, as well as undergone restructuring and privatisation of most of the state banking sector that had been plagued heavily by bad debts. Slovakia also managed to gradually catch up with other EU candidate countries in the accession process and is now on track to joining NATO. The country has also seen an expansion in foreign direct investment levels, as the perceived political risks dissipated and the government made attracting FDI a top priority. The year 2002 saw the rise to power of a coalition which included many parties from the preceding cabinet, but none of the ones on the left. The government has embarked on further ambitious economic reforms, including key reforms in public services systems such as pensions, education, healthcare and the tax system.

**Table 2.1** Key macroeconomic data on Slovakia

| Indicator | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| GDP at current prices (EUR billion) | 15.6 | 18.0 | 19.0 | 18.5 | 20.9 | 22.0 | 25.7 | 28.5 |
| Annual GDP growth, constant prices (%) | 6.2 | 6.2 | 4.1 | 1.9 | 2.2 | 3.3 | 4.4 | 4.2 |
| Average inflation CPI (%, year-on-year) | 5.8 | 6.1 | 6.7 | 10.6 | 12.0 | 7.3 | 3.3 | 8.5 |
| Foreign trade balance (% of GDP) | -12.2 | -10.6 | -11.3 | -5.5 | -4.8 | -10.7 | -7.1 | -1.7 |
| Current account balance (% of GDP) | -11.2 | -9.9 | -10.1 | -5.8 | -3.7 | -8.8 | -8.0 | -0.9 |
| Net FDI inflow (% of GDP) | 1.1 | 0.5 | 2.1 | 3.7 | 10.7 | 5.8 | 6.2 | . |
| Gross foreign debt (% of GDP) | 41.5 | 48.5 | 55.9 | 53.4 | 56.3 | 55.0 | 54.2 | 56,3 |

Source: Eurostat, Statistical Office of the Slovak Republic, National Bank of Slovakia.

## A.1. Economic Growth

Following the breakdown of Communism at the end of 1989, Slovakia's output underwent marked decline for several years. This phenomenon, referred to as transitional decline, bottomed out by 1992 and GDP started growing. Rates of GDP growth reached fairly impressive heights by the mid-90s – the economy grew by 5.2% in 1994, the growth peaked at 6.5% in the following year and continued at 5.8 and 5.6% in the subsequent two years. The year 1998 saw the beginning of a slow-down, when growth fell to 4% and then to only 1.3% in 1999 as the government undertook fiscal austerity measures. Growth rebounded in subsequent years to levels at over 3% and was again fairly high at 4.4% in 2002 and 4.2% in 2003 (Table 2.2). In nominal terms in euros, as well as in PPP terms, the economy was growing throughout the period (Table 2.3).

**Table 2.2** Comparative annual GDP growth (%)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| EU15 | 2.8 | 2.4 | 1.6 | 2.5 | 2.9 | 2.8 | 3.5 | 1.5 | 1.0 | 0.7 |
| CCs | . | 6.55 | 4.57 | 4.83 | 3.79 | 3.13 | 9.56 | 2.35 | 2.06 | . |
| Slovak Republic | 5.18 | 6.47 | 5.84 | 5.64 | 3.96 | 1.32 | 2.2 | 3.3 | 4.39 | 4.2 |

Source: Eurostat (2003)

**Table 2.3** Comparative GDP per capita (in PPP, % of EU-15)

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|
| EU15 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| CCs | 41.46 | 42.81 | 43.91 | 44.39 | 44.62 | 45.7 | 46.6 | 47.3* |
| Slovak Republic | 40.2 | 41.7 | 43.0 | 43.4 | 42.9 | 43.7 | 44.7* | 47.1* |

* Data are forecasts

Source: Eurostat (2003)

## A.2. Supply structure of the economy

Looking at the supply-side structure of growth, the decade saw a steady rise of the services sector both in terms of growth performance (Table 2.4) as well as its share on GDP, as the structure of the economy gradually changed in line with transition from a planned economy to a market economy. The other sectors, agriculture, industry and construction, saw both periods of decline and growth.

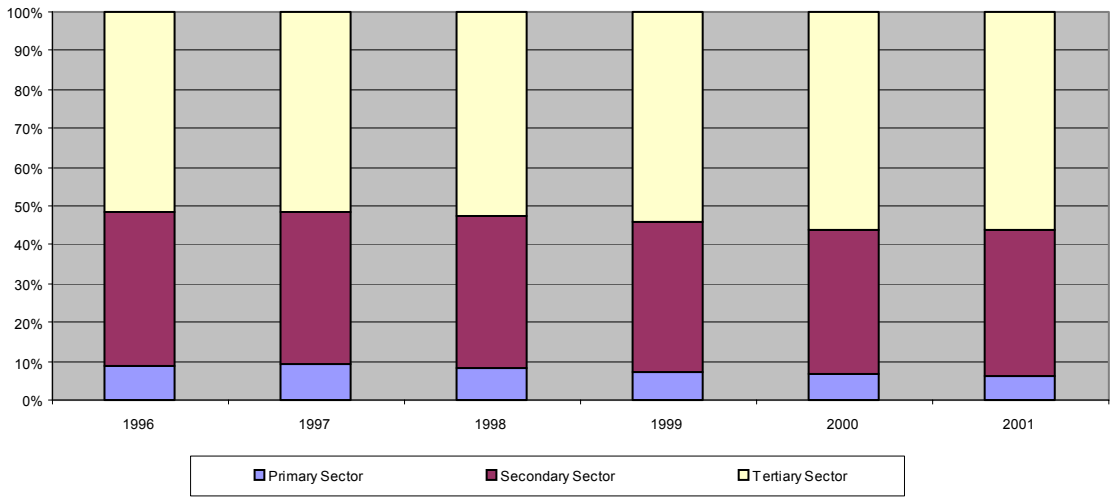
**Table 2.4** Major sectors of economic activity (% change, 1995 prices)

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|
| Agriculture | 0,0 | -2.1 | 9.7 | 5.4 | 0.3 | -0.2 | -5.0 | 10.9 |
| Industry | 10.8 | 5.0 | -5.5 | 3.2 | 5.1 | -5.5 | 3.6 | 4.0 |
| Construction | -8.9 | 60.5 | -1.5 | -15.6 | -29.9 | 2.7 | -1.5 | 11.0 |
| Services | 6.4 | 3.4 | 12.0 | 6.2 | 2.3 | 5.8 | 4.1 | 3.8 |

Source: Slovak Statistical Office (based on Quarterly National Accounts)

Major structural changes can be observed in late 1990s and beyond 2000. Sectoral structure of employment shifted in favour of the tertiary (services) sector, whose share increased from 51.5% in 1997 to 56.2% in 2001, while the shares of employment in secondary (manufacturing) fell by 1.7 points and primary (agriculture) by 3.1 points (Figure 2.1).

**Figure 2.1** Structural Changes in Shares of Key Sectors on GDP




Source: Slovak Statistical Office

### *Industry*

Slovakia underwent rapid industrialisation during the Communist era, focusing on the production of heavy machinery and basic industries (chemicals, metals processing). Many large factories were dominant employers in their regions. The machinery and armaments production sectors, which played a key role in the Slovak economy before the fall of Communism never recovered. Very few of the companies have been able to overcome problems of obsolete and energy-intensive production technology and obsolete design. In both 1997 and 2000, industry declined by over 5% as a sign of the on-going process of industrial restructuring.

Further information on structural changes in industry is provided in Chapter 4.

### *Services*

The expansion in services came in line with the growth of the private sector of the economy. In no year since the creation of Slovakia in 1993 has the service sector contracted – although growth levels varied. They were the highest in 1997 and 1998 - the years of significant expansion of domestic demand (see also Table 2.4). The macro-economic slowdown in 1999 affected the growth path of the whole services sector, including the sub-sector of market services (i.e. NACE[1] K - Real estate, renting and business activities). Based on available statistics (see Tables 2.5 and 2.6), which are not comparable between 1993-1999 and 2000-2002 periods due to different data reporting methodologies[2], computer activities (until 1999 reported as "data processing") are among the few exceptions from the rule: they have been continuously growing both in terms of turnover and employment in the 1990s and beyond

[1] NACE - Nomenclature générale des Activités économiques dans les Communauts Européennes is the European Union's present standard coding system for economic activity.

[2] Prior to 2000, the Slovak Statistical Office included the value added tax (VAT) in revenues. Since 2000, the methodology has been harmonised with the EU standard and the data do not include VAT.

2000, accounting for over 12% of total revenues in market services in 2000. In the most recent period (2000-2002), services are characterised by modest growth rates both in terms of the total sector's performance, as well as across the market services sub-sector.

**Table 2.5** Market services in 1997-2000

| SUB-SECTOR OF NACE K | 1997 | 1998 | ✓1999 | 2000 |
|---|---|---|---|---|
| Revenues in total (without tradesmen) | 69,024 | 79,191 | 82,377 | 95,958 |
| of which: | | | | |
| Activity in the field of real estates | 9,175 | 8,870 | 10,446 | 11,831 |
| Renting of machines and devices | 1,243 | 1,922 | 2,627 | 3,080 |
| **Data processing** | **7,557** | **8,504** | **9,385** | **11,380** |
| Legal and tax consultancy and public opinion research | 2,389 | 3,430 | 4,804 | 9,678 |
| Architectural design and engineering | 10,392 | 9,844 | 5,203 | 10,165 |
| Technical testing and analysis | 683 | 893 | 994 | 1,689 |
| Advertising | 7,641 | 11,446 | 13,614 | 7,939 |
| Other business services | 16,456 | 15,857 | 17,821 | 19,897 |
| Education | 1,063 | 900 | 964 | 1,020 |
| Health care | 857 | 1,856 | – | – |
| Waste disposal | 2,679 | 2,492 | 2,928 | 3,572 |
| Recreation, cultural and sports activities | 8,116 | 12,449 | 12,988 | 14,681 |
| Laundry and dry-cleaning | 269 | 255 | 311 | 381 |
| Hairstyling and cosmetic care | 52 | 27 | 44 | 243 |
| Other services | 452 | 446 | 248 | 402 |

Source: 2002 Statistical Yearbook, Slovak Statistical Office (2003)
Note: Figures in Mio SKK (EUR = 42 SKK); ✓ until 1999 VAT included in the Receipts figures; 2000 onwards, data reporting compatible with the EU standards, i.e. turnover not including VAT, see below

**Table 2.6** Market Services in 2000 - 2002

| SUB-SECTOR OF NACE K | 2000 | 2001 | 2002 |
|---|---|---|---|
| Turnover in total (excluding VAT) | 145720 | 157,899 | 163,379 |
| of which: | | | |
| Activity in the field of real estate | 19,651 | 20,479 | 20,501 |
| Renting of machines and devices | 4,260 | 4,525 | 5,324 |
| **Computer activities** | **17,284** | **18,713** | **20,603** |
| Legal and tax consultancy and public opinion research | 28,143 | 25,860 | 25,485 |
| Architectural and engineering activities | 23,942 | 23,850 | 23,976 |
| Technical testing and analysis | 2,358 | 2,362 | 2,508 |
| Advertising | 9,429 | 11,509 | 11,489 |
| Investigation and security activities | 3,484 | 4,035 | 4,773 |
| Industrial cleaning | 1,431 | 2,333 | 2,697 |
| Other business services | 8,033 | 13,107 | 13,599 |
| Education | 2,108 | 2,104 | 2,130 |
| Waste disposal | 4,151 | 5,271 | 5,834 |
| Recreation, cultural and sport activities | 17,047 | 19,240 | 20,096 |
| Laundry and dry-cleaning | 748 | 969 | 980 |
| Hairstyling and cosmetic care | 1,890 | 1,833 | 1,811 |
| Other services | 1,761 | 1,709 | 1,573 |

Source: 2002 Statistical Yearbook, Slovak Statistical Office (2003)
Note: Figures in Mio SKK (EUR = 42 SKK)

Further information on structural changes in industry and services, their consequences and sub-sectors affected is provided in Chapter 4.

## A.3. Demand structure

The following three tables provide an overview of the demand side of economic growth. In 1994, 1997 but especially in 1999 and 2000 growth was driven by improving net exports (X). In 2001 their contribution was negative, but it again became positive in 2002 and was the key driver of growth in 2003, compensating for declining consumption and fixed investment (see Table 2.9).

**Table 2.7** Demand side of economic growth (% change, 1995 prices)

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | n/a | 1.5 | 3.6 | 9.1 | 6.0 | 5.8 | 2.9 | -1.8 | 4.0 | 5.4 | -0.6 |
| G | n/a | -10.1 | 2.1 | 17.4 | -4.5 | 11.5 | -7.7 | 1.3 | 5.1 | 4.0 | 2.9 |
| I | n/a | -11.7 | 34.7 | 36.0 | 6.4 | 5.1 | -20.2 | -0.7 | 16.5 | 4.1 | -1.2 |
| X[3] | -626,6 | 724,9 | 253,0 | -1494,5 | -1276,1 | -1783,6 | -367,4 | -37,6 | -662,7 | -626,0 | *** |

Source: Slovak Statistical Office (based on Quarterly National Accounts)

**Table 2.8** GDP by expenditure components (% share, 1995 prices)

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | 54.3 | 52.4 | 51.2 | 52.5 | 52.6 | 53.8 | 54.8 | 56.2 | 53.1 | 53.4 | 55.5 |
| G | 25.2 | 21.6 | 20.7 | 22.9 | 20.7 | 22.2 | 20.3 | 19.8 | 20.4 | 20.4 | 21.3 |
| I | 25.0 | 21.0 | 26.5 | 34.1 | 34.3 | 34.7 | 27.3 | 26.5 | 29.9 | 29.8 | 26.0 |
| X | -4.5 | 5.2 | 1.7 | -9.5 | -7.7 | -10.7 | -2.4 | -0.3 | -4.0 | -3.6 | -2.8 |

Source: Slovak Statistical Office (based on Quarterly National Accounts)

[3] Absolute numbers in 1995 prices (Mio. EUR/ECU).

**Table 2.9** Demand side contributions to GDP growth (%, 1995 prices)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| C | 15.3 | 32.1 | 77.0 | 53.5 | 83.4 | 136.4 | -79.5 | 58.6 | 54.7 | -5.5 |
| G | -49.0 | 6.9 | 61.5 | -18.2 | 60.4 | -129.2 | 20.6 | 29.2 | 16.0 | 14.4 |
| I | -56.5 | 112.3 | 163.6 | 38.5 | 44.0 | -531.4 | -16.0 | 124.9 | 23.9 | -67.6 |
| X | 190.3 | -51.4 | -202.1 | 26.2 | -87.8 | 624.1 | 174.9 | -112.7 | 5.3 | 158.7 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

Source: Slovak Statistical Office (based on Quarterly National Accounts)

Private consumption (C) had a positive contribution to growth in all years except for 2000, when the government implemented sharply restrictive measures. Sharp falls in investment (I) and government spending (G) in 1999 and private consumption in 2000 produced the double-digit drop in domestic demand recorded over that period (Table 2.7). There were two main contributing factors bringing about the economic recovery in 2001 (Table 2.9). First, a key factor boosting domestic demand in 2001 was the 4% rebound in private consumption, reflecting positive developments in both employment and wages and a sharp deceleration of inflation from double-digit rates, reversing the decline of the two preceding years.

Second, large inflows of FDI since 2000 (Table 2.11) have been the factor promoting the growth of fixed investment (FDI inflows reached 10.3% of GDP in 2000). Nearly half of the inflows in 2000 and 2001, though, were related to privatisation, which represents a change of ownership rather than investment. Indeed, the key inflow in 2000 was the sale of a 51% stake in Slovak Telecom to Deutsche Telekom. In 2002 and 2003 FDI inflows continued also in the area of green-field investments due to the improvements in the business environment and the approaching EU accession.

In terms of sectors of economic activity receiving FDI (Table 2.11), the largest share cumulatively went into manufacturing, followed by financial intermediation (privatisation of banks) and wholesale and retail trade.

Overall, Slovakia belongs to the candidate countries with highest levels of gross capital formation, taking the lead since 1996. Moreover, gross fixed investment rose by 11.5% in 2001, reaching 31% of GDP, well above the other CC13, and even highest among the OECD countries (Table 2.10). Worth mentioning is the fact, that Slovakia began catching up with FDI inflows in neighbouring Eastern European countries only after 1998.

**Table 2.10** Gross Capital Formation as % of GDP in the CCs

| COUNTRY | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|
| Bulgaria | . | . | 8.4 | 11.4 | 16.9 | 19.1 | 16.6 | 16.9 |
| Czech Republic | 29.8 | 34.0 | 34.3 | 32.6 | 30.2 | 27.9 | 29.7 | 30.0 |
| Cyprus | . | . | 22.3 | 19.8 | 20.8 | 19.4 | 18.2 | 18.6 |
| Estonia | 27.4 | 26.6 | 27.8 | 30.9 | 29.4 | 24.6 | 25.8 | 28.5 |
| Hungary | 22.1 | 23.9 | 27.2 | 27.7 | 29.7 | 28.5 | 30.6 | 27.3 |
| Latvia | . | . | 18.8 | 22.8 | 27.6 | 27.0 | 27.1 | 27.7 |
| Lithuania | . | . | 24.5 | 26.5 | 24.4 | 22.7 | 20.7 | 21.9 |
| Malta | . | . | 28.6 | 25.6 | 23.7 | 24.0 | 27.9 | . |
| Poland | 17.6 | 19.7 | 21.9 | 24.6 | 26.2 | 26.4 | 26.5 | 27.2 |
| Romania | . | . | 25.9 | 20.6 | 17.8 | 17.0 | 19.4 | 19.0 |
| Slovak Republic | 21.4 | 26.5 | 37.1 | 36.6 | 36.1 | 31.9 | 30.1 | 34.7 |
| Slovenia | . | . | 23.5 | 24.2 | 25.6 | 28.4 | 27.8 | 25.5 |
| Turkey | 21.5 | 25.5 | 24.6 | 25.1 | 24.2 | 23.4 | 24.4 | 15.5 |

Source: World Bank (Data Query service)

**Table 2.11** Foreign direct investment in Industry and Services: 2001 inflows and cumulative total

| SECTOR OF ECONOMIC ACTIVITY (NACE) | 2001 | Cumulative | % |
|---|---|---|---|
| | in USD | | |
| Mining, quarrying | 3.2 | 34.4 | 0.7 |
| Manufacturing | 130.6 | 2009.2 | 43.0 |
| Electricity, gas and water supply | 68.1 | 7.9 | 0.2 |
| Construction | 1.4 | 29.7 | 0.6 |
| Wholesale, retail trade | 105.6 | 525.7 | 11.3 |
| Hotels, restaurants | 5.4 | 32.2 | 0.7 |
| Transport, storage, communication | 48.3 | 650.7 | 13.9 |
| Financial intermediation | 774.3 | 1224.0 | 26.2 |
| Real estate, renting and business activities | 25.0 | 135.9 | 2.9 |
| Other services | 2.9 | 13.2 | 0.3 |
| Health care and social work | 0.2 | 1.6 | 0.0 |
| Private households | 19.4 | 0.0 | 0.0 |
| TOTAL | 1,186.1 | 4,670.0 | 100.0 |

Source: OECD Economic Survey of the Slovak Republic (2002); Note: USD = 38 SKK

### *Foreign Trade*

At the onset of transformation Slovakia succeeded in rapidly reorienting its exports from the COMECON markets, where over 60% of its exports were directed in 1993 to the EU markets.

Slovakia is a small open economy exporting some 78% of its GDP. Moreover, it is strongly dependent on foreign trade with the European Union. Geographically, exports to the EU as a share of total exports account currently for about 60%, compared to only around 40% in 1996. The share of imports to the EU in total imports amounts to approximately 50%. These shares reflect a high degree of trade integration with the EU given that the overall openness of the Slovak economy - defined as the sum of imports and exports as a percentage of the GDP - is very high and amounts to around 110%. Most export commodities remain in categories with low value-added, which are highly sensitive to the economic cycle mainly in Western Europe. According to the World Development Indicators, share of high technology exports on manufactured exports in Slovakia is below the average of all 13 candidate countries (Table 2.13).

Notably, in terms of trade in services, Slovakia is one of the least open economies even among the CCs. The lowest share of services in total trade (14%) among all CCs is correlated with the lowest share of services on the gross value added in the country's economy (46%). Nevertheless, Slovakia maintains high comparative advantage in trade in transportation services (being a hub of international transit of crude oil and gas).

Looking at the changes in export shares by SITC categories between 1993 and 2001, we see significant declines in the shares of Chemicals and Manufactured products in parallel with increases in the share of Machinery and equipment exports, best explained by the expansion in car production.

**Table 2.12** Changes in the structure of Slovak exports (% of manufactured exports)

| SITC category | Share of Slovak exports | |
|---|---|---|
| | 1993 | 2001 |
| Food and live animals | 5.5 | 2.7 |
| Beverages and tobacco | 0.9 | 0.4 |
| Crude materials | 4.9 | 3.3 |
| Mineral fuels | 4.9 | 6.6 |
| Oils, fats and waxes | 0.1 | 0.1 |
| Chemicals | 12.0 | 7.3 |
| Manufactures by material | 38.8 | 27.4 |
| Machinery and equipment | 19.4 | 38.5 |
| Miscellaneous articles | 13.4 | 13.5 |
| Other | 0.1 | 0.1 |

Source: own calculations based on Statistical Office data

Export performance is driven by a few key industrial players, particularly a Volkswagen car plant located in the capital city of Bratislava and a steel mill in Eastern Slovakia now owned and operated by U.S. Steel. Significant portion of foreign exchange receipts also comes from natural gas and crude oil transit fees from pipelines bringing Russian raw materials to the EU markets, which has been a major source of Slovakia's comparative advantage in transportation services in the past decade.

The share of high-tech exports has been low and stagnant at around 4.0%, compared to the CC13 average of 9.3% in 2000.

**Table 2.13** High-tech exports by the EU candidate countries (% of manufactured exports)

| COUNTRY | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| Bulgaria | 3.8 | 3.6 | . | . | . |
| Czech Republic | 6.9 | 7.3 | 7.9 | 8.3 | 8.2 |
| Cyprus | 6.2 | 3.9 | 4.2 | 4.1 | 2.5 |
| Estonia | 8.8 | 9.0 | 11.6 | 13.4 | 29.8 |
| Hungary | 5.7 | 18.0 | 20.6 | 22.6 | 26.4 |
| Latvia | 5.2 | 6.4 | 4.0 | 4.1 | 4.0 |
| Lithuania | 3.5 | 3.7 | 3.2 | 3.1 | 4.2 |
| Malta | 58.9 | 56.0 | 60.4 | 61.7 | 71.7 |
| Poland | 2.9 | 2.6 | 2.9 | 2.6 | 3.3 |
| Romania | 1.6 | 0.9 | 1.5 | 3.1 | 5.6 |
| Slovak Republic | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Slovenia | 4.0 | 4.0 | 4.0 | 4.0 | 5.0 |
| Turkey | 2.0 | 2.0 | 2.0 | 4.0 | 5.0 |
| CC13 | 4.9 | 6.0 | 6.7 | 8.0 | 9.3 |

Source: World Bank (data query service)

ICT-related exports have risen steadily throughout the period for which a NACE-based trade statistics are available, with the exception of "computers and information processing equipment", which reported a decline in 2001 compared to the previous years.

**Table 2.14** Share of ICT-manufacturing on industry in total (%)

| NACE | YEAR | GROSS OUTPUT | GROSS VALUE ADDED | EMPLOY-MENT | INVEST-MENT |
|---|---|---|---|---|---|
| Office machinery and computers (NACE 30) | 1998 | 0.2 | 0.2 | 0.3 | 3.5 |
| | 1999 | 0.2 | 0.2 | 0.3 | 5.4 |
| | 2000 | 0.2 | 0.2 | 0.3 | 0.04 |
| | 2001 | 0.2 | 0.2 | 0.3 | 0.1 |
| | | | | | |
| Radio, TV and recording (NACE 32) | 1998 | 1.4 | 1.4 | 1.6 | 2.3 |
| | 1999 | 0.8 | 1.1 | 1.9 | 2.6 |
| | 2000 | 1.4 | 1.9 | 2.4 | 1.1 |
| | 2001 | 1.6 | 1.6 | 2.1 | 0.8 |
| | | | | | |
| Manufacturing (NACE 15-37) | 1998 | 80.5 | 79.7 | 85.6 | 62.3 |
| | 1999 | 79.8 | 69.8 | 85.3 | 81.4 |
| | 2000 | 81.1 | 79.2 | 85.9 | 55.9 |
| | 2001 | 80.7 | 83.7 | 86.3 | 73.5 |

Source: 2001 Yearbook of Industry, Slovak Statistical Office (2002)

The period of transition has brought extensive liberalisation of the economy and the renewal of macroeconomic stability, creating conditions for continued economic growth. Sizable structural changes took place, particularly with respect to increasing the share of services on

GDP, bringing the structure of the economy in line with modern market economies. The economy has also become more open and fully reoriented its trade towards the European Union, with exports playing an important role in economic growth.

## A.4. Labour Market Performance

Slovakia has one of the lowest employment rates among OECD countries – 56.7% in 2001 compared to 63.9% in the EU15, although traditionally, female employment rates lag far less (51.8% compared with 54.8%). Another salient characteristic of the Slovak labour market lies in the high share of the public sector on employment, as the general government accounts for over a fifth of existing jobs, which represents one of the largest government sectors in OECD countries[4]. The low employment rates are generally attributed to low rates of job creation and prior to recent reforms also to a relatively generous welfare system.

Despite the positive human development trends reported by the UNDP[5], national labour market performance shows unfavourable development. During the recent period, persistent unemployment became the most pressing issue of the socio-economic development in Slovakia (as evidenced by numerous sociological surveys, see for instance Table 2.15). Unemployment grew steadily from 12.7% in 1996 to 18.8% in 2001 (Table 2.16). The number of registered unemployed – applicants for jobs registered in labour offices – reached an average of 520,642 individuals in 2001, as compared to 349,821 persons in 1995.

**Table 2.15** The Most Pressing Problems as Viewed by Slovak Citizens

| PROBLEM AREAS | 1997 | 1998 | 2001 |
|---|---|---|---|
| Unemployment | 60 | 65 | 82 |
| Health care | 48 | 50 | 69 |
| Standard of living | 65 | 65 | 64 |
| Crime and personal safety | 62 | 66 | 46 |
| Housing | 29 | 29 | 26 |
| Ethics, quality of interpersonal relations | 43 | 36 | 24 |
| EU and NATO integration | 11 | 18 | 12 |
| Environment | 18 | 14 | 9 |
| Ethnic and minority problems | 6 | 7 | 5 |

Source: Vagac and Sirak (2003) based on data from Public Opinion Research Institute of the Slovak Statistical Office; Note: % of positive answers

The share of unemployed women varied slightly during the respective period, from 52.5% in 1996 to 45.3% in 2001. The comparison of male and female unemployment rates shows no significant gender-related deviations, however, the proportion of men among unemployed is moderately increasing. Women, on the other hand, prevail among the long-term unemployed.

[4] based on OECD February 2004 Economic Survey of the Slovak Republic.

[5] The Slovak Republic ranked 36th among 173 countries of the world in the international ranking of human development in 2002 (based on UNDP's Human development index HDI, using comparable data from 2000).

Young people are among the most affected by unemployment. Youth unemployment rate for those aged 15-24 was almost double the average rate for all age groups at 37.3% in 2001. High levels of unemployment of secondary school graduates reflect the fact that the supply of educational institutions is not in line with labour market demand.

A major concern is the increasing number of long-term unemployed: the share of unemployed for more than 12 months reached 57.8% of all unemployed in December 2001, which is an increase by 5% as compared to 2000[6]. Decreases in the numbers of long-term unemployed were seen in the 2nd half of 2000, in 2001 and 2002 as a result of the introduction of public works jobs, but the shift was only temporary.

As large portion of the labour force moved into unemployment, the number of employed persons fell by 4.6% in the period in 1996-2001. Women accounted for 44.5% on total employment in 1996, while their share increased by 1.5 points to 46.0% in 2001. Employment gradually decreased in the public sector (by 23.6%); the private sector recorded an increase by 12.6% during the period under scrutiny.

**Table 2.16** Slovakia's Labour Market Indicators

| Indicator | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|
| Unemployment rate (%) | 11.3 | 11.8 | 12.5 | 16.2 | 18.6 | 19.2 |
| Unemployment rate of women (%) | 12.7 | 12.8 | 13.2 | 16.4 | 18.6 | 18.7 |
| Economic activity rate (%) | 60.1 | 59.9 | 59.9 | 60.0 | 60.3 | 60.7 |
| of which: | | | | | | |
| Men | 68.7 | 68.6 | 68.9 | 68.7 | 68.6 | 69.2 |
| Women | 52.3 | 51.8 | 51.5 | 52.0 | 52.6 | 53.0 |
| Labour force participation rate (%) | 70.7 | 67.6 | 66.8 | 66.3 | 66.6 | |
| Age specific labour force participation (age group 55-60) | 40.0 | 37.8 | 39.5 | 39.6 | 39.4 | 41.8 |
| Age specific labour force participation (age group 60-65) | 8.2 | 6.8 | 7.7 | 7.1 | 6.5 | 6.5 |
| Structure of labour force (as % of total employed): | | | | | | |
| Employees | 93.6 | 93.7 | 93.2 | 92.3 | 92.0 | 91.6 |
| of which: civil servants* | 7.1 | 7.3 | 7.0 | 7.1 | 7.5 | 7.4 |
| Self-employed | 6.4 | 6.3 | 6.8 | 7.7 | 8.0 | 8.4 |
| Recipients of social assistance in material distress (% of total pop.)** | 7.0 | 7.3 | 9.4 | 10.8 | 11.3 | 11.7 |

Notes: * Employees in public administration, defence and compulsory social security.
** Figures include dependent persons on recipients of social assistance benefits (until 1998, social care benefits); Source: adapted from Vagac and Haulikova (2002)

For much of the 1990s, *growth in labour productivity* has outpaced wage growth. Low wages have thus been one of Slovakia's key competitive advantages – driving for instance much of the foreign investment into labour-intensive manufacturing.

[6] Statistical Office of the Slovak Republic, quarterly Labour force surveys.

**Table 2.17** Labour productivity growth in Slovakia (% change, constant prices)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|
| Productivity from GDP | 5.3 | 6.0 | 4.5 | 4.2 | 2.8 | 1.8 |

Source: Slovak Statistical Office (2003)

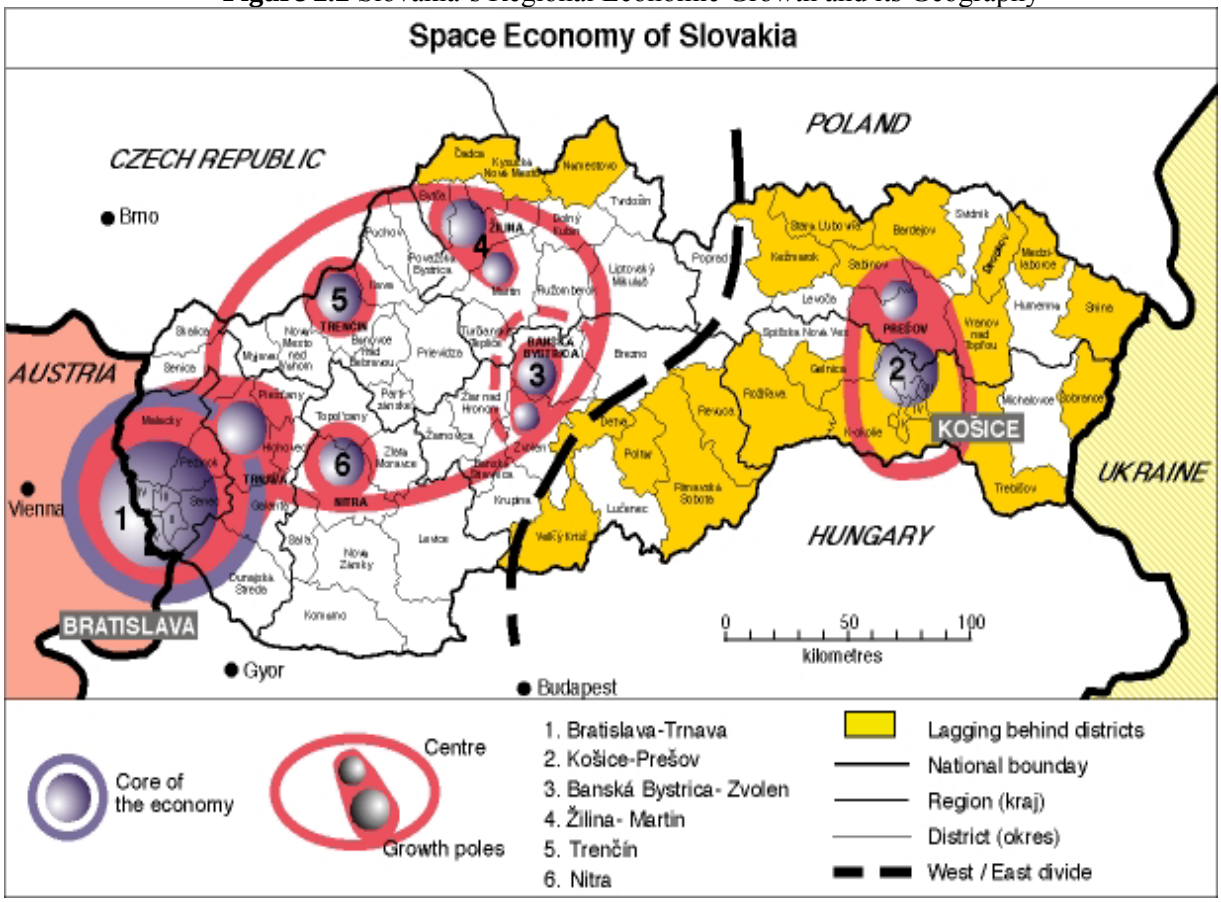
In sectoral terms, data for 1996-2000 period show, that the highest gross value added (GVA) per employee (so-called "apparent labour productivity") was reported in the market services sector (i.e. real estate, renting and business activities, R&D). Detailed information on Gross Value Added per Employee (apparent labour productivity) is provided in Table 4.2.

## A.5. Regional Economy

Despite strong economic growth in the 1990s, unemployment remains quite high and very unevenly distributed, mirroring the on-going fragmentation of the Slovak space-economy, with a clear West-East divide emerging (see Figure 2.2). Bratislava, on the border with Austria, consolidated its position as an economic 'core' of Slovakia (Smith, 1998), with GDP per capita nearly four times the national average at NUTS 3 level, and twice as much at NUTS 2 level (see Table 2.19). As the highly illustrative map by Sokol (1999) shows, the majority of industrial urban centres are clustered in the Western part of the country, forming together what could be called a 'centre' of the Slovak space-economy. In the East, Presov and Kosice, the second largest industrial city of Slovakia, constitute the only two major 'islands of development' in an otherwise increasingly problematic region.

There are significant expectations of improvements in Slovakia's regional economic and social disparities from EU Structural Funds. Slovakia's National Development Plan for 2004-2006 is heavily focused on physical infrastructure development (transport and environmental), i.e. an investment priority, which has been a major contributing factor of the high gross capital formation throughout the 1990s. IS-related structural investment is to be targeted on "soft" (development of network and applications) rather than "hard" (physical construction) factors, its planned volume being substantially lower compared to the transport priority.

**Figure 2.2** Slovakia's Regional Economic Growth and its Geography

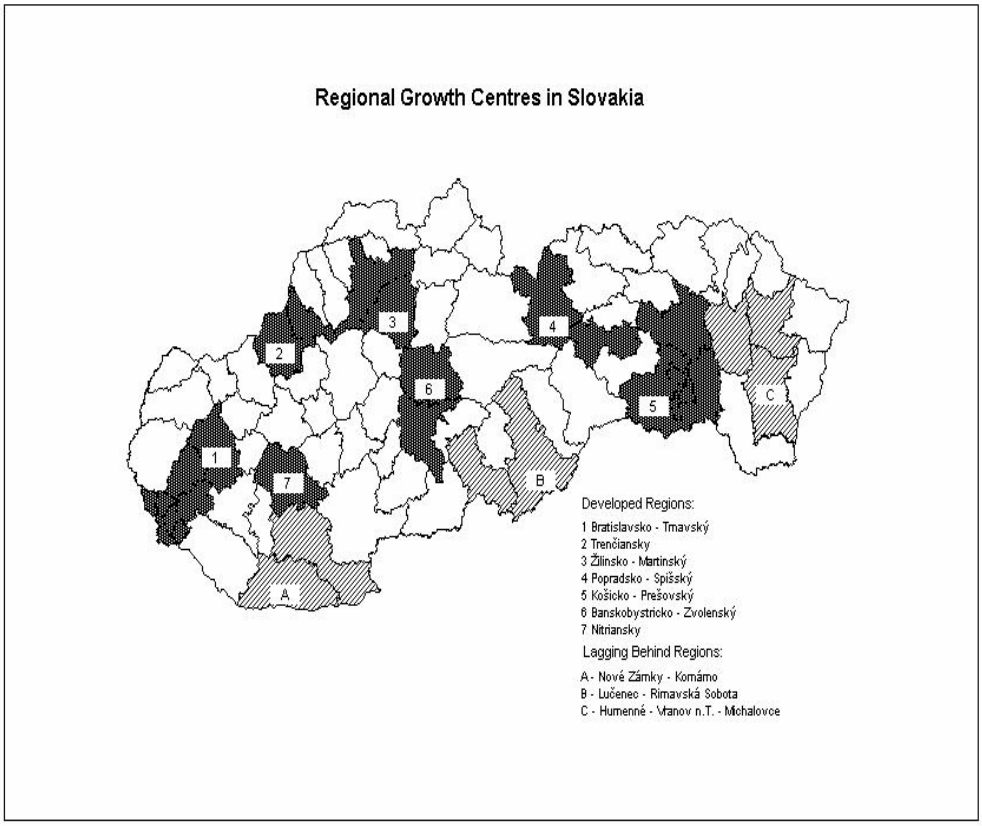



Source: reproduced from Sokol (1999)

The West-East divide seems to combine both urban-rural and core-periphery dimensions, and fits into the broader economic landscape of Central Europe (Sokol, 1999). In the West of the country, the more urbanised and industrialised regions with greater economic diversity, seem to perform relatively well, while in the East more scarcely populated areas with traditional agricultural production or modernised/industrialised only recently under the state-socialism, appear to be "transition losers" as described by Gorzelak (1998).

The regional picture of the 1990s is most unlikely to change considerably in the first decade of the 21st century, as was recently shown by Bucek et al. (2003) in their analysis of regional aspects of Slovakia's EU accession. Figure 2.3 suggests the most likely distribution of regional growth dynamics in the period up to 2010.

**Figure 2.3** Regional Growth Centres in Slovakia beyond 2000




Source: adapted from Bucek et al. (2003)

The Slovak labour market is also marked by strong *regional disparities* which are most visibly demonstrated *in unemployment rates*. The gaps between the levels of registered unemployment between individual districts (NUTS 4) grew steadily and ranged as much as 30% in 2001, as compared to 25% in January 1997. Traditionally, unemployment rate is the lowest in the districts of the capital city Bratislava (3.7%-6.2% as of December 2001), while being the highest in the Central Slovakia's district of Rimavska Sobota (35.5%). At NUTS 3 level, while in the Bratislava Region, unemployment has been consistently low (around or below 6%), the Eastern Slovak regions of Presov and Kosice and Western Slovak agricultural region of Nitra have experienced steady unemployment at levels around 20% (see Table 2.20).

**Table 2.19** Regional Disparities in Economic Performance (NUTS 2)

| | YEAR | BRATISLAVA | WESTERN SLOVAKIA | CENTRAL SLOVAKIA | EASTERN SLOVAKIA | SLOVAK REPUBLIC |
|---|---|---|---|---|---|---|
| GDP (Mio ECU/ EUR) | 1996 | 3,575 | 5,105 | 3,376 | 3,516 | 15,572 |
| | 1997 | 4,316 | 5,745 | 3,914 | 4,030 | 18,005 |
| | 1998 | 4,452 | 6,028 | 4,126 | 4,381 | 18,987 |
| | 1999 | 4,189 | 5,979 | 3,999 | 4,311 | 18,479 |
| | 2000* | 5,201 | 6,882 | 4,514 | 4,736 | 21,333 |
| | | | | | | |
| GDP (Mio PPS) | 1996 | 10,513 | 15,011 | 9,927 | 10,337 | 45,788 |
| | 1997 | 11,977 | 15,942 | 10,862 | 11,185 | 49,965 |
| | 1998 | 12,412 | 16,805 | 11,502 | 12,215 | 52,933 |
| | 1999 | 12,518 | 17,868 | 11,951 | 12,882 | 55,219 |
| | 2000* | 13,662 | 18,077 | 11,856 | 12,440 | 56,035 |
| | | | | | | |
| GDP p.c. (PPS) | 1996 | 17,000 | 8,133 | 7,350 | 6,800 | 8,500 |
| | 1997 | 19,300 | 8,600 | 8,050 | 7,300 | 9,300 |
| | 1998 | 20,100 | 9,033 | 8,500 | 7,950 | 9,800 |
| | 1999 | 20,300 | 9,667 | 8,800 | 8,350 | 10,200 |
| | 2000* | 22,134 | 9,638 | 8,745 | 8,014 | 10,375 |
| | | | | | | |
| GDP p.c. (% of Slovak average) | 1996 | 203 | 93 | 87 | 79 | 100 |
| | 1997 | 203 | 93 | 87 | 79 | 100 |
| | 1998 | 202 | 92 | 87 | 81 | 100 |
| | 1999 | 197 | 94 | 86 | 82 | 100 |
| | 2000 | . | . | . | . | . |
| | | | | | | |
| GDP p.c. (% of E-15 average) | 1996 | 92 | 44 | 40 | 37 | 46 |
| | 1997 | 100 | 44 | 41 | 38 | 48 |
| | 1998 | 99 | 45 | 41 | 39 | 48 |
| | 1999 | 95 | 45 | 41 | 39 | 48 |
| | 2000* | 98 | 43 | 39 | 35 | 46 |

Source: Regional Statistics Yearbook, Slovak Statistical Office (2002) and Eurostat (2003)

* As far as PPP are concerned, the year 2000 can be seen as the first year in which the PPP weights are fully based on ESA95. In the light of this fact, it has been decided by Eurostat to revise (during 2003) the PPP for all the past years reported (see Eurostat's Statistics in Focus - Theme 1 - 2/2003)

**Table 2.20** NUTS3 Regional Disparities in Labour Market Performance

| REGION | INDICATOR | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|
| Bratislavsky | Economically active population | 325.1 | 331.1 | 335.8 | 337.2 | 337.4 |
| | Employed/self-employed | 304.1 | 308.6 | 309.2 | 310.8 | 308.3 |
| | Unemployed | 18.5 | 20.0 | 24.6 | 24.4 | 28.2 |
| | Economic activity rate | 64.7 | 65.2 | 65.6 | 65.4 | 64.8 |
| | Employment rate | 60.5 | 60.8 | 60.4 | 60.3 | 59.2 |
| | Unemployment rate | 5.7 | 6.0 | 7.4 | 7.2 | 8.3 |
| Trnavsky | Economically active population | 260.1 | 260.2 | 266.5 | 273.0 | 286.0 |
| | Employed/self-employed | 230.0 | 226.3 | 229.8 | 225.0 | 232.4 |
| | Unemployed | 28.8 | 30.7 | 32.8 | 44.7 | 51.5 |
| | Economic activity rate | 59.7 | 59.1 | 59.9 | 60.9 | 63.2 |
| | Employment rate | 52.8 | 51.4 | 51.7 | 50.2 | 51.4 |
| | Unemployment rate | 11.1 | 11.8 | 12.3 | 16.4 | 18.0 |
| Trenciansky | Economically active population | 285.9 | 297.9 | 288.4 | 294.1 | 296.7 |
| | Employed/self-employed | 259.6 | 270.7 | 252.4 | 247.8 | 254.0 |
| | Unemployed | 25.4 | 23.0 | 32.9 | 44.2 | 39.8 |
| | Economic activity rate | 59.4 | 61.3 | 58.9 | 59.6 | 59.6 |
| | Employment rate | 53.9 | 55.7 | 51.5 | 50.2 | 51.0 |
| | Unemployment rate | 8.9 | 7.7 | 11.4 | 15.0 | 13.4 |
| Nitriansky | Economically active population | 332.7 | 329.3 | 328.2 | 335.3 | 343.1 |
| | Employed/self-employed | 279.4 | 285.2 | 266.9 | 263.3 | 261.7 |
| | Unemployed | 50.6 | 39.9 | 58.3 | 69.8 | 79.4 |
| | Economic activity rate | 57.9 | 56.9 | 56.4 | 57.2 | 58.2 |
| | Employment rate | 48.6 | 49.3 | 45.8 | 44.9 | 44.4 |
| | Unemployment rate | 15.2 | 12.1 | 17.8 | 20.8 | 23.1 |
| Zilinsky | Economically active population | 326.2 | 332.5 | 332.3 | 332.1 | 334.9 |
| | Employed/self-employed | 294.7 | 292.9 | 275.1 | 266.7 | 267.6 |
| | Unemployed | 27.5 | 34.8 | 52.6 | 61.4 | 63.3 |
| | Economic activity rate | 61.6 | 62.1 | 61.5 | 60.9 | 60.8 |
| | Employment rate | 55.6 | 54.7 | 50.9 | 48.9 | 48.6 |
| | Unemployment rate | 8.4 | 10.5 | 15.9 | 18.5 | 18.9 |
| Banskobystricky | Economically active population | 307.7 | 308.3 | 313.8 | 317.4 | 327.6 |
| | Employed/self-employed | 262.7 | 257.4 | 246.2 | 245.7 | 251.2 |
| | Unemployed | 42.8 | 48.2 | 66.3 | 69.6 | 73.4 |
| | Economic activity rate | 58.5 | 58.2 | 58.9 | 59.2 | 60.7 |
| | Employment rate | 49.9 | 48.6 | 46.2 | 45.8 | 46.5 |
| | Unemployment rate | 13.9 | 15.6 | 21.1 | 21.9 | 22.4 |
| Presovsky | Economically active population | 338.5 | 342.5 | 357.7 | 362.4 | 366.2 |
| | Employed/self-employed | 284.6 | 282.4 | 285.9 | 278.4 | 279.7 |
| | Unemployed | 51.0 | 56.2 | 68.3 | 80.1 | 83.1 |
| | Economic activity rate | 58.7 | 58.6 | 60.5 | 60.5 | 60.4 |
| | Employment rate | 49.4 | 48.3 | 48.4 | 46.5 | 46.1 |
| | Unemployment rate | 15.1 | 16.4 | 19.1 | 22.1 | 22.7 |
| Kosicky | Economically active population | 346.0 | 343.1 | 350.5 | 356.7 | 360.6 |
| | Employed/self-employed | 291.0 | 275.2 | 266.9 | 264.1 | 268.8 |
| | Unemployed | 53.0 | 64.3 | 81.0 | 91.2 | 89.3 |
| | Economic activity rate | 59.0 | 58.0 | 58.7 | 59.2 | 59.2 |
| | Employment rate | 49.7 | 46.5 | 44.6 | 43.8 | 44.1 |
| | Unemployment rate | 15.3 | 18.7 | 23.1 | 25.6 | 24.8 |

Source: Slovak Statistical Office (based on Labour Force Survey data)

A clear regional disparity is also manifested in the distribution of foreign direct investment, which has been extremely uneven, with a dominant portion – over a half of all FDI – having consistently been located in Bratislava region. Kosice region accounted for some 20%, mainly due to the purchase of the big VSZ steel-maker by US Steel. The remaining six regions received between 3 and 6% of FDI inflows (see Table 2.21 for data on NUTS3 level).

**Table 2.21** FDI in Regions: cumulative inflows (mid-2002)

| | CORPORATE SECTOR | | BANKING SECTOR | | TOTAL | |
|---|---|---|---|---|---|---|
| REGION | USD Mio. | % | USD Mio. | % | USD Mio. | % |
| Bratislava | 227.0 | 54.1 | 1,244.2 | 100.0 | 3,471.1 | 64.7 |
| Trnava | 233.2 | 5.7 | 0.0 | 0.0 | 233.2 | 4.3 |
| Trencin | 168.0 | 4.1 | 0.0 | 0.0 | 168.0 | 3.1 |
| Nitra | 151.5 | 3.7 | 0.0 | 0.0 | 151.5 | 2.8 |
| Zilina | 220.0 | 5.3 | 0.0 | 0.0 | 220.0 | 4.1 |
| Banska Bystrica | 170.8 | 4.1 | 0.0 | 0.0 | 170.8 | 3.2 |
| Presov | 122.3 | 3.0 | 0.0 | 0.0 | 122.3 | 2.3 |
| Kosice | 827.2 | 20.1 | 0.0 | 0.0 | 827.2 | 15.4 |
| Total | 4,120.0 | 100.0 | 1,244.2 | 100.0 | 5,364.2 | 100.0 |

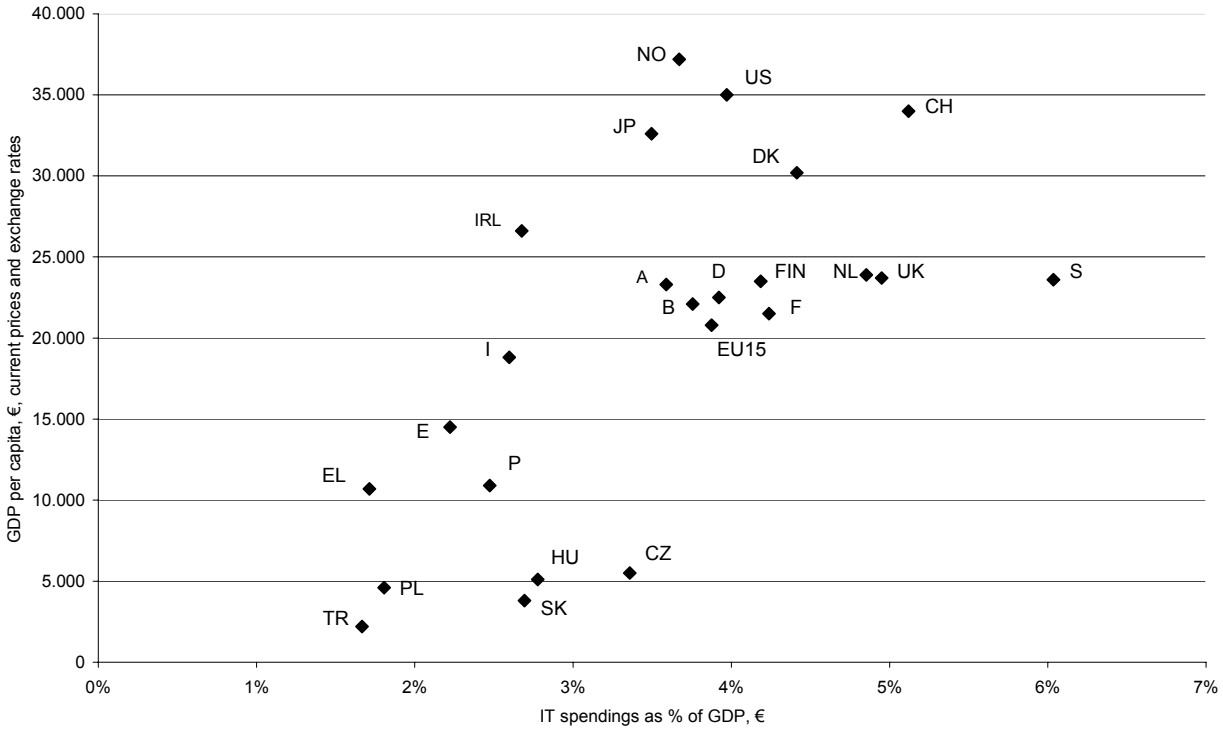
Source: National Bank of Slovakia; Note: USD = 38 SKK

## A.6. GDP and ICTs

The level of economic growth is important, given its correlation with the level of ICT spending clearly demonstrated by some authors. According to Eurostat, Slovakia's ICT expenditure has steadily reached between 2.6 and 2.9% of GDP in the years 2000-2003, above the average levels for acceding countries of 2.4-27%. The steady development suggests that it has not been a significant demand-side contributor to Slovakia's economic growth.

If ICT expenditure indeed has a measurable impact on growth, competitiveness and therefore future wealth, the figures show that Slovakia together with the Czech Republic and Hungary already surpass Greece or Spain in ICT spending as % of GDP in 2001 (Figure 2.4).

**Figure 2.4** GDP and IT expenditure as % of GDP in 2001




Source: EITO Book (2002)

## A.7. SWOT analysis

- Slovakia has experienced macroeconomic recovery in the past few years, moving towards healthier growth driven by improved export performance and capital investment.
- The improved perception of the country (after its entry into OECD, NATO, and the acceleration of the EU accession process and the launch of extensive reforms) in the West has significantly increased the inflows of foreign direct investment.
- Slovakia is one of the most open CEE economies in terms of trade in goods (next only to Malta and Estonia). However, the exports are driven by a narrow range of products, in particular car production.
- An ongoing issue is the inability of economic growth to translate into job creation that would reduce the high national and regional unemployment rates. The main causes are twofold: sharp increases in labour productivity and an inflexible, over-regulated labour market.
- Benefits of growth are unequally distributed, and most regions of Slovakia remain deprived of benefits of foreign investment.
- The accession of Slovakia to the European Union opens up the possibility of further foreign investment to produce for the EU market, although there is the associated risk that some of that production will easily move abroad as wages and prices converge to EU levels.
- Recent reforms of public finances (notably the tax reform and labour market reform) can further increase the attractiveness of Slovakia's business environment.

**Table 2.22** SWOT: National and Regional Economic Developments

| | |
|---|---|
| **STRENGTHS**<br>• Rapid macroeconomic improvements in recent years<br>• Favourable demand-side conditions of economic growth<br>• Low levels of foreign debt | **WEAKNESSES**<br>• Export dependence on specific industries, mostly with low value added<br>• High levels of unemployment and limited job creation<br>• Severe regional disparities in income and unemployment |
| **OPPORTUNITIES**<br>• Public finance reforms<br>• EU accession<br>• Greater impact of growth on job creation through labour market reform | **THREATS**<br>• Departure of wage-cost sensitive production further east to lower cost countries<br>• Reinforcing West-East regional divide of the country |

## *swot analysIS*

The current *favourable macroeconomic environment* creates a solid basis and more space for strategic investment decisions by business sector in the area of technological development, including ICTs. An *improved inflow of FDI* after 2000 provides additional resources to increase the notoriously low levels of technology-intensity of Slovak (manufacturing) exports. Economic benefits of an almost completed privatisation and restructuring of major infrastructure industries (through massive FDI to power generation, gas supply and telecom companies) are slowly spilling over to the wider economy.

*New fiscal and labour market policy reforms to be implemented in 2004* appear to have a realistic ambition and finally a sufficient political backing to significantly improve the responsiveness of national and regional factors markets (introducing also more institutional flexibility to the existing system of work contract arrangements).

On the one hand, the long-awaited *EU accession* provides strong impetus to further regional trade integration. Also, through international policy coordination Slovakia's public spending priorities, which have long been biased towards economic transition needs, can be positively affected towards *Lisbon targets*. On the other hand, Single European Market will most likely reinforce the current *economic geography*, depending on the success of regional industry adjustment process beyond 2004. However, access to substantial EU structural funding creates an unprecedented political pressure on the Slovak government to address the regional problem with much more priority than has been the case over the 1990s.

# B. NATIONAL AND REGIONAL INFORMATION SOCIETY POLICIES

This chapter provides an overview of information society (IS) policies in Slovakia as they evolved over the course of the 1990s up till the time of writing.

The IS policy area has suffered from institutional fragmentation and frequent changes in competencies. Due to the inter-ministerial nature of the agenda and the poor tradition of inter-ministerial coordination in the Slovak state administration, the IS agenda has not had a clear focal point throughout the period.

The partial policies designed at different levels and in different departments suffered from the fact that they were not backed by sufficient political will and budgetary allocations. In the later stages of the EU accession process, however, the union began to play a growing role in agenda setting, pushing the Slovak government towards formulating clearer policies on developing information society.

Within the accession process regions have also become more involved in strategic planning and have included IS among their priorities.

## B.1. Evolution of IS-related Institutional Framework

In IS policy field, the last decade has witnessed numerous changes of responsible policy implementing organisations, which can be summarised as follows:

- 1990-1992: competencies on the former federal level of the former Czecho-Slovakia;
- 1993-1998: Statistical Office (general informatics), Ministry of Transport, Posts, and Telecommunications (telecom policy and regulations), Ministry of Economy (ICT industry), Government Office (informatics of state administrations), Office for the Strategy of Development of Society, Science, and Technology (information society dimensions, operated between 1997 and mid-1999);
- 1999-2000: Ministry of Transport, Posts, and Telecommunications (telecom policy and regulations, general informatics), Ministry of Economy (ICT industry), Government Office (informatics of state administrations);
- 2000-2003: Ministry of Education (information society), Ministry of Transport, Posts, and Telecommunications (telecom policy), Telecommunication Office (regulation), Ministry of Economy (ICT industry), Government Office (informatics of state administrations), National Security Office (e-signature);
- May 2003: Ministry of Transport, Posts and Telecommunications (telecom policy and information society), Telecommunication Office (regulation), Ministry of Economy (ICT industry), Government Office (informatics of the state administration), National Security Office (e-signature).

Current status of division of ICT competencies aggregates competencies for information society and telecom policy within the Ministry of Transport, Posts and Telecommunications (MTPT). The principal problem with this aggregation is that it results in a clear conflict of interests in the MTPT as a policy maker and at the same time the entity exercising ownership rights to a stake in the incumbent operator (34% shares). During early 2003 there were discussions about the need to create a separate ministry for information society with all relevant competencies to coordinate and manage activities and policies related to the information society but no clear strategy for such an institutional change has emerged.

*Division of IS Policy Powers and Tasks (as of May 2003)*

- MTPT (state telecom policy, state information society policy co-ordination);
- Telecommunication Office – autonomous government agency (price and technical regulation);
- Antimonopoly Office – autonomous government agency (antimonopoly regulation);
- Ministry of Economy (ICT industry policy);
- Government Office (co-ordination of informatisation[7] process of the state administration, competences for public administration are not clear, due to discontinuation of GOVNET project in 2002 - see Section 6.7);
- Government Council for Public Administration Informatisation – consultative body of the government (limited competencies for inter-ministerial co-ordination of IT projects in the public administration);
- National Security Office – autonomous government agency (information security - e-signature certificates);
- Government Plenipotentiary for the Protection of Personal Data in Information Systems – appointed by the government;
- 8 regional governments – elected bodies (regional economic development, including local telecommunication infrastructure development);
- ZMOS - Association of Towns and Municipalities of Slovakia (co-ordination of informatics activities towards improving electronic communications with citizens, also partner for general informatics projects);
- UMS - Association of Towns of Slovakia (co-ordination of informatics activities towards improving electronic communications with citizens, also partner for general informatics projects (specific group of mainly larger cities are members of this association)).
- In January 2004, the government approved the Strategy of Informatisation of the Society, which includes the creation of a post of a Government Plenipotentiary for Informatisation. Initially, the office of the Plenipotentiary will be a part of the MTPT and should later become a separate entity.

## B.2. Evolution of IS Policy Framework

During the period 1990–2002 the three most typical features of IS policy-making in Slovakia were the permanent changes of competencies ("institutional volatility"), and the failure to draft and approve strategic documents, as well as the lacks of a public debate on information society issues. Until June 2001, Slovakia was lacking an official government strategy document focused on IS agenda. A number of ministries with fragmented responsibilities (Ministry of Education, Ministry of Transport) have attempted to implement some IS policy ideas, but the results have been rather limited.

On June 13, 2001, the Slovak Government adopted Resolution No. 522/2001 on Information Society Policy in the Slovak Republic. The document was submitted by the Ministry of Education, and prepared in co-operation with other line ministries, professional bodies and experts. The Resolution has recognized the importance of addressing a wide range of IS

[7] In accord with Slovak usage, the word informatisation is used to denote the process of introduction of information society technologies.

issues and engaged Slovakia into eEurope+ activities. It also assigned political responsibility for IS policy coordination to the Deputy Prime Minister for the Economy, who is to co-ordinate together with the Minister of Education activities related to information society. Most importantly, the Resolution set out to prepare a comprehensive government strategy towards information society by October 2001, and an action plan to implement eEurope+ activities (approved by the EU Summit in Gothenburg, on June 16, 2001) in the Slovak Republic. The required policy documents have been approved by the Slovak Government in early 2004 as the Strategy for Informatisation of the Society and Action Plan.

The following official IS-related government policy documents were approved and implemented in the 1990s:

- National plan for informatics – approved by the Slovak government during the former Czecho-Slovakia in June 1992, but never implemented;
- Concept of Communications Development in the Slovak Republic (1993-2000) - approved in August 1993;
- State Telecom policy 1996-2000 - approved in December 1995;
- National Plan of Regional Development – approved in March 2001;
- State Telecom policy 2000-2002 - approved in June 2000;
- State IS policy - approved in June 2001;
- State Telecom policy 2003 - approved in March 2003;
- National Development Plan - draft approved in March 2003;
- National Strategy for IS (incl. Action Plan for IS) – approved in January 2004.

*National IS Policies*

Concept of Communications Development in the Slovak Republic (1993-2000)
Sector development goals were set by the Concept for the short-term (1993-1995) and medium-term (1996- 2000) horizons. Its main objective was to significantly increase the quality as well as the quantity of postal and telecommunication services.

For telecommunications, the following short-term (1993-1995) priorities were formulated:

- increased international co-operation;
- liberalisation of telecommunication services;
- legislation;
- transformation of the state-owned Slovak Telecom;
- technological development.

Objectives and results:

- international co-operation (full integration of the Slovak Republic into international telecom activities was sought after the split of the former Czecho-Slovakia);
- liberalisation of telecommunication services (only the liberalisation of data services was implemented);
- transformation of the state-owned enterprise Slovak Telecom from a state enterprise[8] to a joint stock company fully owned by the state (not implemented because of the

[8] State enterprises as an organisational form are governed by a special regime

lacking political will to privatise certain enterprises deemed as strategic during 1993-1995);

- technological development (rapid development of the Slovak Telecom's infrastructure: density (increase by more than 40% compared to 1992 rates), starting network digitalisation (from 0% in 1993 to 25% in 1995) and investments per capita (increase by more than 80% compared to 1992 volumes). For telecommunications development in 1993 - 1995, a total of 18 billion SKK was invested (original expectation was 15 billion SKK), of which 45% were raised and financed through loans from international development banks (World Bank, EBRD, EIB) with government guarantees and through credits from suppliers of technology. The investment was directed primarily into new digital exchanges, optical digital lines, digital transmission systems, increase of fixed-line penetration and initial steps in improving the quality of local networks.

In December 1995, this document was replaced by the State Telecom Policy 1996-2000.

*State Telecom Policy 1996-2000*

The document provides an analytic and synthetic view on the current and future state of telecommunication in Slovakia, taking into account the Development Concept of Communications by 2000, Telecommunication Project II and Slovakia's commitments in the EU association agreements.

The following priority areas for telecommunications policy were defined:

- adjustment of legislation (to permit liberalisation of services, increased regulatory powers and introduction of more robust regulatory processes),
- liberalisation of telecommunication services,
- regulatory framework,
- transformation of the telecommunication operator,
- acceleration of technological upgrading

The implementation of these priorities can be summarised as follows:

- adaptation of legislation (new Telecom Act approved in May 2000, replacing the obsolete Telecom Act of 1964, designed strictly for a monopoly telecom market, preparation having been assisted by the Slovak Telecom's privatisation advisor),
- liberalisation of telecommunications services (liberalisation of data services, and infrastructures, including the second mobile operator of GSM 900 network in 1996, but introduction of the third mobile operator of GSM 900 did not take place, as two public tenders in 1998-1999 failed (in 1999, the frequencies reserved for the third mobile operator were divided and sold to the two existing GSM operators),
- regulatory framework (implementing EC directives, particularly on liberalisation of all types of telecom services and networks, introduction of universal service obligations, harmonisation of frequencies, etc.),
- transformation of the telecommunication operator (transformation to joint stock company took place April 1999, privatisation of 51% shares Slovak Telecom took place in July 2000 to Deutsche Telekom),
- acceleration of the physical infrastructure development (expansion of the Slovak Telecom infrastructure: density (increased by 50% from 1995), network digitalisation

(from 25% in 1995 to 70% in 2000) and investment per capita (increased only during 1996-1997, later decreased because of absence political will for privatisation of Slovak Telecom).

In May 2000, this document was replaced by the State Telecom Policy 2000-2002.

*State Telecom Policy 2000-2002*

The document defines a strategy of development of telecommunications particularly in the area of public telephone service, price policy and regulation, satellite communications, mobile and personal communications, interconnection, leased line services, utilisation of frequency spectrum, development of land analogue and digital radio and TV broadcasting, numbering of telecommunication networks and telecommunication services, Information Society and international co-operation.

The goal of the State Telecommunication Policy was to establish equal and transparent conditions for the development of the telecommunications market in the Slovak Republic. Its main goal was to harmonise the Slovak legislation with EU legislation by the end of 2002 (introduce full liberalisation of telecommunications market).

Implementation of the priorities can be assessed as follows:

- public telephone service (relevant legal provisions made, but the present licensing process lacks transparency - it is quite common that licensing conditions are not made public and clear for prospective operators; privatisation agreement between the government and Deutsche Telekom has not been made publicly available; there is a principal conflict of interests inside the Ministry of Transport, Posts and Telecom because of its dual function of policy-maker and owner of 34% shares of Slovak Telecom);
- price policy and regulation (transfer of powers from Ministry of Finance to the Telecommunication Office – a separate national regulatory authority established in 1993, a move consistent with accepted practice in regulation policy);
- satellite communications (improved regime);
- mobile and personal communications (improved regime, but continued failure of public tender in 2002 to sell a licence for the 3rd mobile operator GSM/UMTS);
- interconnection (relevant legal provisions made, but the present licensing process lacks transparency, with prices being subject to commercial secrecy);
- leased line services (enabling enhanced competition for international and long-distance levels, but problems of the "last mile" because of the lack of implementation of "unbundling local loop" into Slovak legislation during 2002);
- utilisation of frequency spectrum (improved regime allocating frequencies for UMTS and satellite services);
- development of terrestrial analogue and digital radio and TV broadcasting (improved regime and the launch of several pilots for digital TV broadcasting);
- numbering of telecommunication networks and telecommunication services (relevant legal provisions introduced, but the present licensing process is not harmonised with “Acquis 1998” regime);
- Information Society (targeted Slovak Telecom's activities supporting education system in Slovakia, e.g. Infovek project);

- international co-operation (standard levels of international co-operation achieved).

In March 2003, this document was replaced by the National Electronic Communication Policy in 2003.

*National Electronic Communication Policy 2003*

This document (adopted in March 2003) sets the priorities for meeting the development needs of the Slovak economy in the period of a fully liberalised telecommunication market. Its main priorities include:

- harmonisation with EU legislation – "Acquis 2003" (one amendment of current telecom law was rejected by parliament after presidential veto in July 2003[9], new e-communication law was approved by Parliament in December 2003);
- state regulation (the Policy sets three objectives – to strengthen the national regulator, increase its independence by separating its budget from the MTPT, move shareholder rights in the Slovak Telecom from the MTPT to another ministry and create a joint national regulator by merging the Council for Broadcasting and Retransmission, Telecommunication Office and possible also the Postal Regulator;
- promotion of competitive environment (primarily by implementing EU directives on electronic networks and services and on access and interconnectivity;
- universal service development (representing the first introduction of the concept with the long-term goal of meeting every founded request for universal service at adequate quality and acceptable price);
- efficient use of the frequency spectrum;
- information security;
- implementation of information society services (the policy recognises that content creation is primarily the role of the private sectors, but the state is to cooperate, monitor and regulate as needed)
    - Access for all - the policy further stresses the need to reduce internet access tariffs and increase the spread of broadband services
    - Broadband access – the policy calls for the spread of broadband access by reducing barriers to competition, promoting efficient use of the frequency spectrum and supporting broadband access in rural regions
    - Digital TV and radio – full switch from analogue to digital broadcast to be completed by 2015
    - Research and development in electronic communications – the main task seen as support for R&D in this area in state research programmes

[9] After a presidential veto, a simple majority is required to re-approve a law in parliament.

*National Strategy for Information Society (2004)*

Three different versions of this document were prepared in 2001 – 2003. The version approved by the government in January 2004 includes the following six priorities:

- creating a fully competitive environment within the info-communication infrastructure and services sector
- improving communication of public administration with citizens and business through e-government,
- education to take advantage of IS opportunities,
- facilitating e-commerce and e-business development
- stimulating IT research and development and commercial applications
- providing a secure and trust-conducive digital environment

National IS Action Plan (annexed to the IS Strategy document) includes survey of all tasks from the eEurope+ (legislative and other framework improvements, internet accessibility, human capital investment, stimulating internet use) and eEurope 2005 (implementation of a detailed structured action plan) with setting of responsible national coordination organisations and deadlines (2003-2005). Financing of national IS action plan for 2004 had not been included in the 2004 budget.

Most of the tasks in the action plan focus on creating further sub-sectoral strategies and are not sufficiently specific.

*Regional IS Policies*

*National Plan of Regional Development of the Slovak Republic* is the basic medium-term programming document for implementation of PHARE Economic and Social Cohesion assistance in the Slovak Republic in the period 2000 - 2006. Priorities identified also include the development of regional telecommunication infrastructures. In fact, majority of the planned telecom investment financing approved by the EC has been put into the development and upgrading of the local telecom networks serving three industrial parks in the Eastern Slovak districts of Humenne-Guttmanovo, Roznava and Spisska Nova Ves.

*National Development Plan (NDP) of the Slovak Republic* is the basic programming document for accessing the EU Structural Funds in the period 2004-2006. Four development axes include:

- development in competitiveness in industry and services;
- employment based on qualified and flexible labour force;
- multifunctional development of agriculture and rural areas;
- development of transport, environmental and local infrastructures.

For the first time, Slovakia's regional policy sets out an explicit IS policy goal. Under the NDP, one of the priorities in the Sector Operational Programme[10] "Basic Infrastructure" is also Local Infrastructure, where one of two measures focuses on the development of information society. To promote regional IS development, NDP seeks to address the identified barriers, including inadequate financial resources, low level of regional info-

[10] Managing authority of this SOP is MTPT.

communication infrastructure and insufficient usage of ICT. Specific activities to be undertaken are identified in the SOP programme complements (Ministry of Construction and Regional Development, 2003): building of regional and local info-communication infrastructures, public info-centres enabling to provide info services for citizens, LANs, peering centres, internet usage of effective work on regional and local governments, development of regional digital content, regional monitoring systems, GIS, SW development, smart cards, connection of regional research centres to central SANET (Slovak academic network[11]), etc. Target groups include: regional and local governments, NGOs, schools, culture institutions, local citizens, visitors, unemployed persons, students, specific communities (e.g. Roma ethnic minority), etc.

Monitored indicators, echoing eEurope Action Plans' priorities, include:

- number of on-line services
- number of internet access per 1,000 inhabitants
- internet users
- regular usage of internet
- households with internet access
- number of PCs per 100 students
- number of PCs with high-speed internet access per 100 university students
- number of public internet access points per 1,000 inhabitants
- percentage of specific public on-line services (education, health, social, culture)

**Table 3.1** National Development Plan: Priority "Local Infrastructure"

| SOP "BASIC INFRASTRUCTURE" | PRIORITY | MEASURE 2 |
|---|---|---|
| Building and development of information society in public sector | Specific target<br>Support of regional economic development by knowledge society | Global target<br>To start process of "intelligent regions" development |
| | | Specific targets<br>E-government, e-access to public services<br>On-line access to e-health services<br>On-line access to e-education services |
| | | Operational targets<br>Cheaper internet access<br>Usage of internet for support and development of regional policy<br>Regional digital content<br>SW development and portals<br>High-speed internet access for researchers and students |

Source: Ministry of Construction and Regional Development, www.build.gov.sk (August 2003)

At the sub-national level, the newly created regional governments have made considerable SF programming efforts to include IS component into their development strategies. However, despite ambitious visions of "intelligent regions," their real influence will remain rather limited in the coming years, with the SF managing authority being vested in the sector ministries in 2004-6 programming period. *Regional and local IS development* will therefore

[11] For further information on SANET, see page 34.

largely depend on the successful implementation of new SF-funded projects, and a further strengthening of financial base and administrative capacity of the autonomous regions to be able to assume a more active role in that development beyond 2006.

## B.3. Overview of IS Policy Actors and Projects

In addition to the government departments, which played a formal role at the various stages of IS policy making described above, a key role has been played by the civil society, which stepped in when the government progressed too slowly. The key initiative in the area of education IST, Infovek, was initiated by a group of individuals and later adopted by the government.

In the corporate sector, a key player with impact on IS policy has been the incumbent fixed-line operator Slovak Telecom. The government has suffered from the dual role of the policy-maker and shareholder in the telecom sector.

There are several initiatives focused on IS, that have been launched in Slovakia in recent years, although the government was rarely the initiator. They are rather characterised by an active participation of the NGO sector, which seeks financial and logistical support from business investors/users. The role and capacities of the government sector as one of the policy actors is in a more detail reported and analysed in chapters 5 and 7.

**Policy Actors**

***Non-Governmental Organisations***

**Internet For All** (IPV) is a Slovak non-profit NGO founded in January 2002 (www.inet.sk). The basic philosophy of IPV is to:

- ensure speedier, cheaper and more secure internet;
- accelerate establishment of basic pillars for information society;
- promote wider using of internet;
- support investments for education

The association launched a petition for cheaper internet in 2002 after Slovak Telecom increased access fees along with a boycott of internet users using Slovak Telecom to connect to the internet, which banned them from accessing some web pages.
Although there was no direct effect, the efforts drew attention of the media, public at large and the media.

**eSLOVAKIA**[12] is an association created through a joint personal initiative of the Slovak Prime Minister and the CEO of Slovak Telecom in May 2002. The move was in part a response to calls for the government to step in and influence the rising internet access tariffs. The main objectives of eSlovakia as presented by the partners were:

- acceleration of information society in Slovakia,
- enlightenment of information society for public,
- creation of a strategic partnership between the main players,

[12] http://www.vlada.gov.sk/eslovakia

- support of well-prepared projects.

Three main pillars of eSlovakia are as follows:

- iAccess,
- iContent,
- iEducation.

Activities under eSlovakia have included the introduction of a pilot project of five internet kiosks, which concluded in January 2004 and the launch of a Computers for Schools initiative in 2004.

eSlovakia has been criticised for slow progress and formal nature. For a year since the initiatives creation, there were virtually no tangible developments, although the Computer for Schools initiative is a sizable venture with potentially major impact on the level of ICT availability in schools. In terms of eSlovakia's effects on internet access fees, there has been no direct impact.

Partnerships for Prosperity (PPP) is a Slovak non-profit NGO registered in June 2001 (www.p3.sk). The basic philosophy of the PPP is to provide a continuous forum for co-operation and communication between the political (decision-making) level and the civil society. A formation of such public-private partnerships under the auspices of a non-profit, non-governmental organisation is considered by many as the best solution for transparent co-operation in society-profit projects. Its main objectives are to help:

- provide a forum for interest brokerage between government, business and science partners in the field of IT;
- forge economically viable partnerships between the interested parties;
- enhance the perspective for a more dynamic advancement of IT in areas of Education (e-learning), Government (e-government) and Business (e-business) in Slovakia.

PPP has been successful in pushing the issue of e-government and of e-commerce infrastructure higher up on the government agenda by organising a number of meetings and initiatives.

*Public and Public-Private IS Initiatives*

**Project MESTO.SK** (www.mesto.sk) is a joint project of several civic associations, towns and government actors aimed at improving information policy of Slovak towns and cities. The initiative operates an extensive portal with a variety of town-specific information and rich content on all 138 Slovak towns. In 2002 this project won SlovakPrix 2002 MultiMedia (i.e. national version of the EuroPrix MultiMediaArt) - prize for the best multimedia presentation in category "citizens, democracy and e-government". **Project ISOMI** (www.isomi.sk) was launched in early 2002 and aimed to improve public administration at the local level - local governments in Slovakia. The key project partners are ZMOS (Union of Towns and Villages), Slovak Telecommunications and several major IT companies. The project runs a unified database of information on and for local governments.

**"INFOVEK"[13]** In 1999, a group of enthusiasts from universities and the state administration launched a capacity-building project to connect primary and secondary schools into the Internet, and to equip the teachers with appropriate, up-to-date skills. As of February 2003, nearly 850 schools had internet connections, during 2003 further 800 schools were planned to be connected as well (by the end of 2003 35% of all schools will have been connected).

**Portal "Obcan" ("Citizen")** Portal "Obcan" is a joint initiative of several IT companies and the Government Office launched in April 2003, testing a web-information system aimed at improving information for citizens in relation to different state administration procedures (see section 6 for more details).

*Professional, Consumer and Industry Associations*

There are a large number of active professional and voluntary associations in the area of information society, which have been active in pushing the government to expedite developments in IST policy.

*API* (Association of Internet Service Providers) was founded in April 1999. The association has been active in criticising the policies of the incumbent operator in the area of internet access policies and prices.

ATO (Association of Telecom Operators) founded in 2001 has been active in supporting liberalisation of the telecom markets, commenting on laws and policies.

Association of Telecommunication Users in Slovakia (established in 1997), is a consumer protection association of telecom users, including PC users.

Slovak Association for Electronic Commerce has been promoting the development of the framework for electronic commerce.

ITAS (Association of IT companies in Slovakia) aims at promoting the spread of information technologies.

Slovak Electrotechnical Society is a voluntary professional association supporting telecommunication activities and the systematic distribution of information to its own members and to the public.

Slovak Informatics Society is a voluntary professional association supporting informatics activities and the systematic distribution of information to its own members and also to the public.

SANET (Slovak Academic NETwork) has been providing internet infrastructure and services to academia since early 1990s, considerably upgrading the performance and quality in the recent years.

ATM Association (established in 1997)

ISDN Association (established in 1998)

## B.4. SWOT analysis

Most of the 1990s have seen only marginal IS-related institutional and policy changes, which were mostly determined by the economic transition process. Given that the major development priority was to extend and upgrade the national telecom infrastructure - through Government's massive investment into the incumbent operator (Slovenske Telekomunikacie,

[13] For further information on Infovek, see the chapter 8.

ST) - the IS policy was essentially reduced to telecom policy. Slovakia's telecom sector restructuring process culminated in 2000, when 51% ownership of ST was sold to Deutsche Telekom, who agreed to invest an additional one billion euro in the period up to 2004, substantially boosting overall investment in the sector.

Despite some policy analysis efforts in mid-1990s (by the then Office for Strategy for Development of Society, Science and Technology), no explicit IS policy objectives were formulated before the 1998 – 2002 period (the first cabinet of Prime Minister Mikulas Dzurinda), with the major motivating factor of change being the strong political pressure to catch-up with the EU accession process in other candidate countries. However, any efforts to progress in this policy field have been hampered by:

- lack of financial priority in terms of state budget allocations to IS;
- persistently failing inter-ministerial coordination, partly due to unclear division of policy powers and tasks;
- fragmentation of IT systems development and resources along the formal departmental lines,
- lack of transparency and widespread allegations of corruption inside the responsible public administration bodies.

In a similar vein, the necessary regional component of IS policy development had not been introduced until 2001, when it was facilitated by the EU PHARE-funded institution- and capacity-building programmes aimed at preparing the country and its regions for the Structural Funds.

In order to address the lack of government priority for IS development, and to promote the use of ICTs to the benefit of the Slovak businesses and citizens, several IS initiatives have recently emerged, based mostly on national-level public-private partnerships between municipal associations and private firms and an active role of NGOs in the agenda-setting process, pressing the government to expedite developments.

Overall, Slovak *IS institutional framework* is still characterised by a substantial organisational inertia, with a typical sectoral mindset and thinking in the responsible government agencies. Moreover, the key Ministry of Transport, Posts and Telecommunications is now clearly preoccupied with a more pressing and politically rewarding transport policy agenda, given that new roads and highways have become a major national development priority with planned state budget allocations to be massively co-financed from the EU Structural Funds (SF).

*IS policy framework* seems to be very slowly recovering from the "identity crisis" due to the substantial reduction of telecom policy agenda, following privatisation of the Slovak Telecom. IS policy agenda-setting process continues to both lag behind and rely heavily on international (EU) policy developments, with very few signs of independent initiative and creativity inside the administration.

**Table 3.2** SWOT: National and Regional IS Policies

| | |
|---|---|
| **Strengths**<br>• Existence of up-to-date IS policy<br>• Proactive NGOs in IS promotion | **Weaknesses**<br>• Absence of national vision (strategy) of "the Slovak" IS<br>• Absence of action plans for IS (backed by specific budgets and implementation provisions)<br>• Absence of major regional-level IS policies |
| **Opportunities**<br>• EU accession and subsequent access to the EU's Structural Funds | **Threats**<br>• Persisting lack of flexibility of IS institutional and policy framework incapable of streamlining existing efforts and available resources |

# C. INDUSTRIAL DEVELOPMENT AND COMPETITIVENESS

First, Slovakia's industry and services sectors – their performance (output, employment, value-added, investment and trade) and geography - are briefly reported and analysed in this chapter. Second, the history, current development and future trends of the Slovak ICT sector (both ICT-manufacturing and ICT-services) are analysed based on available industrial and trade statistics, as well as relevant academic and business literature review.

## C.1. Industry: Regional Production and Employment

A brief account of the regional distribution of jobs and production as well as inward foreign investment in the most economically important manufacturing industries is now given, with special attention being paid to the development and geography of ICT-related manufacturing.

Mechanical engineering (about 50,000 jobs nationally) used to be the dominant industrial sector in the former planned economy, both in terms of output and employment. Its emergence and historical development was determined by the end of WWII and the subsequent Cold War years, and is thus closely linked to the location of the armaments industry in the "old" industrial regions of Povazska Bystrica and Dubnica nad Vahom (Trencin Region). The highest localisation is reported by the regions of Trencin and Zilina, comprising together almost 43 per cent of the total employment, with the share on regional industry employment being 13.9 per cent in the former and 18.8 per cent in the latter. The industry has also attracted some of the major foreign investors (e.g. INA, Whirlpool, Embraco, Lombardini, Sachs). Unfortunately, complicated shareholder structures (mainly in the former armaments enterprises) still hinder the development of this industry.

The recent growth of the production of electrical engineering has made this branch an important pillar of the Slovak industry. The privatisation of the industry has been completed, and the industry is currently represented by a large number of foreign inward investors (Delphi, Siemens, Molex, Osram). The substantial share of employment is located in the less developed regions of Nitra and Kosice, where the production is based on cheap "blue-collar" work (auto cable harness assembly). Nationally, this manufacturing industry employed about 30,000 people in 2001.

At the same time electronics production with higher value-added - radio, TV and recording, in particular - is growing substantially, attracting leading foreign investors (Sony, Matsushita, Alcatel[14], Punch, Samsung). Home to the ICT sector, electronics in particular, is the north of Slovakia (Zilina region, see Figure 4.1), where almost 50% of total employment (which was 10,500 in 2001) is located, followed by Trnava region, where SONY is operating its factory since the late 1990s. Office equipment and computers are manufactured mainly in Trnava[15] and Bratislava regions, accounting for some 40% and 30% of jobs in that industry, respectively. Another growing ICT-manufacturing industry - medical, precision and optical equipment – is highly concentrated in Trencin region (Stara Tura) and Bratislava with some 40% and 30% of the nation’s 5,500 jobs in that industry, respectively.

[14] see Box 4.1 below

[15] more precisely in the town of Piestany, where ON Semiconductors, a daughter plant of the U.S. telecom giant Motorola, is located and expanding since the end of the 1990s (see also Chapter 5).

**Box 4.1** The Alcatel Story: "A Slovak Silicon Valley?"

Nationally, the electronics industry had never been of great significance during the socialist times. However, electronics and telecomunication equipment manufacturing has become a strategic sector of the local economy of Liptovsky Mikulas (Zilinsky kraj, Central Slovakia), together with the military production introduced into the local economy as a result of the Slovak industrialisation programme: military production accounted for about 60% of the total output in *TESLA* company during the 1980s. In the 1970s and 1980s, *Liptov region* (in the northern part of Central Slovakia) became a typical local production system with supporting educational institutions established alongside key enterprises operating in the region. Yet with the post-1989 economic collapse, an increasing competition from more technologically advanced Western telecom firms, TESLA saw a rapid decline both in terms of output and employment, a crisis comparable only to that of the armaments industry.

FDI in the armaments and engineering was very limited in early 1990s, with the only significant project of DM 12 million investment by the French-German partnership Alcatel SEL in the domestic telecom enterprise TESLA Liptovsky Hradok. *Alcatel SEL TLH* is seen as one of the success stories of the otherwise controversial armaments conversion through FDI. It has introduced modern production methods and technologies, absorbed the former military sector labour force, reduced job loss and contributed to the upgrading of country's telecom system which is seen as a major component of national infrastructure development programmes. However, as already noted by Smith (1998), Alcatel SEL TLH is clearly part of a global corporate strategy to gain market access to CEECs. Local suppliers are non-existent, despite existing domestic telecom production and R&D capacities of TESLA, suggesting that the regional economic impacts are limited, apart from the employment of a relatively small, elite group of well-paid workers and managers. As observed by the same author, this reality contradicted the impressions of some local managers who have called the region '*a kind of Slovak Sillicon Valley'* pointing to the clustering of electronics firms in the locality. However, this foreign investment has not been the catalyst to the development of local production linkages, and remains a rather isolated plant surrounded by struggling companies who have been marginalized from the most most lucrative Slovak markets (Smith, 1998: 342).

This has partly started to change, after Alcatel Slovakia's Software Centre was established in Liptovsky Hradok in 1999, currently employing more than 200 workers (see also Chapter 5 for more details on the spillover effects of this investment to the wider economy).

Among Slovakia's most important industries we can include the following two traditional ones: *Textile* production (total of 18,500 jobs in Slovakia) is concentrated in the regions of Zilina (30%), Presov (18%), and Nitra (14.5%). The *clothing industry* (about 29,000 national jobs) is concentrated in the Trencin region (36%) and Presov region (22.5%). Trencin is the home to the two biggest clothing companies in Slovakia, each having around 3,000 employees. Most of the production is exported (up to 80% to the EU markets), however in these days they are facing problems due to the recession in the European markets. In addition to the large companies there are about 670 firms in the clothing industry, mainly SMEs. Employment in the clothing industry stands at 14.3 per cent of the regional industry employment in Presov (more than 6,000 jobs in more than 100 registered local businesses).

### *Automotive Industry: The Leading Producer, Exporter and Investor*

An original joint-venture of *Volkswagen Slovakia (VW)* and a local company BAZ (Bratislava Car Works) started in 1991, has marked a new era of automotive production in Slovakia (Smith and Ferencikova 1998, Vagac 2000). VW has since become both the biggest foreign investor and exporter in Slovakia, steadily improving its performance. In terms of the key performance indicators like output, exports, profits, employment[16] and investments, VW clearly determines the competitive position not only of the transport equipment branch, but

[16] In 2002, VW Slovakia directly employed about 8,400 people (TREND TOP 2002, June 19, 2003). Transport equipment industry itself employed about 25,000 people in 2001, while the Slovak automotive sector, including supply industries, provided about 44,400 jobs in 2001, compared to 35,900 in 2000. The jobs figure for 2003 is around 60,000 (based on estimations of the Slovak Association of the Car Industry, see www.zapsr.sk)

also the Slovak manufacturing sector as a whole. Anchored in the industrial complex outside Bratislava, VW has been steadily increasing its production over its 12-year history: while in 1992, 10 to 15 cars were produced daily, in 2001 it was more than 600 cars daily (i.e. about 225,000 annually) and the plans are to raise daily production to more than 1,000 cars.

Technical capacity of production in VW Slovakia was installed for 1,800 to 1,900 cars a day. Further growth will depend on production and innovative capacity of components suppliers for automotive industry[17]. There are more than 60 Slovak components suppliers for VW car assembly in Bratislava. In addition, new models of VW[18] attracted its traditional first- and second-tier subcontractors, which located in industrial parks across Bratislava (e.g. Johnson Controls, Lear, Plastic Omnium) and Trnava (e.g. Delphi Automotive Systems, Sachs Slovakia) regions. Consolidation and expansion in this sub-sector has been driven by the desire to move up the value chain by suppliers and demands by Original Equipment Manufacturers for single source supply on a global basis. Suppliers are forced to continue searching for additional added value or cost reductions. The production of car components represents substantial part of the Slovak industry. During the period 1997-2002, the supplies of components for automotive industry in Slovakia gradually increased from SKK 17.2 billion to SKK 53.3 billion. The most recent figures show that more than 40% of gross turnover in automotive industry is generated by the producers of components, while the rest is being generated by VW Slovakia alone.

Moreover, the automotive sector in Slovakia received a huge boost with the January 2003 announcement of plans by French auto giant *PSA Peugeot Citroen (PSA)* to locate its second Central European factory near the Western Slovak town of Trnava, with this investment project being comparable in certain respects to that of VW. According to the strategic plan, since 2006 they will start producing about 300,000 cars a year (Peugeot 106 or Citroen C3), creating about 3,500 new jobs in the assembly and about the same number in the supplier industries, investing up to €700 million between 2003 and 2006. VW and PSA are Europe's two largest car-makers. With planned capacity of 300,000 new cars annually, PSA's plant means that Slovakia's overall annual auto production could triple by the end of the decade,[19] making the country the 10th biggest car producer in the world[20]. Undoubtedly, PSA's investment will spur growth in Slovakia's industrial parks and drive output increases at the country's automotive suppliers.

### *Economic Geography of the Slovak Manufacturing*

Overall 1990s development of the industrial sector was reported in section 2. To provide a geographical picture of its most important sub-sector - manufacturing industry[21] - Figure 4.1 below summarises the results of the location quotient (LQ) analysis,[22] in which 2000 data for NACE 10-41 industry at NUTS 3 territorial level was used. LQ higher than 1 and

[17] There are about 150 enterprises (mainly SMEs) in the "components sector", supplying the production of both passenger cars and commercial vehicles.
[18] Due to its high rate of innovation and flexible production programme, VW has been able to introduce a new model practically every year.
[19] The Government's 1998 Programme of the Development of the Automotive Industry in the Slovak Republic had originally envisaged an annual production of 350,000 cars by the end of 2010.
[20] Slovakia will likely become the car-making "superpower" (in terms of the number of cars produced per capita in the world), as Hyundai's Kia Motors has chosen the Nortern Slovakian region of Zilina over the Polish competing location for its planned €700 million investment project in Europe.
[21] which is the biggest employer in the economy, accounting for about 26% jobs
[22] Much of the analysis is based on the research by Sirak and Rehak (2002).

employment figure of more than 2,000 suggest a regional specialisation in a given manufacturing industry. The ICT-related manufacturing, as reported under 'office machinery and computers', 'radio, TV and recording', and 'medical and precision instruments' is shown in *bold*. Table 4.1 below summarizes the most recent NACE-based regional manufacturing production data, showing in *bold italic* the regional shares of the most important industries selected above.

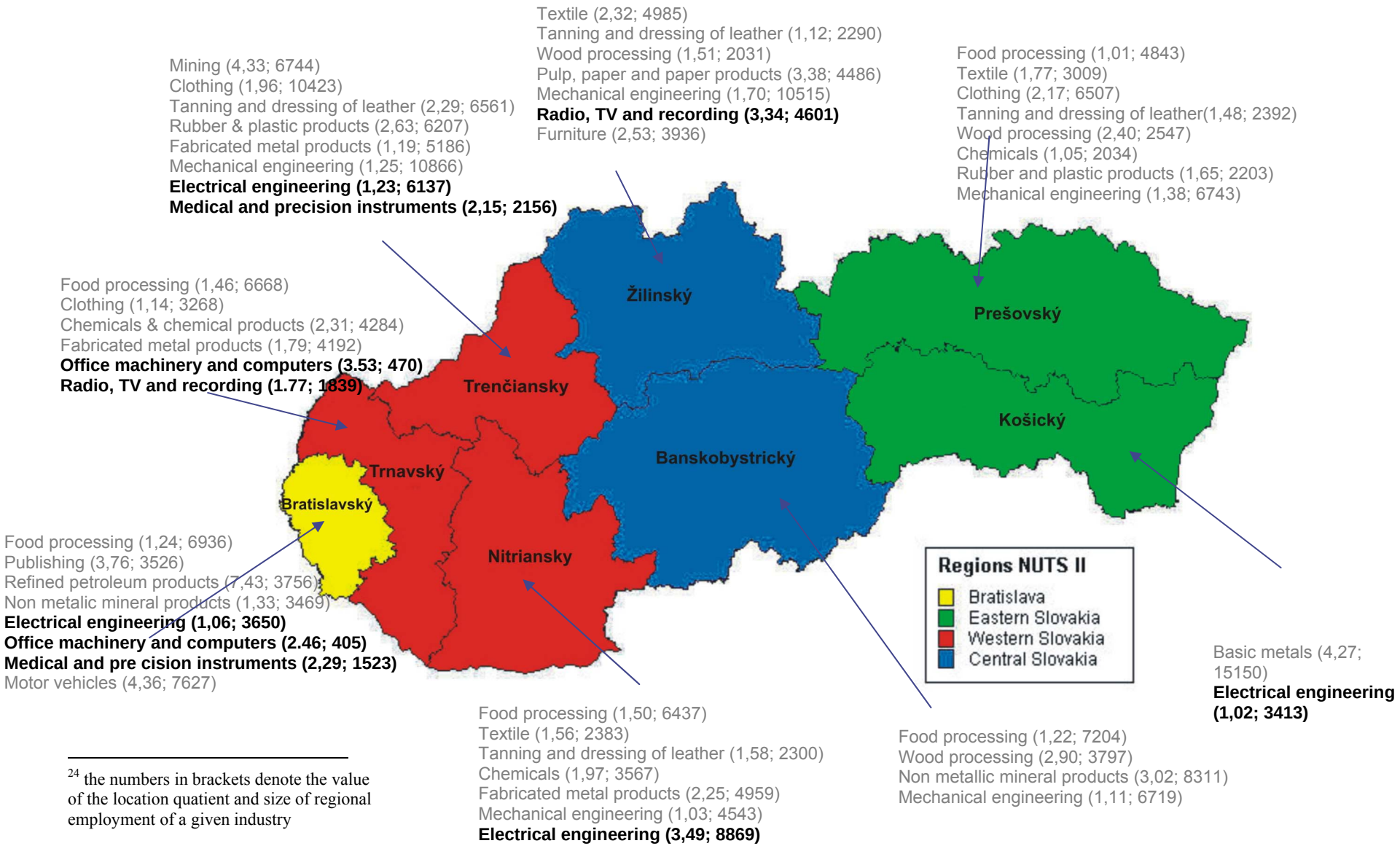
**Table 4.1** Slovak Manufacturing by Regions (shares of production in %)

| Regions[23] / Manufacturing industries (NACE categories) | BA | TT | TN | NR | ZA | BB | PO | KE |
|---|---|---|---|---|---|---|---|---|
| Food and beverages | 19.68 | 14.30 | 11.08 | 14.6 | 9.18 | 13.35 | 9.42 | 8.39 |
| Tobacco | I | . | . | . | . | . | . | . |
| ***Textiles*** | ***4.44*** | ***5.29*** | ***16.65*** | ***16.05*** | ***33.48*** | ***5.31*** | ***15.53*** | ***3.25*** |
| ***Wearing apparel*** | ***1.68*** | ***9.28*** | ***44.97*** | ***7.46*** | ***2.87*** | ***8.17*** | ***18.93*** | ***6.63*** |
| Leather and leather products | 2.83 | 2.45 | 29.57 | 22.95 | 29.54 | 1.63 | 9.86 | I |
| Wood and wood products | 1.69 | 3.1 | 4.55 | 3.24 | 12.22 | 44.12 | 27.94 | 3.14 |
| Pulp, paper and paper products | 2.21 | 6.37 | I | 15.38 | 52.41 | 5.89 | 6.81 | 10.68 |
| Publishing, printing and reproduction | 56.76 | 2.68 | 3.48 | 6.26 | 14.65 | 7.31 | 4.28 | 4.58 |
| Coke, refined petroleum products, nuclear fuel | 96.85 | I | . | . | . | I | . | I |
| Chemicals and chemical products | 12.63 | 21.2 | 11.5 | 21.5 | 5.88 | 6.81 | 8.23 | 12.23 |
| Rubber and plastic products | 7.15 | 4.79 | 52.41 | 10.02 | 1.75 | 0.86 | 21.31 | 1.72 |
| Other non-metallic mineral products | 28.24 | 10.85 | 16.04 | 8.1 | 2.85 | 24.02 | 1.23 | 8.68 |
| Basic metals | I | 5.29 | 1.62 | na | 5.06 | 22.22 | I | 65.76 |
| Fabricated metal products | 8.11 | 29.98 | 17.74 | 13.93 | 9.98 | 7.27 | 5.35 | 7.64 |
| ***Mechanical machinery*** | ***5.95*** | ***1.52*** | ***21.89*** | ***8.39*** | ***17.37*** | ***10.26*** | ***21.59*** | ***12.93*** |
| ***Office machinery and computers*** | ***43.06*** | ***28.82*** | ***I*** | ***.*** | ***.*** | ***.*** | ***.*** | ***I*** |
| ***Electrical machinery*** | ***21.95*** | ***4.22*** | ***25.15*** | ***20.77*** | ***5.05*** | ***1.54*** | ***1.28*** | ***20.04*** |
| ***Radio, TV and recording equipment*** | ***9.01*** | ***39.86*** | ***1.32*** | ***4.34*** | ***36.48*** | ***I*** | ***I*** | ***.*** |
| ***Medical, precision and optical instruments*** | ***49.12*** | ***5.82*** | ***23.61*** | ***I*** | ***I*** | ***I*** | ***10.51*** | ***6.24*** |
| ***Motor vehicles, trailers and semi-trailers*** | ***92.36*** | ***2.26*** | ***1.36*** | ***1.35*** | ***1.33*** | ***0.62*** | ***0.57*** | ***0.14*** |
| ***Other transport equipment*** | ***I*** | ***I*** | ***7.57*** | ***1.81*** | ***16.15*** | ***I*** | ***37.13*** | ***I*** |
| Other manufactured products, incl. furniture | 27.26 | 9.53 | 9.3 | 7.05 | 35.9 | 6.75 | 2.04 | 2.17 |
| Recycling | . | . | . | . | I | . | 15.52 | 82.26 |

Source: 2000 Yearbook of Industry, SU SR (2001)
Note: I - data is not available due to individual data protection

[23] Legend: BA - Bratislava Region, TT - Trnava Region, TN - Trencin Region, NR - Nitra Region, ZA - Zilina Region, PO - Presov Region, KE - Kosice Region.

**Figure 4.1** Regional Specialisation in Manufacturing[24]




[24] the numbers in brackets denote the value of the location quatient and size of regional employment of a given industry

## C.2. Services: Regional Turnover and Employment

In 2001, the tertiary sector (services plus distributive trade) accounted for about 56% of labour force in Slovakia, of which the services sector itself for 44% (for absolute terms see Table 4.2). The importance of services sub-sectors in terms of jobs is as follows: Transport and Telecommunications sector (more than 18% of jobs) is the biggest service employer, followed closely by Public Administration and Defence (17%), Education (18%), and Health Care (15.5%); some 10% is employed in Real Estate, Renting and Business Activities,[25] around 7% in Hotels and Restaurants, and 4% in the Financial Intermediation.

Despite the fact that the services sub-sectors report the highest levels of gross value added (GVA) per employee ("apparent labour productivity" – see Table 2.18), the share of services in total GVA (46%) and in total trade (14%) is the lowest among all candidate countries (see Eurostat's Statistics in Focus - Theme 2 - 46/2002).

Unfortunately, NACE-based data on geographical distribution of services employment continues to be unavailable, so it is not possible to generalise on the regional specialisation in services activities, as in the case of industry. Nevertheless, official 2002 turnover data as well as business press can provide some rough idea of how the market services (including computer activities, Figure 4.2) and telecom services (Table 4.10 further below) are distributed regionally, suggesting the dominance of Bratislava region.

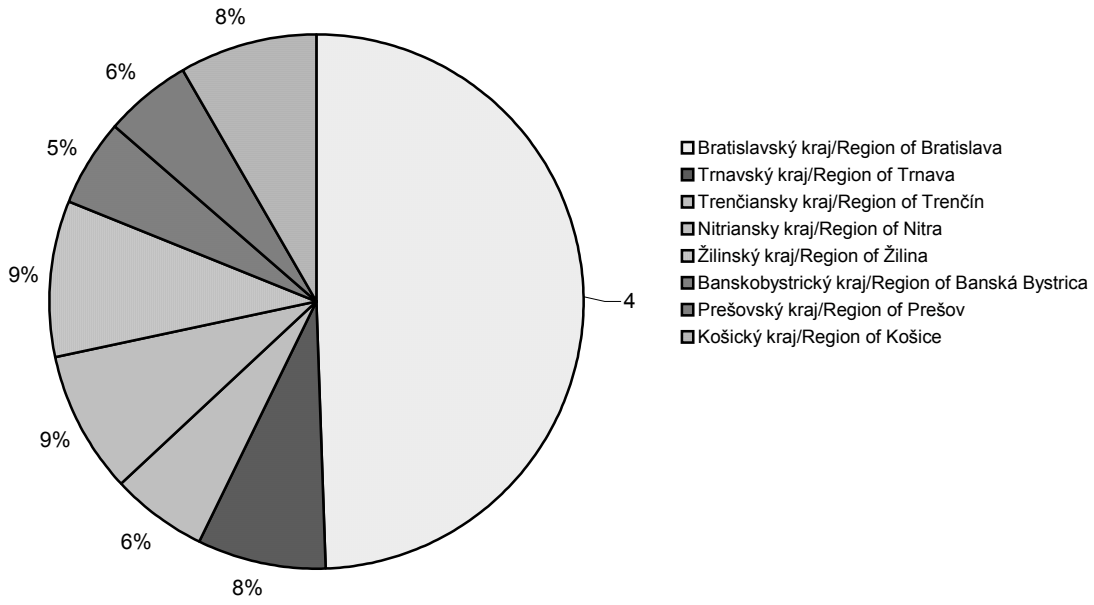
**Table 4.2** Apparent Labour Productivity in Industry and Services (1996-2000)

| NACE | Code | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|
| INDUSTRY: | C+D+E | 6,796 | 7,112 | 7,282 | 7,942 | 9,133 |
| Mining and quarrying | C | 4,387 | 3,679 | 4,420 | 4,932 | 6,289 |
| Manufacturing | D | 6,426 | 6,879 | 7,060 | 7,497 | 8,773 |
| Electricity, gas and water supply | E | 12,182 | 12,050 | 11,585 | 14,249 | 14,412 |
| SERVICES: | | | | | | |
| Hotels and restaurants | H | 3,506 | 4,304 | 4,310 | 4,448 | 4,595 |
| Transports, storage, post and telecommunications | I | 9,532 | 11,604 | 11,506 | 11,215 | 11,282 |
| Financial intermediation | J | 20,603 | 25,960 | 20,411 | 17,037 | 19,075 |
| Real estate, renting and business activities, R&D | K | 19,533 | 30,459 | 30,605 | 31,024 | 31,128 |
| Public administration and defence; social security | L | 7,149 | 5,796 | 6,517 | 6,181 | 12,946 |
| Education | M | 2,855 | 3,364 | 3,731 | 3,510 | 2,665 |
| Health and social work | N | 3,255 | 5,159 | 5,056 | 4,435 | 2,579 |
| Other community, social and personal service activities | O+P | 3,571 | 5,870 | 6,759 | 6,586 | 4,900 |

Notes: 1. Apparent labour productivity = gross value added per employee (GVA), 2. Figures in EUR thousands
Source: Slovak Statistical Office (2002) based on National Accounts

[25] below referred to as "Market Services," NACE K

**Figure 4.2** Regional Shares of Market Services




S

Source: Slovak Statistical Office (2003)

## C.3. ICT Sector: Market, Production and Employment

As can be seen from data by European Information technology Observatory (EITO) in Table 4.3, the lion's share of the Slovak ICT market (i.e. the demand side) is clearly enjoyed by telecom operators (70%), with the smaller IT market (30%) being dominated by computer hardware purchases.

**Table 4.3** Slovakia's ICT market value (Mio EUR)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|
| ICT market | 393 | 533 | 640 | 900 | 1,060 | 1,242 | 1,342 | 1,640 | 1,925 |
| Telecom market | 205 | 290 | 390 | 582 | 744 | 827 | 882 | 1,104 | 1,340 |
| IT market | 188 | 243 | 250 | 319 | 315 | 415 | 460 | 536 | 585 |

Source: EITO Book (2002)

### *ICT Manufacturing*

Table 4.4 shows that the performance of Slovak ICT-manufacturing is continuously improving, but is still very fragile. A growing share of total industrial output, GVA and employment is reported in the segment of radio, TV and recording equipment and apparatus (NACE 32), while the share of office machinery and computers (NACE 30) has remained relatively low and completely unchanged in terms of main structural indicators in recent years (see Table 4.5). The performance of NACE 32 is driven mainly by operations of big inward Japanese investors (Sony and Matsushita), with TV and radio receivers being the only ICT-manufacturing segment, which reported trade balance surpluses in the last few years (see Table 4.6).

**Table 4.4** Performance of Slovak ICT-manufacturing industries

| NACE | YEAR | NUMBER OF ENTER-PRISES | GROSS OUTPUT (MIO €) | GROSS VALUE ADDED (MIO €) | EMPLOY-MENT (PERSONS) | INVEST-MENT (MIO €) |
|---|---|---|---|---|---|---|
| Office machinery and computers (NACE 30) | 1998 | 10 | 25.810 | 6.951 | 1,224 | 89.678 |
| | 1999 | 10 | 23.923 | 7.049 | 1,338 | 76.274 |
| | 2000 | 8 | 29.466 | 9.355 | 1,359 | 100.519 |
| | 2001 | 9 | 40.546 | 11.375 | 1,518 | 113.224 |
| | | | | | | |
| Radio, TV and recording (NACE 32) | 1998 | 29 | 219.901 | 50.661 | 8,534 | 57.037 |
| | 1999 | 36 | 128.414 | 38.337 | 8,542 | 49.656 |
| | 2000 | 36 | 266.985 | 82.680 | 10,545 | 54.631 |
| | 2001 | 31 | 331.094 | 73.625 | 9,184 | 49.345 |

Source: 2001 Yearbook of Industry, SU SR (2002)

ICT-related exports have risen steadily throughout the period for which a NACE-based trade statistics are available, with the exception of "computers and information processing equipment", which reported a decline in 2001 compared to the previous years.

**Table 4.5** Share of ICT-manufacturing on industry in total (%)

| NACE | YEAR | GROSS OUTPUT | GROSS VALUE ADDED | EMPLOY-MENT | INVEST-MENT |
|---|---|---|---|---|---|
| Office machinery and computers (NACE 30) | 1998 | 0.2 | 0.2 | 0.3 | 3.5 |
| | 1999 | 0.2 | 0.2 | 0.3 | 5.4 |
| | 2000 | 0.2 | 0.2 | 0.3 | 0.04 |
| | 2001 | 0.2 | 0.2 | 0.3 | 0.1 |
| | | | | | |
| Radio, TV and recording (NACE 32) | 1998 | 1.4 | 1.4 | 1.6 | 2.3 |
| | 1999 | 0.8 | 1.1 | 1.9 | 2.6 |
| | 2000 | 1.4 | 1.9 | 2.4 | 1.1 |
| | 2001 | 1.6 | 1.6 | 2.1 | 0.8 |

Source: 2001 Yearbook of Industry, SU SR (2002)

**Table 4.6** Trade in selected ICT-manufacturing products (Mio EUR)

| NA-CE | ICT-MANU-FACTURING | EXPORTS | | | IMPORTS | | | TRADE BALANCE | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2001 | 2000 | 2001/ 2000 | 2001 | 2000 | 2001/ 2000 | 2001 | 2000 |
| 3001 | Office machinery and parts thereof | 14.472 | 13.633 | 107.9 | 29.176 | 24.706 | 120.1 | -14.705 | -11.073 |
| 3002 | Computers and information processing equipment | 90.804 | 111.207 | 83.0 | 362.551 | 296.530 | 124.3 | -271.747 | -185.323 |
| 3130 | Insulated wire and cable | 74.216 | 64.508 | 117.0 | 167.808 | 135.735 | 125.7 | -93.592 | -71.227 |
| 3210 | Electronic valves and tubes and other electronic components | 155.947 | 114.409 | 138.6 | 297.316 | 248.324 | 121.8 | -141.369 | -133.915 |
| 3220 | TV and radio transmitters; telegraphy apparatus | 49.158 | 42.124 | 118.7 | 207.135 | 147.741 | 142.6 | -157.977 | -105.617 |
| 3230 | TV and radio receivers; sound or video recording … | 248.773 | 148.897 | 169.9 | 209.940 | 147.509 | 144.7 | 38.833 | 1.388 |
| 3320 | Instruments and appliances for measuring, checking, testing | 60.518 | 47.567 | 129.4 | 228.980 | 192.574 | 120.9 | -168.462 | -145.007 |

Source: Slovakia's Foreign Trade in 2001, SU SR (2002)

Based on review of secondary literature and information from firm interviews, the following profile of *electronics manufacturing industry* in Slovakia can be outlined. Among the key industry *strenghts* supporting the locational competitive advantage, the following are being reported by established foreign investors (i) presence of world-class companies operating substantial facilities in the country from which they support their European customers; quality managers (both Slovak and expatriate) operating these facilities; extremely cost-effective and highly educated workforce at all levels (from plant operators to engineers and managers); responsive and competitive construction industry; central location (in the heart of Europe's highway network system) from which to support customers in Central, Eastern and Western Europe; high-quality telecommunications infrastructure throughout the country; excellent quality of life; supportive education system, particularly at third level; and good regional spread of projects with companies located outside the capital of Bratislava (SARIO, 2002a).

### *ICT Services*

At the end of 2002, the growing sector of computer activities itself employed some 10,500 people[26], of which about 6,500 in software (SW) consultancy and supply. According to SARIO (2002), of this, some 2,000 professionals are employed by the foreign-owned SW

[26] similar to Radio, TV and Recording Equipment industry

companies operating in Slovakia (Siemens, Alcatel, IBM, etc.)[27], while the domestic sector employs over 3,000 people in the development of applications software, medical software, logistics Software, banking/insurance software, customs/government systems software. In addition, in excess of 1,000 people are employed in up to 200 small companies involved in a range of other SW support services.

**Table 4.7** Computer Activities: Output in 1997 - 2002

| NACE | 1997 | 1998 | ≁1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|
| Total (K) | 69,024 | 79,191 | 82,377 | 145,720 | 157,899 | 163,379 |
| Computer activities (K 72) | 7,557 | 8,504 | 9,385 | 17,284 | 18,713 | 20,603 |

Notes: 1. Figures in Mio SKK (EUR 0 42 SKK)
2. ≁ 1997-1999 Receipts (including VAT), 2000-2002 Turnover (without VAT)

Activities in these SMEs range from translating, localising, integrating, customising, selling and servicing Software Products from multinationals. This activity is a very important source of jobs for new SW graduates, and for creating and sustaining an environment for the further development of this industry in Slovakia. International companies, e.g. Alcatel and Siemens and others, are successfully operating Software Development Centres in Bratislava and regional locations as follows: Kosice (Siemens and Datalan), Trencin (Asset Soft), Zilina (Siemens/Asset Soft), Ruzomberok (Asset Soft), Banska Bystrica (Asset Soft and Datalan), and Liptovsky Hradok (Alcatel).

## C.4. ICT Sector: Major Players

Slovak ***electronics manufacturing*** is dominated by foreign-owned operations, currently employing some 25,000 people in the following product sectors: automotive cable harness assembly, semiconductor/diode manufacturing, electronic connector/component manufacturing, electric motor manufacturing and other electronic assembly operations. Table 4.8 lists some of the key players, which established their operations between 1991 and 2002.

The dominance of foreign-owned sector is clear in ***telecommunications services*** as well (see Table 4.11), where the three biggest operators (ST, Orange, Eurotel) are in the hands of American, German and French capital. This was further reinforced by a major consolidation of the Internet Services sub-sector in 2001, when several long-established local operators were merged or taken over by foreign-owned companies (mainly Norwegian and Dutch).

On the other hand, the growing ***software and shared services*** are slightly dominated by the domestic sector (see also 4.3.2). Besides Alcatel and Siemens, there are other major players too. IBM operates a shared services centre in Bratislava and Accenture has recently located one of the few of its Technology Solutions Centres in Europe in Bratislava. Dell opened a call centre for its German customers in 2003, currently employing some 200 Slovak professionals. Hewlett-Packard launched its higher value-added outsourcing operations centre in Bratislava end of 2003.

[27] Moreover, according to an anecdotal evidence, around 1,000 Slovak software engineers are said to be working in Germany and Austria for highly competitive compensation.

**Table 4.8** Foreign Multinationals in the Slovak Electronics Industry

| FIELD OF OPERATIONS | COMPANY NAME | REGION ("KRAJ") | EMPLOYMENT | ESTAB-LISHED | PARENT HQ |
|---|---|---|---|---|---|
| Automotive cable harness assembly | VW Elektrosystemy | Nitra | 4,000 | 1996 | GER |
| | Siemens Automotive | Kosice | 2,500 (plus 2,000 sub-contractors) | 1993 | GER |
| | Yazaki | Nitra | 3,134 | 1994 | JPN |
| | Leoni | Trencin | 2,600 | 1993 | GER |
| | Kromberg&Schubert | Nitra | 1,600 | 1996 | GER |
| | Punch | Zilina, Trnava | 1,500 | 1998 | B |
| | SEWS (Sumitomo) | Nitra | 1,000 | 1997 | JPN |
| | Delphi Automotive Systems | Trnava | 450 (will grow quickly to 1,300) | 2001 | USA |
| | Todenco | Trencin | 150 | 2001 | JPN |
| Electronic components/ Connectors and circuit boards (semicond's/ diodes) | Sony | Trnava | 1,117 | 1996 | JPN |
| | Matsushita | Zilina | 1,060 | 1997 | JPN |
| | ON Semiconductors | Trnava | 300 | 1998 | USA |
| | Molex | Kosice | 480 (will grow quickly to 900) | 1997 | USA |
| | Semikron | Trnava | 150 | 2000 | UK |
| | Electronika Slovensko | Trnava | 320 | 1992 | GER |
| | Samsung Electronics | Trnava | na | 2002 | Korea |
| Electric motors | Emerson Electric | Trencin | 1,765 | 1993 | USA |
| | BSH Drives and Pumps | Kosice | 980 | 1993 | GER |

Source: SARIO (2002a)[28]

**Table 4.9** 10 Biggest Electronics Companies in Slovakia

| RANK | COMPANY NAME | TURNOVER | |
|---|---|---|---|
| | | 2001 ('000 SKK) | 2001/2000 (%) |
| 1. | Sony Slovakia, Ltd., Trnava | 5,866,892 | 71.1 |
| 2. | BSH Drives and Pumps, Ltd., Michalovce | 4,042,463 | 15.2 |
| 3. | Kablo Pirelli, Ltd., Bratislava | 2,502,000 | 14.4 |
| 4. | Alcatel Slovakia, j.s.c, Liptovsky Hradok | 2,366,914 | 31.3 |
| 5. | Emerson Electric, j.s.c., Nove Mesto nad Vahom | 1,957,392 | 11.7 |
| 6. | Siemens Automotive, Ltd., Michalovce | 1,902,706 | 12.8 |
| 7. | Leoni Autokabel Slowakia, Ltd., Trencin | 1,899,904 | 19.6 |
| 8. | Osram Slovakia, j.s.c., Nove Zamky | 1,519,790 | 20.7 |
| 9. | SEWS Slovakia, Ltd., Topolcany | 1,423,546 | 3.4 |
| 10. | Leoni Slowakia, Ltd., Nova Dubnica | 1,367,410 | -10.1 |

Source: TREND TOP 2001 (2002), Note: EUR = 42 SKK

[28] Information is sourced mainly from an unpublished sector study on electronics industry in Slovakia carried out by Shannon Development & Tom Kelleher Consultants for SARIO in August 2002 (financed from Phare).

**Table 4.10** The Biggest Telecom Companies in Slovakia

| Rank | Company Name | Turnover | |
|---|---|---|---|
| | | 2001 (‘000 SKK) | 2001/2000 (%) |
| 1. | Slovak Telecom, Bratislava | 20 219 988 | 9,8 |
| 2. | Orange Slovensko, Bratislava | 10 172 363 | 34,9 |
| 3. | EuroTel Bratislava, Bratislava | 7 988 790 | 33,1 |
| 4. | Nextra, Bratislava | 220 145 | 56,8 |
| 5. | ViaPVT, Bratislava | 138 217 | 37,8 |
| 6. | Slovanet, Trencin | 130 604 | 78,1 |
| 7. | eTel Slovensko, Bratislava | 95 310 | n.a. |

Source: TREND TOP 2001 (2002), Note: EUR = 42 SKK

**Table 4.11** Foreign Ownership of the Slovak Telecom Sector

| COMPANY | OWNERSHIP STRUCTURE |
|---|---|
| Slovenske telekomunikacie, Bratislava | 51% Deutsche Telekom (Germany)) |
| Orange Slovensko, Bratislava | 64% France Telecom (France) |
| EuroTel Bratislava, Bratislava | 49% Atlantic West B.V. (USA), 25.5% Deutsche Telekom (Germany) |
| Nextra, Bratislava | 100% Telenor (Norway) |
| UPC Slovakia | 100% UPC (Holland) |
| Telenor Slovakia | 100% Telenor (Norway) |

There are several well-known examples of foreign-owned ICT-based companies, which are developing links with other sectors of economy, including university sector. A good example is the U.S. company *ON Semiconductors* (a daughter of Motorola Corp.), which has developed strong links with the Slovak Technological University (STU) and funds four engineers undertaking research at the STU Design Laboratory since June 2000. Students from STU undertaking training projects are at the plant as part of their studies. In addition, the company has also commenced a Linkage Programme with Vocational School in Piestany (in Western Slovakia, where the company is located since 1998) to further develop special technical competencies in the community.

*Alcatel Slovakia* is another big (foreign) investor, that is generating spill-overs to the wider economy, not only through the implementation of substantial ICT projects for the government sector (the above-mentioned Telecommunications Projects in the 1990s, Slovak Railways in 2002-2004), but also via linkages with the education system. After Alcatel Slovakia in Liptovsky Hradok re-focused on software development buisness in 1999 (see Box 4.1 on the activities of the company in 1990s), it has considerably strenghtened its co-operation with the education system - Slovak Technological University in Bratislava, University of Zilina and Technological University in Kosice. The Military Academy in Liptovsky Mikulas has become a major source of IT graduates for the company. The company has two software centres in

Slovakia: the one in Bratislava employs 200, with the other one in Liptovsky Hradok employing 130. The balance of Alcatel's staff provide telecom-related services (a total employment of 495 was reported in 2002). In addition, over 100 Slovak engineers form the heart of an elite corps of Alcatel support staff permanently based abroad servicing world wide customers (SARIO, 2002b).

In ***cross-border*** perspective, various players in electronics and IT business established their CEE head offices in Vienna (including Siemens, IBM, Hewlett Packard). It appears that Vienna is becoming a bridging platform for this sector to the CEE region. Both in areas of software development and digital technologies, there is an unsatisfied demand for highly-qualified workers, produced by the CEE education systems. Networking and "cooperation initiation" as well as creation of transnational regional infrastructures (e.g. the so-called BioTech- or NanoTechValleys) are currently a primary component of European innovation policies. Cross- and transnational cooperation is relevant also to the *automotive industry.* Organizing of the transnational links of the successful automotive cluster in Lower Austria with Central Europe has become an important regional location factor across the western borders of Slovakia. The growth of the two global high-tech industries has stimulated a strong industrial interest (also from the leading IT multinationals mentioned above) in establishing ***EUROVALLEY***[29], a state-of-the-art industry and technology park, the modern facilities of which are already being constructed in the border region of Malacky, about 30 km from Bratislava City. Having a gateway location, it is of strategic importance for Bratislava region to develop cross-border links with the neighbouring areas. Much has already been said and published about the vision of an integrated functional urban region Vienna-Bratislava. However, it is only quite recently that a genuine planning of specific actions has started, mainly with financing from the Austrian government and a contribution from the EU's Interreg initiative and Phare CBC[30].

## C.5. SWOT analysis

The 1990s have seen a start of a new era of automotive production in Slovakia. Volkswagen Slovakia became both the biggest foreign investor and exporter in Slovakia, steadily improving its performance in terms of major indicators like output, exports, profits, employment and investments, clearly determining the competitive position of the Slovak manufacturing sector since the end of the last decade. The newly-located (PSA Peugeot-Citroen) and the announced (Hyundai) large-scale investment projects of the global automotive industry giants will make the country the world's biggest producer of cars by 2010.

Other major sub-sectors which have been reporting growth and competitive gains over and beyond the 1990s include oil refinery, metallurgy, electrical engineering, and electronics, as well as some more traditional industries (textile and clothing), given their economic importance in terms of exports and regional employment. Sub-sectors with traditionally high trade specialisation, but currently losing out include chemicals and chemical products, and mechanical machinery (including ship-building). Major industrial adjustment process following the up-coming EU's Eastward Enlargement will bring about further restructuring

[29] see also www.euro-valley.sk

[30] e.g. VITECC – Vienna Tele Cooperation Centre was launched in 2000 to promote cross-border communication flows among Vienna, Bratislava, Brno and Gyor.

and consolidation, with output and employment structures[31]. The Slovak manufacturing production convergence is already well ahead of that in most other CCs.

Despite high shares of services employment and the sector's high labour productivity, its 2000 share in the total gross value added was the lowest among all CCs. This is also correlated with the lowest share of services on country's total foreign trade in the same period.

Overall, the economic geography of industry and services sectors is biased towards the historically more industrialised western parts of the country, while the "light industries" are still highly localised in the Eastern Slovak regions.

Besides being the biggest sector employer, Slovak manufacturing has also been a major recipient of FDI over the years, which undoubtedly helped accelerate its modernisation and structural convergence towards the EU average.

Domination of FDI manifests itself also in the ICT sector (electronics and telecommunications in particular), while the role of the indigenous players in the computer activities (including the growing software consultancy and supply) is relatively stronger.

**Table 4.12** SWOT: Industry and Services Development and its Geography

| **Strengths** | **Weaknesses** |
|---|---|
| • Manufacturing production structure close to the EU average<br>• Presence of world-class automotive and ICT companies<br>• Good regional spread of ICT projects<br>• Favourable labour cost | • Too much reliance on cost-based industrial competitiveness factors<br>• Low share of services in total GVA and trade<br>• Weak domestic ICT manufacturing at the lower end of the value chain<br>• ICT-related trade balance deficits |
| **Opportunities** | **Threats** |
| • New supplier opportunities due to relocation of global automotive and electronics industries towards CEECs<br>• Emerging automotive (Western Slovakia) and machinery/electronics (North-East Slovakia) clusters with strong domestic supplier base<br>• Growing indigenous software industry | • Unbalanced external dependency of the industrial sector<br>• Foreign-owned industrial plants developing as "cathedrals in the desert"<br>• Cost-sensitivity of the foreign-owned ICT sector<br>• ICT-related brain drain |

***swot analysIS***

The automotive industry has become the biggest employer and exporter in Slovakia in the late 1990s and beyond 2000. With the envisaged annual production of cars of up to some 800 thousand units (i.e. a combined output of VW, PSA and most likely Hyundai), the country is unexpectedly becoming the world's biggest producer in the sector. Other major industry sectors that are growing in importance include electrical engineering, and electronics, mainly due to strong presence of major global players coming from the U.S., Germany, Japan, and most recently from Korea. Traditional chemicals, metallurgy and heavy-engineering

[31] see also the recent data-rich comparative assessment by Havlik (2002)

producers have embarked on a major restructuring path since the late 1990s, mainly due to the competitive pressures of the EU single market. Their medium-term destiny is difficult to assess at present. Overall, Slovakia's manufacturing production structures can be assessed as fairly close to those operating in the EU.

Regarding the services sector, its international competitiveness is very fragile, reflecting also its comparatively lowest (among CEECs) share in the country's total gross value added and international trade. Slovakia's comparative advantage remains in the transportation of gas and crude oil between the "East" and "West", now heavily controlled by the foreign (Russian, German and French) capital. The rising share of industry, with its low-technology content and an excessive reliance on cost-based competition factors, together with a relatively weak services sector may well combine to increase an overall vulnerability of the Slovak economy to external fluctuations in the coming years.

While the quality of the foreign companies operating in Slovakia is one of the country's major strengths, the output structure of activities undertaken is its greatest *weakness*. Almost three quarters of the 25,000 people employed in the manufacturing electronics industry are employed in automotive cable harness assembly, which is at the lower end of the value chain, particularly in terms of skills utilization, value added, support engineering required, sub-supply opportunities, opportunities to move up the value chain, long term survival in any particular location. Moreover, the ICT-manufacturing sub-sector is highly cost-sensitive (it will most likely continue to migrate to lower labour-cost regions), and susceptible to design changes that could significantly reduce labour inputs in its manufacturing future. While employment in the sector will grow significantly in the short term, it is unlikely that the sector will survive beyond ten years unless radical policy action is taken (SARIO, 2002a) with regard to (i) encouraging the existing base of companies to gradually move into new higher value added products (the majority of the present base of companies can move in this direction and are already manufacturing higher value added products elsewhere in Europe); and (ii) encouraging new sectors of the industry to locate in Slovakia.

The rest of the electronics manufacturing industry in Slovakia (i.e. components/connectors for radio, TV etc., semiconductors/diodes, circuit boards, electric motors) is continuing to add value and activities other than sole manufacturing, including purchasing sub-supply procurement, logistics, design and customer relationship management. However, as identified by SARIO (2002a) report, the absence of a major Supply Chain Facilitator (SCF) or Computer Equipment Manufacturer (CEM) is a major liability. It will be very difficult for the industry to move up the added value chain without a number of these facilities. It is believed, that such facilities provided the backbone of the Irish electronics manufacturing industry in the 1980-1990s (and still do) and enabled the industry to grow into higher value added products and manufacturing processes.

The history of Alcatel's FDI projects in Slovakia, which started on a brown field in early 1990s in the telecom equipment business, with completely focusing on software services in late 1990s, illuminate that no major spill-over effects of high-tech industrial location can be expected, if there is no committed government (FDI, S&T etc.) policy to prevent "cathedrals in the desert," i.e. repeating policy mistakes of Slovakia's industrialisation programme in the 1950s and 1960s.

Overall, positive industrial growth and convergence trends are not robust enough to provide reliable foundations for IS strategies based on major competitive strengths either in ICT-

manufacturing or ICT-services. A promising exception from the rule seems to be the growing Slovak software services industry (see DiagnosIS).

# D. PRESENCE OF MOST RELEVANT ECONOMIC ACTIVITIES FOR IST APPLICATIONS

### Economic Activities - IST Investments – Applications:

First, an overview of the national science and technology (S&T) system and policies is presented here. Second, available (both statistical and anecdotal) evidence of ICT-related investment and financing flows, government and business projects and their IS spill-overs is reported and analysed in this section.

## D.1. Research and Development

The state of research and development (R&D) in Slovakia is subject to frequent lamentations of the domestic scientific community, mainly due to issues of insufficient financing. Historically, the business sector had financed but also spent a fairly high share of total research and development expenditure, but this figure also had a declining tendency in the late 1990s.

Uniquely in the region, the proportion of Gross Expenditure on Research and Development (GERD) spent by universities was very low only 9.5% in 2000 compared to two to three times that share in other European countries. This was largely attributable to the existence of the Slovak Academy of Sciences – a collection of state research institutes and a large system of research institutes under various ministries.

Looking at GERD expressed as a share of GDP, over the years 1996-2000 Slovakia's GERD reached 0.86%, as compared with the OECD average of 2.2% and EU's average of 1.8%, but also below the neighbouring Czech Republic's 1.21%. Although still higher than figures for a number of other candidate countries, the annual figure had actually been declining in Slovakia over the period. This, however, was not matched by an effective drop in the numbers of research institutions or personnel, despite the fact that the relative share of research workers in the national labour force in Slovakia currently reaches 0.36%, about a half of the OECD average of 0.64% and EU average of 0.55%.

The structure of the research and development base inherited from the socialist era carried many distortions.[32] The sector was large in size and fairly extensively financed, but disconnected from the mainstream of world science in most areas due to political barriers. The Slovak Academy of Sciences carried out basic research almost exclusively and there was a large system of departmental research institutions under individual ministries. The science and technology sector received funding to the tune of 4% of GDP per year, but the efficiency of the use of funds was low. In the early years of transition, particularly before 1998, science and technology policy stagnated and the sector suffered from the unreformed institutional structure.

To help consolidate the disintegrated R&D base from the 1990s, a number of key laws were adopted during 2001 and 2002: Act No. 203/2001 Coll. on the Science and Technology

[32] Information in this paragraph draws on Beblavy, M., Kraus, I., Trnovec, T. and Urban, M., Chapter 4: Science and Technology Policy in Slovakia and Other Countries, in: Beblavý, M. (ed), National Report on Science and Technology Policy, Bratislava, SGI 2002.

Support Agency;[33] Act No. 132/2002 Coll. on Science and Technology; Act No. 133/2002 Coll. on the Slovak Academy of Sciences.

The adoption of this new framework legislation has increased the autonomy of S&T sector and created conditions for the stable and progressive financing of S&T in Slovakia and a more efficient transfer of research and technology for socio-economic development.

Tables 5.1 and 5.2 provide an overview of the regional R&D assets (i.e. the input side), measured by R&D expenditures (public and private) and R&D workers, illustrating the comparatively highest technology endowment and innovation potential of Bratislava region.

**Table 5.1** Total R&D Expenditures as Share of Regional GDP (NUTS 3)

| YEAR | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|
| Regions | % | | | |
| Bratislava | 1.54 | 1.54 | 1.47 | 1.32 |
| Trnava | 0.87 | 2.77 | 0.70 | 0.57 |
| Trencin | 1.94 | 1.38 | 1.29 | 0.84 |
| Nitra | 0.87 | 0.79 | 0.61 | 0.48 |
| Zilina | 0.88 | 0.81 | 0.57 | 0.42 |
| Banska Bystrica | 0.60 | 0.44 | 0.42 | 0.36 |
| Presov | 0.39 | 0.32 | 0.35 | 0.31 |
| Kosice | 0.59 | 0.55 | 0.48 | 0.43 |
| Slovak Republic | 1.03 | 1.13 | 0.82 | 0.68 |

Source: own calculations based on Regional Statistics Yearbook, Slovak Statistical Office (2002)

**Table 5.2** Total R&D Employment by Regions (NUTS 3)

| YEAR | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| Regions | full-time equivalent | | | | |
| Bratislava | 10,668 | 10,687 | 10,761 | 10,516 | 10,154 |
| Trnava | 1,557 | 1,624 | 1,552 | 1,675 | 1,669 |
| Trencin | 2,028 | 2,043 | 1,556 | 1,353 | 1,157 |
| Nitra | 2,089 | 2,862 | 3,228 | 2,017 | 2,016 |
| Zilina | 1,898 | 1,895 | 1,809 | 1,651 | 1,871 |
| Banska Bystrica | 1,790 | 1,778 | 1,737 | 1,317 | 1,509 |
| Presov | 1,218 | 1,038 | 1,124 | 1,085 | 858 |
| Kosice | 2,865 | 2,891 | 2,891 | 2,853 | 3,022 |
| Slovak Republic | 24,113 | 24,818 | 24,658 | 22,467 | 22,256 |

Note: EUR = 42 SKK; Source: Regional Statistics Yearbook, Slovak Statistical Office (2002)

[33] This agency is financed from the state budget and is responsible for the support of research and development tasks and the promotion of international co-operation in science and technology based on intergovernmental agreements and international programmes of research and development. It started operations on September 1, 2001.

## D.2. Industrial Innovation and Co-operation

On the outputs side of S&T system, we can look at innovative activity through the prism of patents submitted by Slovak institutions and individuals to the European Patent Office (EPO), as well as the number of triadic patent families, jointly submitted to the EPO, Japanese and US Patent Offices. Significantly, in the area of ICT, no international patents have been submitted from Slovakia whatsoever (see also OECD Main Science and Technology Indicators, 2001). Table 5.3 below shows the statistics on the domestic patents filed with filed with the Slovak Office for Protection of Industrial Property. We can see that in the ICT-related categories (*with shading*), the number of patents submitted have oscillated around 38 a year. This, however, is a very rough figure, given the official classification as used and reported by the Office.

**Table 5.3** History of Domestic Patents: An Overview

| FILING CATEGORY: | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|
| Agriculture | 4 | 5 | 7 | 3 | 6 | 3 | 4 | 9 |
| Foodstuffs and Tobacco | 5 | 9 | 5 | 8 | 4 | 11 | 10 | 7 |
| Personal and domestic articles | 3 | 3 | 2 | 7 | 7 | 6 | 3 | 3 |
| Health and Amusements | 9 | 13 | 8 | 14 | 9 | 7 | 17 | 18 |
| Medical, dental and hygienic preparations | 10 | 4 | 5 | 7 | 1 | 6 | 6 | 3 |
| Separating and mixing | 5 | 7 | 9 | 7 | 5 | 7 | 5 | 2 |
| Shaping metal | 4 | 8 | 3 | 7 | 3 | 4 | 1 | - |
| Material processing | 14 | 8 | 10 | 6 | 14 | 2 | 3 | 7 |
| Printing | - | 1 | 3 | 2 | 0 | - | 1 | 1 |
| Transportation | 11 | 17 | 17 | 16 | 17 | 28 | 29 | 34 |
| Transportation and storage of materials | 13 | 7 | 5 | 6 | 5 | - | - | - |
| Inorganic chemistry | 21 | 24 | 6 | 11 | 16 | 9 | 15 | 23 |
| Organic chemistry | 10 | 14 | 10 | 11 | 9 | 11 | 4 | 10 |
| Macromolecular compounds | 2 | 3 | 4 | 7 | 5 | 5 | 4 | 3 |
| Dyes, animal and vegetable oils | 9 | 5 | 6 | 1 | 6 | 2 | 6 | 7 |
| Biochemistry, sugar industry, leather | 5 | 5 | 10 | 10 | 4 | 4 | 4 | 5 |
| Metallurgy | 2 | 6 | 2 | 3 | 1 | 1 | 2 | 2 |
| Textiles | - | 3 | 2 | 0 | 2 | - | - | 2 |
| Paper | - | 1 | - | 2 | 0 | - | - | - |
| Construction | 26 | 35 | 13 | 19 | 16 | 22 | 24 | 22 |
| Drilling and Mining | 0 | 1 | 1 | 0 | 1 | - | - | - |
| Engines and pumps | 26 | 12 | 19 | 17 | 15 | 11 | 37 | 20 |
| Engineering in general | 15 | 9 | 11 | 10 | 5 | 16 | 13 | 4 |
| Lighting and heating | 9 | 10 | 4 | 7 | 8 | 8 | 9 | 19 |
| Weapons and ammunition | 1 | 5 | 6 | 12 | 17 | 4 | 3 | 7 |
| Measuring, optics and photography | 11 | 21 | 4 | 9 | 13 | 15 | 11 | 7 |
| Horology, regulation, computers | 5 | 5 | 3 | 4 | 5 | 10 | 10 | 9 |
| Musical instruments, information storage | 1 | 1 | 7 | 1 | 1 | 3 | 1 | 2 |
| Nuclear engineering | 1 | 1 | 1 | 2 | 0 | - | - | - |
| Electrical technology | 8 | 16 | 12 | 12 | 12 | 12 | 9 | 15 |
| Electronic circuitry, communication technology | 6 | 10 | - | 3 | 6 | 7 | 10 | 5 |
| Other | 12 | - | - | - | - | - | - | - |
| Total | 620 | 269 | 195 | 224 | 213 | 214 | 241 | 246 |

Source: Statistical Yearbooks of the Slovak Republic, Slovak Statistical Office (2002, 1999, 1997)

Based on the first mapping of business innovation activity in Slovakia, Table 5.4 identifies those manufacturing sectors which introduced most product or process innovation at the end of the last decade, with the ICT-manufacturing sub-sectors (NACE 31-33) clearly above the average.

**Table 5.4** Major sectors of innovative activity by NACE in 1997-1999
(% of innovating enterprises in manufacturing)

| | | |
|---|---|---|
| 15 | Food and beverages | 29.5 |
| 17-18 | Textiles and wearing apparel | 14.2 |
| 21 | Pulp, paper and paper products | 12.5 |
| 22 | Publishing, printing and reproduction | 20.7 |
| 23 | Coke, refined petroleum products, nuclear fuel | 50.0 |
| 26 | Other non-metallic mineral products | 29.9 |
| 27-28 | Metal and metal products | 16.1 |
| 29 | Machinery, excluding electrical | 23.1 |
| 31 | Electrical machines and equipment | 26.6 |
| 32 | Radio, TV, communication equipment[34] | 13.9 |
| 33 | Medical, precision and optical instruments | 37.5 |
| 34-35 | Motor vehicles, trailers and semi-trailers | 20.0 |
| 36 | Other manufactured products, incl. furniture | 12.5 |

Note: Results of European Innovation Survey of Manufacturing in Slovakia
Source: Slovak Statistical Office (2001)

Regarding the promotion of industrial *innovation at the regional level,* interesting and policy relevant information is reported by Sirak and Rehak (2004). In their 2001-2002 survey, Slovak firms were asked to assess actions that governments at various levels can take that will help increase innovation in their host region. On the basis of the importance attached, priorities or continuing priorities for policy action over the next five years can be identified. Overall, firms' preferences were distributed in favour of the measures which improve general business environment, thus echoing some of the the current policy priorities of the Slovak government.

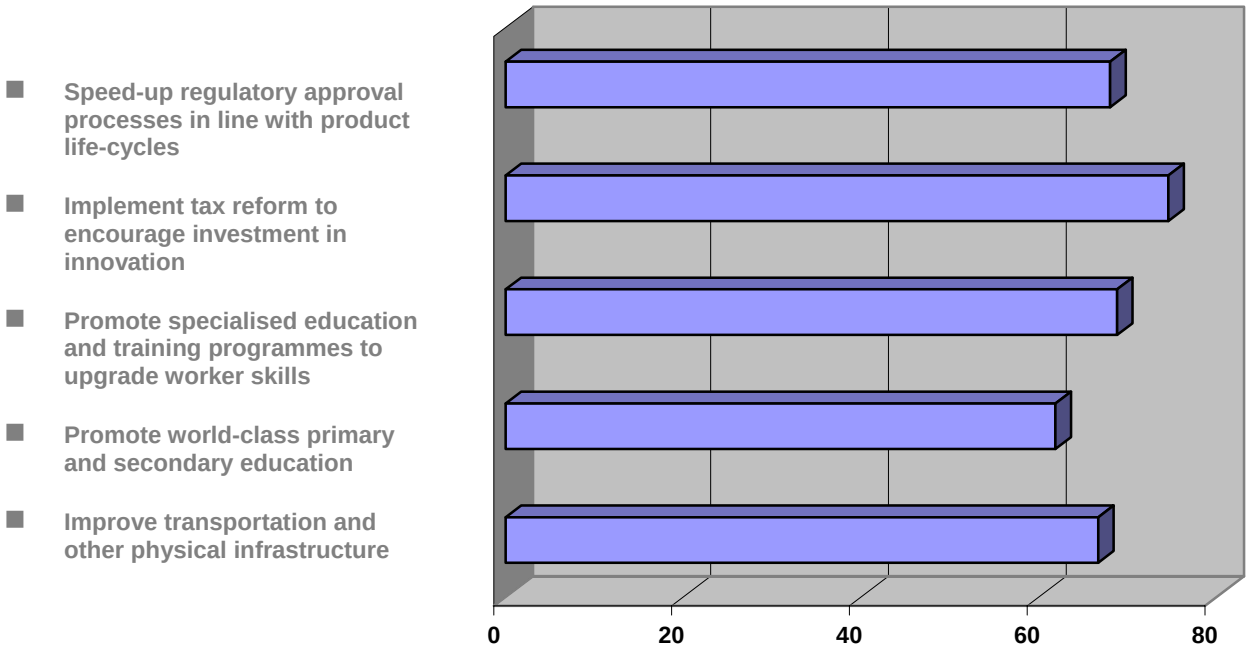
An extensive IT survey (NADSME, 2002)[35] mapped (both in 2000 and 2002) the *"cooperative spirit"* among the Slovak SMEs, regarding the possibilities of joint technological development and innovation. Interestingly, more than one third (32%) SMEs continues to show no particular interest in such industrial networking practice, with the most reluctant being the "micro-firms"[36] (41%), the banking sector (64%), and SMEs located in the regions of Nitra (42%) and Kosice (41%). More than one fifth (22%) is already engaged in some kind of industrial cooperation, most typical of manufacturing sector and SMEs located in the Trencin region.

[34] Survey results for "Office machinery and equipment" (NACE 30) is not published by the Statistical Office, for unspecified reasons. Moreover, according to authors' information, similar innovation survey of the services sector was planned to be released in Spring 2003, but – it has not been made available at the time of submission of this report.

[35] carried out by the Public Research Institute of the Slovak Statistical Office and comissioned by National Agency for the Development of Small and Medium-Sized Enterprises (NADSME)

[36] i.e. up to 10 employee. In Slovakia, SMEs cover the group of businesses with 0-49 (small) and 50-249 (medium) employees.

**Figure 5.1** Firms' Top 5 Priorities for Improving Regional Innovation Systems




Source: reproduced from Sirak and Rehak, 2004

## D.3. ICT: Major Investors and Users

In Slovakia, the Government has always been a major economic sector, being both an important ICT user (as evidenced by the large IT procurement contracts in recent years) as well as a "social investment planner" providing financing to state- or private-run industrial and services sectors, with a clear priority towards the former. With an improving business environment, the Slovak companies are currently also undertaking major ICT-related investments to further improve their efficiency and competitiveness.

### *Public Sector*

**GOVNET** is a project of building a physical network among Slovak government agencies, launched in early 1990s, after the Slovak government recognised the need to share documents within its administration. An annual budget was about 250 million SKK. The so-called Small Govnet phase began in 1993 with the selection of a provider of an open, TCP/IP-based system running over modems on analogous lines, providing computers with office software connected through modems via leased lines. The total cost including one server and 20 PCs was SKK 8 million. The system became operational and users underwent training in 1994. Until 1996, the network had no internet connection. In 1996 and 1997 the network underwent a major upgrade installing routers allowing higher speeds at each government office and introducing Internet connectivity in 2002. Due to problems of alleged corruption and other irregularities the project was stopped in 2002 by government decision.

**Telecom Projects I-II** Slovak Telecom (Slovenske telekomunikacie, ST) possesses a high quality and the most extensive infrastructure in Slovakia. The incumbent operator has been continuously modernising its physical infrastructure since the beginning of the 1990s under

two extensive government-backed infrastructure development projects (called TP I and TP II), substantially co-financed by loans from major international financial institutions (including EBRD, EIB). Since 2000, investment decisions have been taken over by the main ST shareholder - Deutsche Telekom. Table 5.5 gives an overview of the investments made so far.

**Table 5.5** Investments in fixed telephony by the Slovak Telecom (in billion SKK)

| YEARS | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|---|
| Major Investors | TP I | | | | TP II | | | | Deutsche Telekom | |
| Total Investments | 16.0 | | | | 32.0 | | | 6.0 | 5.0 | 5.5 |

Note: EUR = 42SKK, Source: Ministry of Transport, Posts and Telecommunications

In late 2002, the Ministry of Education published a draft S&T policy proposal, which includes a dozen of *government-backed R&D programmes*, accompanied by rough financial allocations. ***"Information Society Building"*** is the name of the biggest one of them, with a planned allocation of some EUR 155 Million to be financed from the state budget in the period 2002-2010 (plus 8 million euros to be raised from other sources)

The role of the Government as a major investor in ICT is also confirmed by the overview of ***public IT procurement*** contracts (Table 5.6) recently concluded through its agencies and state-run enterprises. A EUR 59 million contract with Alcatel to modernise the Slovak Railways' telecom infrastructure was the biggest ICT investment project in the public sector in 2002.

**Table 5.6** 15 Biggest IT Procurement Contracts in 2002

| No. | Procurement Organisation | Total Contract Value (incl. VAT) in '000 SKK | Subject of Procurement |
|---|---|---|---|
| 1. | Slovak Railways (services company) | 1,799,779 | Telecom infrastructure |
| 2. | Ministry of Finance | 1,325,703 | Information system |
| 3. | Regional energy company (Western Slovakia) | 480,955 | Information system |
| 4. | Ministry of Defence | 415,464 | Information system |
| 5. | Slovak Energy Supply Company | 408,511 | HW, and Information system |
| 6. | Ministry of Interior | 393,494 | HW |
| 7. | Slovak Mail Company | 244,481 | Information system |
| 8. | Ministry of Justice | 232,487 | HW, SW licenses |
| 9. | Slovak Gas Company | 197,634 | Information system |
| 10. | Customs Office | 174,406 | Information system |
| 11. | Central Tax Authority | 152,503 | HW, SW, Services |
| 12. | Regional Energy Supply Company (Central Slovakia) | 91,071 | Information system |
| 13. | Railways Company (transport company) | 86,679 | HW |
| 14. | Office for geodesy, cartography and cadastre | 69,343 | HW |
| 15. | Flight operation services company | 65,762 | SW |
| | TOTAL | 6,138,272 | |

Source: TREND TOP in IT (2003), Note: EUR = SKK 42

***Information Society as a structural financing priority*** for the period 2004-6 can be found in the recently elaborated ***National Development Plan*** (see also section 3), which relies heavily on co-financing from the EU**.** An overview of financial allocations by priorities is given in Tables 5.7 and 5.8.

**Table 5.7** ERDF Co-Financing of Sector Operational Programme "Basic Infrastructure"

| PRIORITY | ERDF | |
|---|---|---|
| | (Mio EUR) | % |
| Priority 1: transport infrastructure | 120.49 | 42.90 |
| Priority 2: environmental infrastructure | 90.06 | 32.06 |
| Priority 3: local infrastructure | 64.71 | 23.04 |
| Technical assistance | 5.62 | 2.00 |
| of which for Priority 1 | 1.22 | |
| Priority 2 | 1.83 | |
| Priority 3 | 0.884 | |
| CSF | 1.686 | |
| Total | 280.88 | 100.00 |

Source: Ministry of Construction and Regional Development, www.build.gov.sk (August 2003)

**Table 5.8** Financing of Operational Programme "Basic Infrastructure": Priority "Local infrastructure" (mil. EUR)

| PRIORITY/ YEAR | TOTAL COSTS | PUBLIC RESOURCES | | | | | | | PRIVATE RESOURCES |
|---|---|---|---|---|---|---|---|---|---|
| | | Total (EU+SK) | EU | National resources | | | | | |
| | | | ERDF | Total (SK) | State budget | Regional governments | Local govt's | other | |
| Priority 3 | 86.28 | 81.97 | 64.71 | 17.26 | 17.26 | 0 | 0 | 0 | 4.31 |
| 2004 | 21.48 | 20.41 | 16.11 | 4.30 | 4.30 | 0 | 0 | 0 | 1.07 |
| 2005 | 28.88 | 27.44 | 21.66 | 5.78 | 5.78 | 0 | 0 | 0 | 1.44 |
| 2006 | 35.92 | 34.12 | 26.94 | 7.18 | 7.18 | 0 | 0 | 0 | 1.80 |

Source: Ministry of Construction and Regional Development, www.build.gov.sk (August 2003)

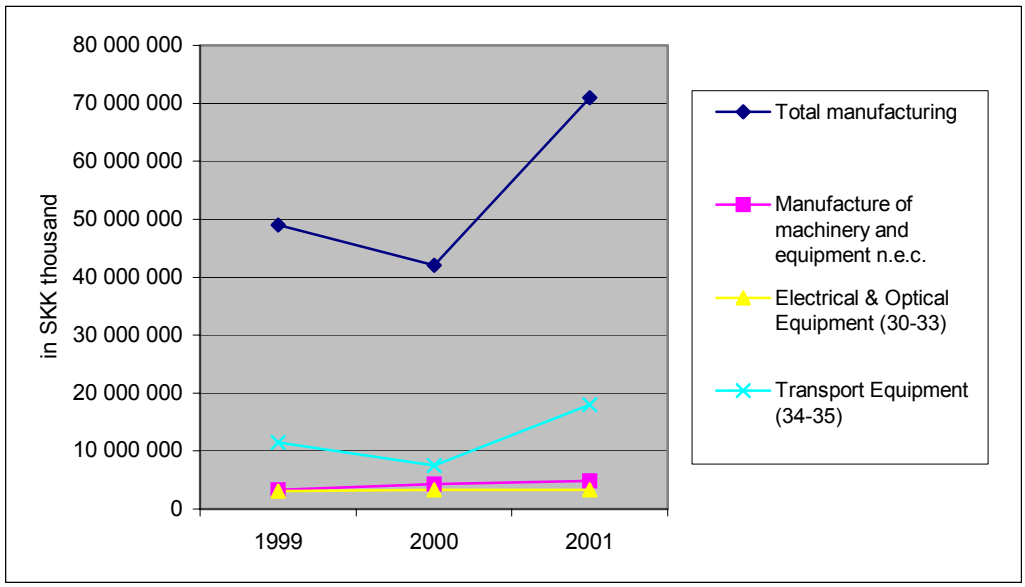
In the 2002 IT survey of SMEs (NADSME, 2002), among the barriers to industrial modernisation, the severe lack of financial resources to purchase the state-of-the-art technology was identified as the major impeding factor (in almost 60% of SMEs surveyed). A related question revealed that of that disadvantaged group, around three quarters (77%) do have their own financial backing not sufficient enough, while the limited access to credit due either to high interest rates or costly bank guarantees was reported by some two fifths (39%) and one third (30%) of the SMEs The weight of the first reason for limited investment capacity grew compared to a 2000 survey, while the other two pitfalls have become much less impeding in the past few years.

### *Private Sector*

Among the major ICT investors and industrial users in Slovakia, is undoubtedly the ***automotive industry*** (dominated by Volkswagen Slovakia), which has been driving the fixed investment boom (reported in section 2) in the recent years, as is also illustrated by Figure 5.2. The share of manufacturing investment to transport equipment gradually increased from

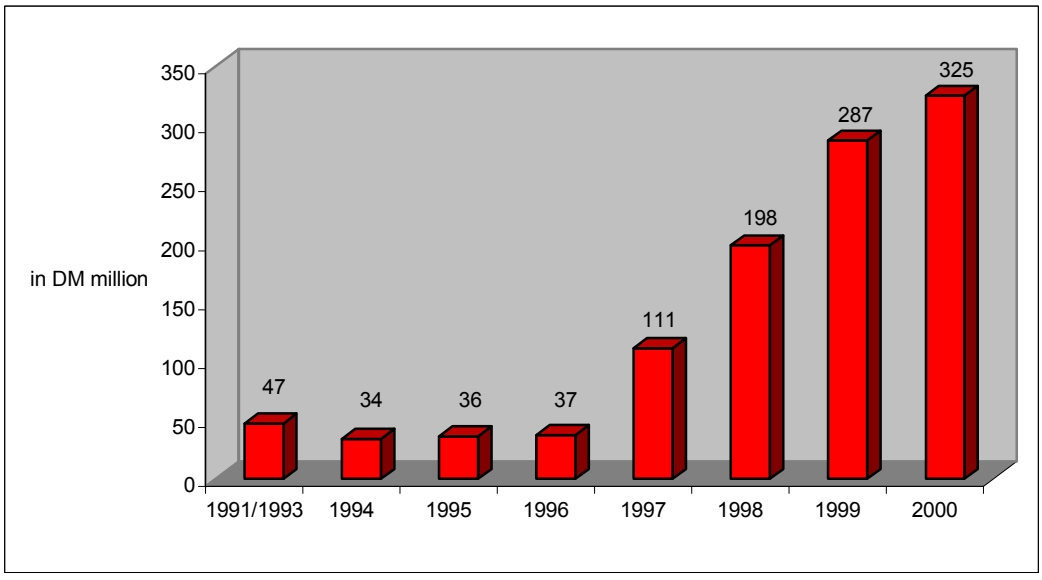
13.38 % in 1999 to 18.59 % in 2001. Transport equipment industry is responsible for most of the new investment projects, including the new VW-led industrial parks near Bratislava (see Figure 5.3). In 2001, VW Slovakia's investment amounted to SKK 15.4 Billion, of which some SKK 9.9 was invested in the new technologies. Most of the 2001 investment was made in the industrial parks (in Malacky and Martin), where some SKK 2.7 Billion was invested in the new technological development or upgrading, including the introduction of manufacturing process control technology. Also, in mid-1990s, VW Group also invested together with Siemens in the construction of a factory (VW Elektricke Systemy) producing automotive electronics equipment in Nitra region (Western Slovakia).

**Figure 5.2** Gross Fixed Investment in Manufacturing




Source: Yearbook of Industry, 2002, Slovak Statistical Office; Note: EUR = 42SKK

**Figure 5.3** VW Investment in Slovakia




Source: SME Daily, January 15, 2003

Based on official 2001 data on *software investment by various sectors and sub-sectors of economy* in Table 5.9, we can see that the other major ICT investors come from oil refinery (Slovnaft Corporation) and power generation and distribution (Slovak Energy Supply Company) and gas supply (Slovak Gas Company) industries, while in the services sector, banks and telecom companies were taking the lead in terms of the money spent on SW.

**Table 5.9** Intangible Fixed Assets By Sectors: Software Investments (stock at the end-2001)

| SECTOR OF ECONOMIC ACTIVITY (NACE) | TOTAL VOLUME (END-2001) | ESTABLISH-MENT EXPENSES | CAPITALIZATION DEVELOPMENT COSTS | SOFTWARE |
|---|---|---|---|---|
| in Million SKK in current prices (EUR = 42SKK) | | | | |
| Slovakia in total | 43,198 | 513 | 1,561 | 29,256 |
| of which: | | | | |
| **INDUSTRY:** | | | | |
| Mining and quarrying | 163 | 0 | 4 | 114 |
| Manufacturing of which: | 10,835 | 112 | 1,081 | 4,720 |
| Food and beverages; tobacco | 1,087 | 3 | 1 | 416 |
| Textiles and textile products | 447 | 2 | 4 | 101 |
| Leather and leather products | 26 | 6 | 0 | 17 |
| Wood and wood products | 109 | 2 | 3 | 75 |
| Pulp, paper and paper products; Publishing and printing | 561 | 3 | 27 | 396 |
| Coke, refined petroleum products and nuclear fuel | 1,179 | 0 | 0 | **755** |
| Chemicals and chemical products | 1,991 | 0 | 330 | 544 |
| Rubber and plastics | 289 | 4 | 72 | 144 |
| Other non-metallic mineral products | 393 | 3 | 55 | 241 |
| Basic metals and fabric-ated metal products | 988 | 5 | 35 | 451 |
| Mechanical machinery | 1,388 | 2 | 207 | 358 |
| Electrical and optical equipment | 1,422 | 66 | 65 | **869** |
| Transport equipment | 793 | 2 | 264 | 281 |
| Other manufacturing | 162 | 14 | 18 | 72 |
| Electricity, gas, and water supply | 3,576 | 4 | 28 | **3,263** |
| **SERVICES:** | | | | |
| Hotels and restaurants | 98 | 8 | 0 | 55 |
| Transport and communications | 8,195 | 100 | 53 | **6,041** |
| Financial intermediation | 11,502 | 72 | 0 | **10,356** |
| Real estate, renting & business activities | 1,837 | 5 | 173 | 1,021 |
| Public administration and defence | 2,432 | 151 | 142 | 1,099 |
| Education | 161 | 1 | 1 | 119 |
| Health and social work | 298 | 6 | 1 | 256 |
| Private households | 1,384 | 21 | 2 | 1,022 |

Source: Slovak Statistical Office (2002); Note: Corporations with 20 employees and more included only.

In *industry*, which accounted for 56% of total intangible fixed assets (IFA), software investments represented 28%, i.e. a half of the total volume. Manufacturing accounted for some 58% of that volume, of which the above-mentioned companies in oil refinery (16%) and electrical and optical equipment (18%) business invested most. The second industrial sub-sector was that of electricity, gas and water supply, investing the other 40% in 2001. In *services* (77% of total IFA, of which 68% in software), transport/telecom and financial intermediation were clearly the two main services investors, with 30% and 52% shares respectively. *Public administration* and defence together with the state-run education sector accounted for 7.5% of SW investment in 2001. *Infrastructure sectors* – energy network companies and banks in particular - have been the key SW investors due to the major restructuring and modernisation undertaken following their privatisation at the end of the last decade.

## D.4. SWOT analysis

Overall, Slovakia disposes of a high level R&D sector which, due to substantial reductions in government support, has been rapidly rationalised. The legal and policy frameworks for R&D have been consolidated in the past few years, thus providing a more solid perspective for the future development.

R&D funding is being slowly but surely increased and more diversified. It is believed that such an increase and diversification will be instrumental in helping implement the R&D priorities of the government more effectively.

Government, automotive, infrastructure (i.e. electricity, gas, and water supply, and transport and telecommunications) and financial services sectors are the leading ICT investors and users in Slovakia.

Regarding the government, there has recently been a moderate shift of ICT investment focus from (very often its own) technical networks and terminal equipment towards more intangible projects, which aim to promote IST applications in various areas of business and society.

Financial engineering schemes to support more risky undertakings like industrial expansion or technological innovation have so far been rather limited, and biased towards the manufacturing sector, with services (including ICT-related) receiving minor or no policy attention at all.

EU Pre-accession and Structural Funds are playing both an important agenda-setting (e.g. S&T policy concept) and stimulating role in ICT take-up and use in Slovakia.

**Table 5.10** SWOT: Economic Activities, IST Investment and Applications

| **Strengths** | **Weaknesses** |
|---|---|
| • High share of business R&D<br>• High ICT investments in essential sectors of the SK economy<br>• Positive effect of foreign ownership on investment (incl. ICT) | • Declining R&D expenditure (both national and regional)<br>• Limited access of SMEs to major financial engineering schemes |
| **Opportunities** | **Threats** |
| • Taking advantage of research networks under the EU framework programmes<br>• EU funding to pool risk capital financing for further IST development | • Brain drain in the academia<br>• Complete obsolescence of laboratory technologies<br>• Too slow modernisation of traditional parts of the economy |

***swot analysIS***

Declining GERD have compelled R&D sector towards applied research and demand-side orientation, however further orientation towards applied areas is needed in the institutes attached to the Slovak Academy of Sciences. Furthermore, there is currently *very little co-operation between research institutes and the universities or industry* and organisational structure is often poor. Similarly, evidence (though rather limited) of the *lacking cooperative culture inside the business sector* may be cause of concern in a networked society, where industrial and regional competitiveness is increasingly based on more intangible factors like social capital and social networks mediated through the new digital technologies.

To address the declining though still relatively high levels of business R&D expenditure, the catalysing potential of risk capital schemes (including venture capital) can be utilised. The possibility to put *risk capital financing* in support of industrial and regional development, *with participation of the EU's Structural Funds*, has recently been strengthened by the respective Community law. The currently over-capitalised banking sector in Slovakia and the access to Structural Funds can even stimulate the growth of risk capital industry, providing more resources to promote a more dynamic IST take-up and roll-out across all sectors of economy.

# E. INFORMATION SOCIETY TECHNOLOGIES (IST) PENETRATION

The chapter is structured into two main parts: the first part deals with information and communication technologies (ICT) penetration in the household sector, enterprise sector and other key sectors in the Slovak Republic to assess the readiness for the use of information society technology (IST) application. The second part focuses on IST, its current spread and potential for future exploitation in the various sectors.

We draw heavily on two recent data sources: the eEurope+ Report (2004) based on June 2003 surveys of households and enterprises and the SIBIS+ survey (2004) based on January 2003 surveys and earlier surveys. Due to differing methodologies and the period between the surveys, some results show significant variations. Where possible, we try to interpret these differences. We augment the picture by references to a number of domestic surveys including data from the official Statistical Office.

## E.1. ICT and IST use in the Household Sector

One of the decisive prerequisites to take advantage of the potential offered by IST is the spread and use of ICT – the availability of telecommunications technologies to households (and to the population in general through other channels such as schools, public access points, etc.). In addition to penetration of fixed-line and mobile telephones, we present available data on other technologies usable to connect to the Internet.

### *Fixed Telephony*

Since January 2003, fixed telephony in Slovakia has been legally liberalised, but effectively, Slovak Telecom has remained the monopoly provider of fixed-line services. Real impact of liberalisation cannot be expected before later in 2004 when alternative operators reach connection agreements with the incumbent and launch commercial service.

In Slovakia, fixed-line penetration in the fixed network is much lower than the EU average. Penetration rose gradually throughout the 1990s, peaked in 2000 at almost 31% and began declining in the face of heavy mobile competition and persistently high prices of fixed line telecommunications. In January 2003, penetration measured as the number of lines per 100 people decreased marginally to 28%.

Development in terms of fixed network digitalisation has seen continual increases, although the present levels of over 80% are still below EU rates of digitalisation. The incumbent operator Slovak Telecom (since 2001 majority owned by Deutsche Telekom - 51% with a 49% stake held by the Slovak Government) has been completely upgrading its fixed telecommunication system since 1993 (see also section 5).

**Table 6.1** Fixed telephony in Slovakia

| INDICATOR: | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fixed lines per 100 population (%)[37] | 16.87 | 18.75 | 20.85 | 23.22 | 25.88 | 28.54 | 30.66 | 31.43 | 28.93 | 26.08 | 24.87 |
| Households with fixed line telephone connection (%) | 37.80 | 42.20 | 49.20 | 57.00 | 61.00 | 61.14 | 63.39 | 75.43 | 69.48 | 61.8 | n/a |
| Network digitalisation (%) | 5.17 | 12.15 | 25.68 | 37.57 | 50.65 | 62.05 | 66.81 | 70.41 | 74.28 | 78.23 | 82.94 |

* 2003 data are for the first half of the year
Source: Ministry of Transport, Posts and Telecommunications

### *Mobile Telephony*

In January 2003 mobile penetration reached 54% (compared with the Czech Republic's 84%) and rose to around 60% by mid-2003. In terms of trends, Slovak penetration of mobile telephones lags some 2-3 years behind rates in EU's member states Greece and Austria.

In Slovakia, NMT-450 service is provided since 1991 by one operator and cellular GSM 900/1800 services are provided by two operators since 1997. The two licensed mobile operators operating on both GSM 900 and GSM 1800 frequencies are Orange and EuroTel. *Orange* (previously named Globtel), which has been operating since 1997 had a 55% share of the relevant market in 2002.[38] The second operator is *Eurotel Bratislava*[39] (45% share of the relevant market in 2002), which started its operations in early 1991. Eurotel also operates the NMT 450 service (now with limited services and numbers of users in the low thousands).

The introduction of GSM services in mid-1990s led to rapid expansion of penetration. After several years of mutual competition, the two operators started encroaching on the market share of the incumbent fixed-line operator and are now aggressively pursuing this market, offering packages competing with fixed-line services.

UMTS services are to be launched from 2005 by the two incumbent mobile operators who bought UMTS licenses in 2002. A third domestic operator awarded a joint UMTS/GSM licence at the same time was later unable to meet financial obligations and the licence was withdrawn.

**Table 6.2** Mobile phone penetration in Slovakia

| INDICATOR: | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| mobile density (%) | 0.06 | 0.11 | 0.23 | 0.53 | 3.65 | 8.77 | 12.3 | 20.6 | 39.7 | 54.4 | 60 |

* Data as of end-June 2003 according to IBM (2004)
Source: Ministry of Transport, Post and Telecommunications

[37] Number of lines per 100 inhabitants
[38] Its main shareholders are the Orange Group (64%) and a group of 12 financial investors led by the European Bank for Reconstruction and Development and AIG (36%).
[39] Main shareholders are the fixed-line operator Slovak Telecom (51%) and the US-based telecom company Atlantic West B.V. (49%).

### *PCs in Households*

Data on the share of household equipped with PCs comes from a number of independent sources. Although these vary by time of data collection, coverage and methodology, the recent results are broadly consistent.

**Table 6.3** PCs in Slovak Households

| Year | 2001 | 2003 | 2003 |
|---|---|---|---|
| PC Penetration | 12.45% | 25% (42% usage of PCs in the last 4 weeks) | 20% (38% of population living in households with PCs) |
| Source | Statistical Office Census, 2001 | SIBIS+ General Population Survey January 2003 | eEurope+ Final Progress Report, 2004 |
| Note | Share of population living in households equipped with PCs | | For PCs per 100 population benchmarking estimate based on previous years' evolution of for data in brackets ITU data |

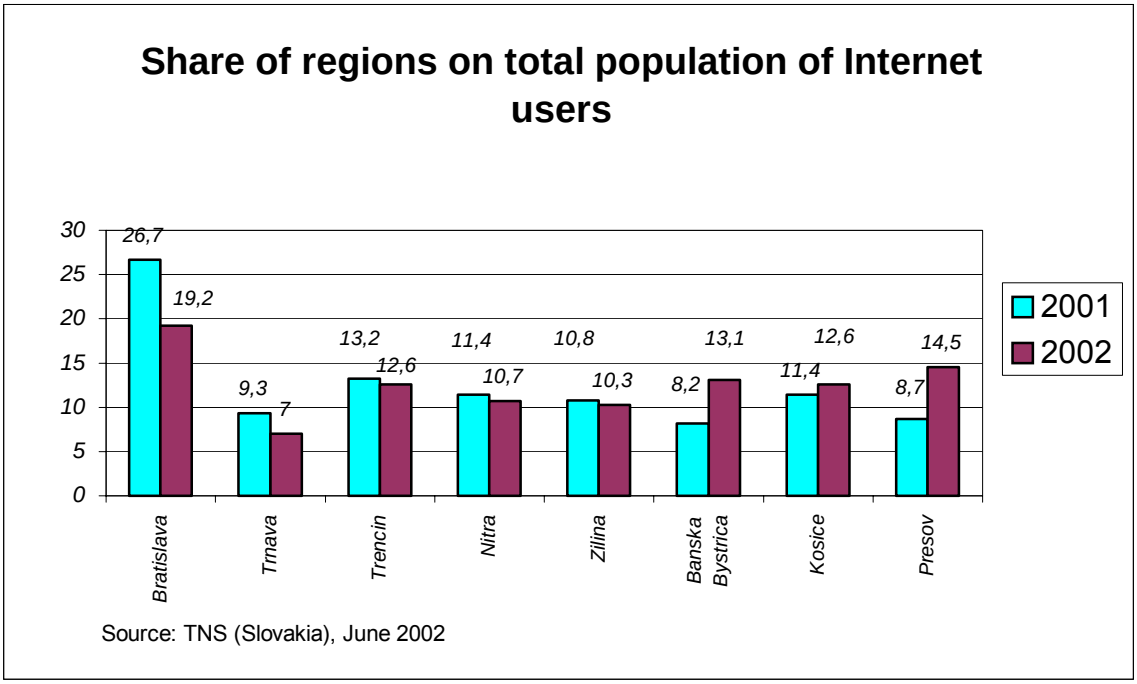
PC penetration is Slovak households (share of population with a PC at home) has risen steadily over past years to 38% in 2003 and now exceeds the average of accession countries as reported by eEurope+ (34%).

The data are seemingly a little difficult to reconcile with results of the 2001 Census in Slovakia, which showed much lower rates. However, a portion of the difference is attributable to methodological differences, in particular as the Census data are calculated for individuals, while eEurope+ and SIBIS+ data report on households.[40]

In terms of regional distribution, some insight is provided by the June 2003 MVK survey and the TNS Survey. The share of households with PCs varies by region, according to the MVK survey, from 30.7% in Banska Bystrica to 42% in Bratislava. Households are more likely to own a PC if they are inhabited by people under 39 years of age, more educated, single or by larger families.

[40] In particular, it seems reasonable to assume that PCs and Internet are mainly present in richer households, which will tend to be smaller (contain fewer members) than less affluent households. Hence a higher share of households with PCs may in fact cover a smaller share of the population.

**Figure 6.4** Slovak Internet Population by Regions




Regional structure of Internet users in Slovakia shows a favourable trend of declining disparities. Earlier regional differences at NUTS 3 level in the use of internet are slowly dissipating, with the East (Presov region in particular) catching-up with the Western part of the country (see Figure 6.4).

It is, however, important to note that there are likely disparities on a sub-regional level masked by the data aggregated at NUTS3 level.

### *Cable Television*

CATV penetration in Slovakia is higher than EU average, with Slovakia reporting figures comparable to Austria. Because of the regulatory regime adopted, it was not before April 2003 that this infrastructure has been used for services other than distribution of radio and TV programmes. The largest operator of cable television is UPC Slovakia.

Since April 2003, UPC has introduced cable internet service in selected locations of Bratislava. Further spread of cable internet depends on the pace of upgrading of existing cable TV networks in other cities. Cable availability, however, varies by region, with 39.1% of all connections located in the Bratislava region in 1998. Bratislava had 60% penetration compared with 31.7% penetration in the Kosice region.[41]

[41] National Centre for Media Communication (1998)

**Table 6.4** Cable TV penetration in Slovakia

| INDICATOR: | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| CATV density (%) | 13.9 | 16.5 | 19.44 | 25.74 | 30.83 | 34 | 36.6 | 40.6 | 35.2 | 41.6 |
| Households with own Satellite antennas (%) | 14 | 14.5 | 14.8 | 15 | 15.1 | 15.1 | 15.48 | 15.5 | 16 | 16 |
| Households with joint TV antennas (%) | 80 | 77 | 75 | 73 | 68 | 65 | 62 | 55 | 60 | . |

Source: Ministry of Transport, Posts and Telecommunications

### *Internet access*

In Slovakia, Internet penetration is much lower than the EU average. The country is also lagging behind in comparison with dynamic growth in EU. In 2002, there were 322,000 Internet customers in Slovakia according to a TNS survey. [42] Household Internet penetration of 13% in 2003 reported in the eEurope+ February 2004 progress report falls below the accession countries' average of 19% despite higher availability of PCs reported above.

eEurope+ also presents figures on the breakdown of access technologies used: while 67.3% of households have no computer and a further 11.8% have no internet connection, dial-up represents the dominant technology connecting 16.0% of all respondents, followed by cable modems (2.0%) and xDSL (1.3%).

In addition to standard dial-up services Slovak Telecom has been offering ISDN lines. Since their introduction in 1998, their number has risen to over 50,000 in the first half of 2003.

Slovakia was one the last the candidate countries where high-speed broadband Internet access was implemented. ADSL services were introduced by Slovak Telecom in selected service areas in June 2003. Internet access via the cable television network was introduced into commercial use since April 2003 but Chello – the package from the cable TV operator UPC – is presently available only in selected locations of Bratislava[43] but two further operators have received licenses to provide the service in Kosice in Eastern Slovakia and in several cities in central Slovakia.

Prior to the introduction of ADSL and cable internet, a popular means of internet service in cities were also microwave antennas, but no precise data on their penetration were available. In some areas, these remain competitive either to limited availability of broadband services or due to competitive prices.

Further possibilities to connect exist through the mobile networks, which both offer GPRS services. Their use, however, is not widespread due to cost issues.

### Other Places of Access

If we look at the places where people connect to the Internet, the surveys indicate the significant importance of use at work and at school, as well as the public access points – the

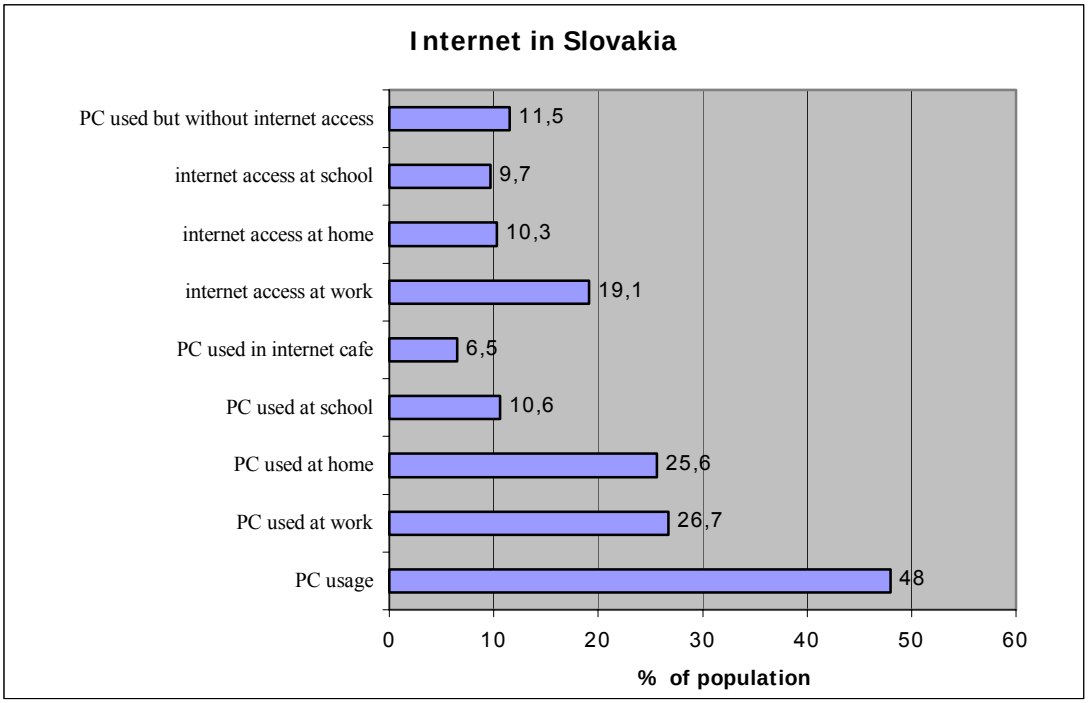
[42] Taylor Nelson Sofres Factum research (June 2002)
[43] As of February 2004, Chello had some 3,000 customers in Bratislava.

sum of the share of users who connect at internet cafes and libraries nears those who connect at home and at work.

A public opinion survey carried out by MVK Slovakia in June 2003 showed, that 27.7% of adult population and 44.9% of the working population use a PC at work and 22.2% of the population have the possibility to connect to the internet at work.

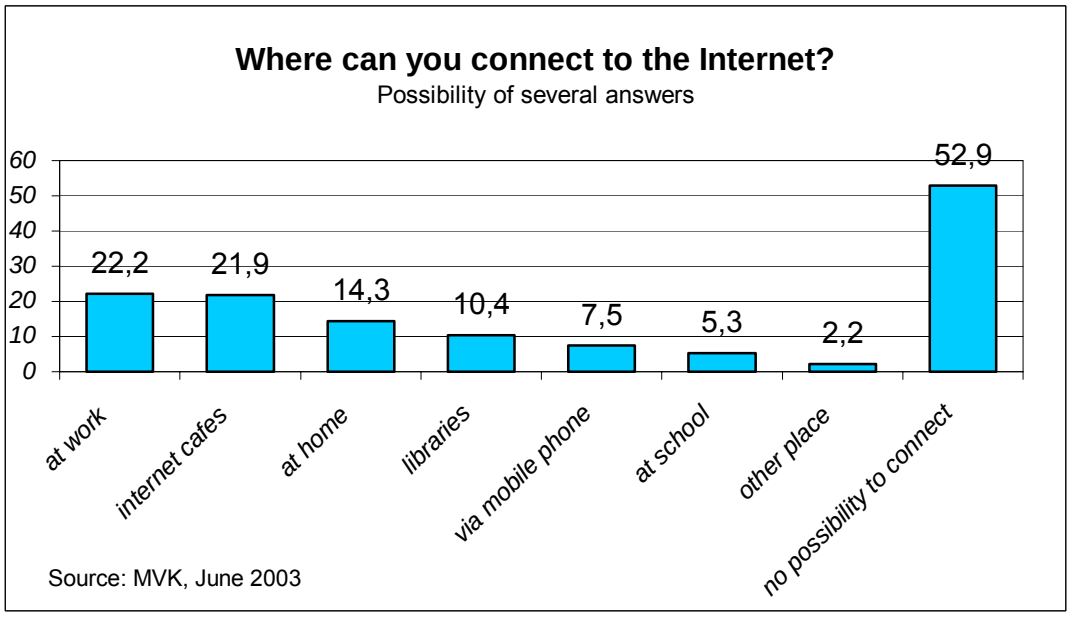
eEurope+ reports frequent use of the Internet in schools (23%) and internet cafés (26%) compared to the averages reported for accessions countries (19% and 15% respectively).

**Figure 6.1** Slovak Internet Access and Use in 2003




Source: MVK (June, 2003)

**Figure 6.2** Internet: Place of Access and Use



Slovakia is a laggard in terms of public internet access points (PIAPs). The eEurope+ reports based on the National Household Survey in June 2003 the lowest number of PIAPs per 1,000 inhabitants on par with Bulgaria, lower than the figure for any country for which data are available and well below the accession countries' average of 0.22.

Although there was no significant initiative with respect to public access points, strategic documents in the education sector refer to plans for opening up schools to the public, including the use of computer labs as public internet access points.[44] An infokiosk initiative is a part of eSlovakia and has been piloted in five places around Slovakia. Nonetheless, no clear national action plan exists specifically stating a policy of making PIAPs available.

**ICT Costs for Households**

A 2003 analysis by the Telecommunication Office, which draws on a number of domestic opinion polls reported here concludes that people interested in using the internet find it too expensive along with no access to a PC (64.2% of respondents who have not used the internet but are interested in using it cite the lack of access to a computer as the main reason, while 54.3% see working with the Internet as too expensive, according to the January 2003 iOmnibus survey quoted).

According to the eEurope+ report, the cost of a PC corresponds to 164% of the average monthly salary in Slovakia, somewhat higher than in the other Visegrad-4 countries (Czech Republic 146%, Hungary 125%, and Poland 83%) and than the average of the acceding countries (91%). The share of users who find the cost prohibitive (response "Computers are too expensive") is the second highest among accession countries after Lithuania at 17%.

eEurope+ June 2003 household survey found the highest share of households who found internet connection too expensive – 17%, more than twice the ACC average of 8%. The costs of 20 hours of peak dial up as a share of monthly income in Slovakia is reported at 15.0%, the third highest among accession countries after Bulgaria (20.7%) and Poland (20.5%).

Internet access prices are not regulated and belong among the highest tariffs in Europe (in PPP terms). During 1999-2003 the typical trend in Slovakia has been a gradual increase of dial-up tariffs, while the general trend in the EU and the neighbouring candidate countries is a gradual reduction of such tariffs (tables 6.5-6.7). This trend has most likely been a key factor in the very slow annual growth of household internet penetration. The Slovak Republic reports the worst development trend from among the Visegrad-4 countries and by June 2003 has overcome Hungary as the Visegrad-4 country with the highest off-peak dial-up access prices in PPP terms.

[44] The Programme Manifesto of the Slovak Government from 2002 makes reference to this ambition.

**Table 6.5** Indicators of Internet Affordability: A Comparison (June 2002)

| INDICATOR: | CZ | H | PL | SK | EU-15 |
|---|---|---|---|---|---|
| Internet access from home (%) | 17 | 9 | . | 3 | 37 |
| Hosts per 1,000 inhabitants | 21.1 | 17.1 | 14.4 | 15.2 | 35.0 |
| Internet access – 40 hours, peak (€) | 61 | 40 | 20 | 47 | 70 |
| Internet access – 40 hours, peak (€/PPP) | 134 | 82 | 36 | *119* | 72 |
| Internet access – 20 hours, peak-off (€) | 12 | 22 | 13 | 13 | 28 |
| Internet access – 20 hours, peak-off (€/PPP) | 27 | 47 | 24 | 33 | 30 |

Source: EC - 2nd monitoring report (IBM, 2002)

**Table 6.6** Indicators of Internet Affordability: A Comparison (January 2003)

| INDICATOR: | CZ | H | PL | SK | EU-15 |
|---|---|---|---|---|---|
| Internet access from home (%) | 17 | 11 | 12 | 4 | 45 |
| Hosts per 1,000 inhabitants | 24.8 | 25.7 | 18.9 | 16.5 | . |
| Internet access – 40 hours, peak (€) | 54 | 30.8 | 19.7 | 51.2 | 6 - 69 |
| Internet access – 40 hours, peak (€/PPP) | 110 | 80 | 37 | *129* | 6-73 |
| Internet access – 20 hours, peak-off (€) | 11.4 | 22.5 | 13.0 | 16.1 | 6.9-17.7 |
| Internet access – 20 hours, peak-off (€/PPP) | 23.2 | 44.3 | 24.5 | 40.7 | 7.1-18.8 |

Source: EC – 3rd monitoring report (IBM, 2003)

**Table 6.7** Indicators of Internet Affordability: A Comparison (June 2003)

| INDICATOR: | CZ | H | PL | SK | EU-15 |
|---|---|---|---|---|---|
| Internet access from home (%) | 18 | 14 | 13 | 5 | |
| Hosts per 1,000 inhabitants | 26.6 | 32.0 | 19.6 | 17.1 | . |
| Internet access – 40 hours, peak (€) | 54 | 38.3 | 100.6 | 49.5 | 6 - 69 |
| Internet access – 40 hours, peak (€/PPP) | 109.5 | 85.4 | 91.2 | *129.8* | 6-73 |
| Internet access - 20 hours, peak-off (€) | 11.4 | 19.2 | 25.1 | 16.2 | 6.9-17.7 |
| Internet access - 20 hours, peak-off (€/PPP) | 23.1 | 37.9 | 22.8 | 40.9 | 7.1-18.8 |

Source: EC – 4th monitoring report (IBM, 2003)

The current tariff structure of fixed telephone services in Slovakia shows the following trends:

- tariff structure (nominal level) is comparable with EU average,
- tariff structure (PPP level) is much higher than EU average,
- monthly fee and local calls tariffs have a permanently increasing trend[45],
- international tariffs have had a decreasing trend due to competition,
- long-distance tariffs had a slowly increasing trend.

[45] almost 50% increase in 2003 over 2002 in PPP terms (see Tables 6.12 and 6.13)

**Table 6.8** Indicators of fixed telephone tariffs: A Comparison (June 2002)

| INDICATOR: | CZ | H | PL | SK | EU-15 |
|---|---|---|---|---|---|
| Monthly fee (€) incl. VAT | 10.2 | 12.3 | 10.7 | 5.5 | 11.78-11.96 |
| Monthly fee (€/PPP) incl. VAT | 22.3 | 25.5 | 19.1 | *14.0* | 11.91-20.15 |
| Local calls - 3 minutes (€cents) | 14.4 | 13.0 | 8.7 | 13.3 | 14.0 |
| Local calls - 3 minutes (€cents/PPP) | 31.4 | 27.0 | 15.6 | 33.8 | 14.5 |
| Local calls – 10 minutes (€cents) | 47.8 | 38.7 | 34.9 | 36.6 | 40.4 |
| Local calls – 10 minutes (€cents/PPP) | 104.8 | 80.6 | 62.5 | 92.9 | 41.6 |
| Long distance calls – 3 minutes (€cents) | 37.4 | 38.7 | 36.7 | 33.4 | 35.5 |
| Long distance calls – 3 minutes (€cents/PPP) | 82.0 | 80.6 | 65.6 | 84.9 | 37.7 |
| International calls to USA - 10 minutes (€) | 3.4 | 3.8 | 10.5 | 2.7 | 2.31 |
| International calls to USA - 10 minutes (€/PPP) | 7.5 | 8.0 | 18.8 | 6.9 | 2.42 |

Source: EC - 2nd monitoring report (IBM, 2002)

**Table 6.9** Indicators of fixed telephone tariffs: A Comparison (January 2003)

| INDICATOR: | CZ | H | PL | SK | EU-15 |
|---|---|---|---|---|---|
| Monthly fee (€) incl. VAT | 9.5 | 12.3 | 10.5 | 7.3 | 11.8 – 19.6 |
| Monthly fee (€/PPP) incl. VAT | 25.0 | 24.3 | 19.8 | *27.4* | 11.9 – 20.2 |
| Local calls - 3 minutes (€cents) | 11.9 | 13.6 | 8.6 | 16.4 | 14.0 |
| Local calls - 3 minutes (€cents/PPP) | 27.0 | 26.7 | 16.2 | 41.3 | 14.5 |
| Local calls – 10 minutes (€cents) | 44.4 | 41.3 | 28.5 | 54.6 | 40.4 |
| Local calls – 10 minutes (€cents/PPP) | 90.1 | 81.3 | 53.7 | 137.8 | 41.6 |
| Long distance calls - 3 minutes (€cents) | 34.7 | 37.7 | 36.1 | 35.4 | 35.5 |
| Long distance calls - 3 minutes (€cents/PPP) | 70.5 | 74.3 | 68.1 | 89.2 | 37.7 |
| International calls to USA - 10 minutes (€) | 1.16 | 1.22 | 1.20 | 1.18 | 1.09 |
| International calls to USA - 10 minutes (€/PPP) | 2.35 | 2.40 | 2.27 | 2.97 | 1.15 |

Source: EC – 3rd monitoring report (IBM, 2003)

The entry of competition into the fixed-line market is likely to reduce both voice tariffs and dial-up charges and should stimulate internet usage.

### *IST in Households*

In analysing the use of IST, we first turn to information on Slovak citizens‘ knowledge of the Internet and awareness of its existence and possibilities. According to the SIBIS report the share of Slovak population who have never heard about the internet was at around 15% just marginally above the acceding countries’ average.

According to the eEurope+ progress report, 36% of Slovaks used the Internet in the past 3 months and a further 6% in the past twelve months. The share of non-users (including those who used the Internet more than 12 months ago) is 59%. The comparable data for all accession countries are slightly worse: the total share of non-users is 62%.

Dynamic growth of internet use over time is shown by the following table, although the penetration differs significantly from the data reported by the eEurope+ Progress Report probably for methodological reasons we were unable to trace.

**Table 6.10** Internet penetration (share of population who used the internet within last 3 months)

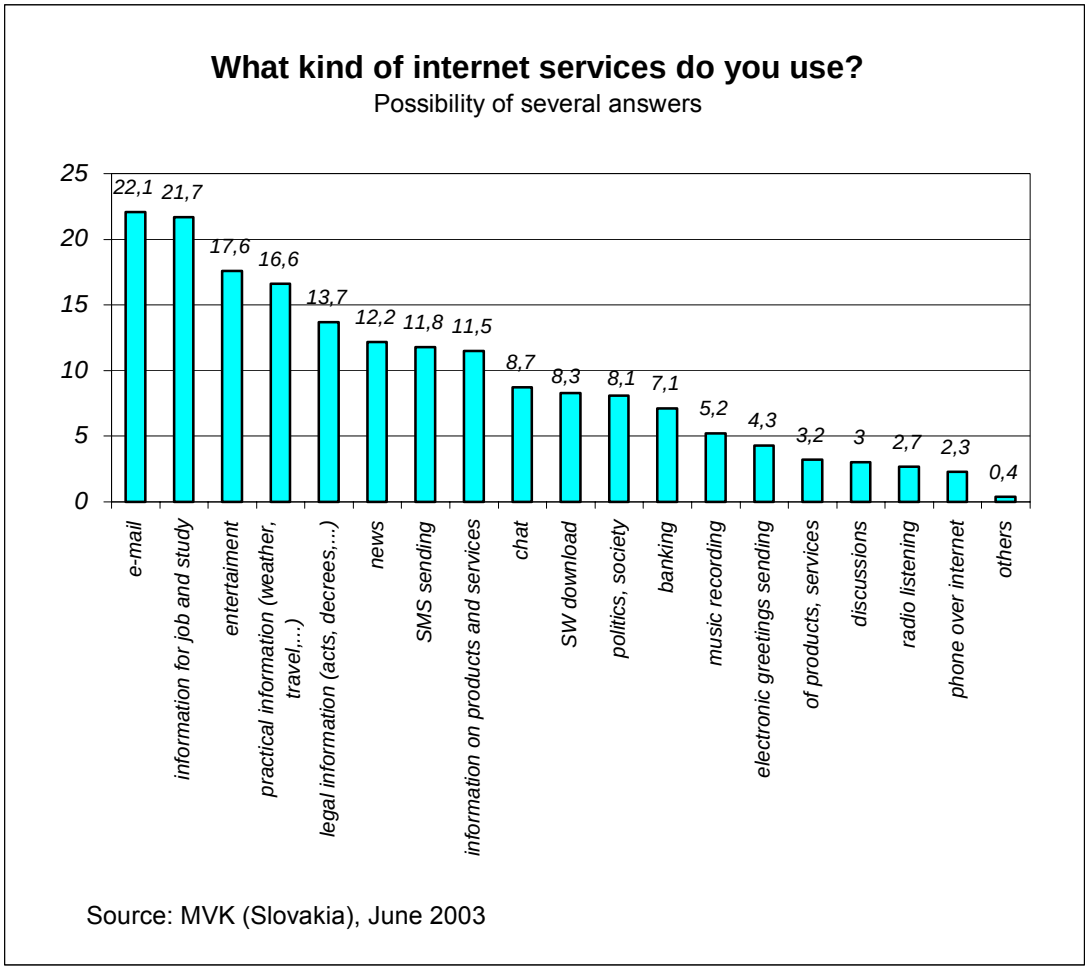
| INDICATOR: | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Internet density (%) | 0.1 | 0.4 | 0.9 | 3.0 | 5.8 | 9.3 | 11.1 | 12.0 | 12.5 | 16.0 | 21.2 |

* own calculation based on MTPT data for Q1+Q2 2003
Source: Ministry of Transport, Posts and Telecommunications

The share of Slovaks who did not know what the Internet was at all was 16% in the June 2003 eEurope+ household survey, above the average of accession countries of 11%. The SIBIS+ report showed that the share of people who agreed or somewhat agreed that the Internet was „not something for them" among non-users and occasional users was 45.6%, compared with 43.7% average in the accession countries and 57.6% in the EU-15.

Usage patterns (services or information accessed) do not seem to display any noteworthy deviations from trends in other accession countries. However, significant lagging can be found in e-commerce applications – only 39% of Slovak internet users search for goods and 10% purchase goods online, according to eEurope+, compared with the ACC average of 51% and 12% respectively.

**Figure 6.3** Internet: Usage Habits




Concerns about privacy and security do not appear to loom large in statistics reported from Slovakia, according to the eEurope+ survey. SIBIS+ survey, using different questions, shows

much higher rates of concern over online security and privacy, but still below accession countries‘ averages.

This finding on security may correlate with the figures cited above: the lagging in the share of users searching for goods is much more significant than the lagging in terms of users purchasing goods, which indicates that a higher share of those who use the internet to search for goods actually complete purchases.

Some evidence on the main reasons why people interested in using the Internet do not actually connect was provided in the iOmnibus Internet survey by TNS SK carried out in early 2003. The top three reasons cited by the sub sample of people were: I don’t have a computer (64.2%), it is too costly (54.3%) and I don’t have sufficient technical skills (47.2%). Particularly the first two reasons seem directly related to purchasing power.

## E.2. ICT and IST in the Enterprise Sector

According to eEurope+ 85% of Slovak enterprises have access to the internet, a figure ahead of the accession countries‘ average of 73%.

In 2002, there were approximately 250 thousand new PCs installed in Slovakia, some 150 thousand of that in the business sector. In the beginning of 2003, the total number of PCs used in the business sector was approximately 700 thousand.

In terms of internet presence, which is mainly indicative of enterprises‘ efforts to exploit the business-to-consumer potential of the Internet, eEurope+ figures show that 60% of enterprises have a website, compared with the ACC average of 39%. 23% also offer goods and services on-line, similarly to the ACC average of 22%.

Further insight on enterprise internet usage patterns and attitudes was provided by the research survey by TNS Factum Slovakia in December 2002: fewer than 45% of companies (in the admittedly limited sample of 166 companies surveyed) are ready to use the internet for purchasing products. Nearly 25% companies do not see the internet as being necessary for that purpose. Interestingly, only 2.4% of companies questioned the security of e-business applications. Some 8% of companies already use electronic signatures, and 42.7% are ready to use it in the near future. 35.9% had not yet made a final decision on the matter of electronic signatures, and only 13.7% had decided not to use electronic signatures at all.

Data on internet banking use in enterprises compare favourably with other Visegrad-4 countries and only the Baltics and Slovenia are ahead of Slovakia’s 72% found in the June 2003 eEurope+ survey.

Similarly, e-government services are used extensively by Slovak enterprises: according to the eEurope+ enterprise survey, 20% of enterprises used the Internet for declaring corporate taxes and 14% for declaring VAT taxes.

### *IST in Manufacturing*

The level of IST use in manufacturing varies greatly with ownership (foreign vs. domestic) and area of manufacturing. Many manufacturers deploy both internal and external information systems for logistics and customer contact.

The eEurope+ enterprise survey presented in the 2004 Progress Report showed that 85% of Slovak enterprises had internet access and 60% had a webpage, ahead of accession countries' averages of 73% and 39% respectively.

Slovak businesses according to an ICT survey of manufacturing SMEs commissioned by the National Agency for the Support of Small and Medium Sized Enterprise (NADSME) in March 2002, the following ICT penetration and application figures are worth mentioning here. Regarding *penetration*, of the Slovak manufacturing SMEs:

- 42.9% had PCs without a network connection (95.6% reported the use of at least one PC in their operations);
- 45.9% had PCs with LAN connection;
- 59.4% had PCs with Internet connection;

Regarding the areas of *application*, in the SMEs surveyed ICTs were used by:

- 91.7% to run their business information system (e.g. financial management),
- 34.1% to control part of the manufacturing process;
- 18.2% to control the whole manufacturing process;
- 42.4% for e-commerce purposes;
- 50% for e-mail.

Further information on ICT investments and the use of IST in manufacturing was discussed in chapter 4.

### *IST in Financial Services*

Banks in Slovakia have been one of the fastest developing providers of content for IST in the form of internet banking, phone banking and mobile banking. The services are available from all major retail banks and in recent years, banks have made an effort to push customers into using these electronic distribution channels by structuring transaction fees to cut down on personal contact and associated costs.

The use of internet banking in Slovakia falls well short of the average for the accession countries (23%) reported in the eEurope+ Final Progress Report but it must be noted that the average is significantly inflated by high usage patterns in the Baltic states. When compared to the culturally and economically comparable Visegrad-4 countries, Slovakia with 14% use ranks somewhat behind the Czech Republic (21%) and Poland (18%) and well ahead of Hungary's 9%.

The Slovak Association on Electronic Commerce (SAEC), which was established in March 1998, plays an important role in supporting the process of e-commerce within Slovakia by acting as a partner to the government in discussions on the legal framework for e-commerce and other issues. Several banks offer e-commerce ready products for businesses and in 2003

several micro payment systems were also functional and implemented for small services such as on-line content subscriptions.

**Table 6.11** Electronic banking in Slovakia

| INDICATOR | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|
| Credit and debit cards (thousands) | 772.7 | 1,002.3 | 1,358.1 | 1,543 | 1,719.5 | 1,974.6 | 2,459.1 | 3,024,8 |
| Self-service ATMs | 782 | 873 | 965 | 1,011 | 1,084 | 1,182 | 1,366 | 1,505 |
| Number of transactions (millions) | 26.8 | 39.0 | 48.9 | 52.9 | 49.5 | 52.1 | 58.9 | 65.0 |
| Amount of transactions (SKK billions) | 26.6 | 39.9 | 57.6 | 69.0 | 82.5 | 95.9 | 122.1 | 155.63 |
| POS terminals | 389 | 1,092 | 3,001 | 4,623 | 6,322 | 9,602 | 12,265 | 13,842 |
| Number of transactions (millions) | 0.1 | 0.4 | 1.2 | 2.3 | 5.6 | 10.6 | 16.0 | 20.7 |
| Amount of transactions (SKK billions) | 0.2 | 0.5 | 1.5 | 3.1 | 6.8 | 11.7 | 17.6 | 23.2 |

Source: Slovak Association of Banking Cards (http://www.zbk.sk), Note: 1 EUR = 40 SKK

The increasing spread of electronic banking services is illustrated by Table 6.11 above. The seven-year period between 1996 and 2003 saw dynamic changes in this area, as evidenced by data presented.

The vast majority of plastic cards in use are electronic debit cards[46], only usable for transactions through ATMs and POS electronic terminals. All banks in Slovakia provide internet banking services (started since 1998). GSM banking services are available from several banks, too.

Since 1997, the company EDIVAN has been providing international EDIFACT (electronic data interchange) standards services. Since 1999, several IT companies began to offer purchasing via the Internet.

The patterns of adoption of IST by clients in financial services show the potential for broader IST use in other sectors as well.

### *IST in Transportation*

In 2003, the following internet services were available for public use in the area of IST in transportation:

- transport schedules for railways, inter-city buses, local buses, airlines, ships – the services are maintained mainly by the transport operators but there are also several private-run for profit and non-profit web pages integrating scheduling information for various means of transportation
- some airlines (Bratislava-based low cost carrier SkyEurope) and the river ship operator SPaP offer on-line booking services

[46] Electronic debit cards, unlike traditional credit card, are not embossed. They cannot be used in non-electronic environments (mechanical creditcard readers) or Internet transactions.

The 2000 State Transport Policy contains also the principle to provide for and support development of the ICTs and introduction of internet applications in the transport sector.

The biggest ICT investments in transport sector are being implemented in *railway transport.* In August 2002, Slovak Railways signed a contract with Alcatel Slovakia on supplying modern telecom infrastructure systems until end 2004 for €59 million. Special telecommunication division of the company is expected to provide telecommunication services as an alternative operator in Slovakia.

Since 1995, in *road transport* the biggest investments are located for building of highway system (more than new 100 km during 1997-2002) including also modern monitoring and management systems for traffic flows. Public transport companies are oriented on local or regional and international transport. Majority of local public transport companies have implemented during 2000-2002 new modern management systems with variable tariff zones, which require implementation of modern ICT. The city of Bratislava has also announced plans for building a parking information system based on mobile technology, which would display the location and numbers of available parking to cars.

In *water transport* sector main ICT investments are oriented on ensuring the safety of water transport traffic on the river Danube (less than 200 km on the territory of Slovakia) through a modern monitoring and management system. The only major port with regular international traffic is located in Bratislava.

In *civil aviation* sector there are a number of small airports, but only five with a standard international flight regime (regular or charters). New investments (including ICT) have been implemented only in two airports (Bratislava, Kosice) during 2000-2003 (airports are still business companies owned by the state; privatisation process is expected to start in 2005).

Implementation of intelligent transport electronic systems (related to the eEurope initiatives) are in preparatory stages only because of a lack of financial sources for this priority in the budget (financial resources are primarily used for construction of new highways systems).

Private *cargo shipping* companies have been allowed by law to use e-control of their own trucks by satellite since 1993 (e.g. the Euteltruck service).

### *IST in Postal Services*

Special postal services (special category of letters and parcels) can be monitored on-line (project Track & Trace) and a variety of other information is provided in the web pages of the Slovak Post (www.slposta.sk). A private run postal code database (www.posta.sk) has been publicly available since 1998.

The Slovak Post company started the project on implementation of new technology for majority of postal traffic systems in 1998. Total investments for development projects during period 2000 – 2004 are expected at SKK 1.6 billion. The plan is to establish public internet access points in main existing postal offices.

General reasons for limited usage of ICT by the main (dominant) postal service operator are as follows:

- legal status of company ("state enterprise"), which limits innovative flexibility and incentives for change,[47]
- limited financial resources for higher implementation of ICT,
- low demand for the use of internet by customers (minimal acceptance of electronic documents by state administration).

International courier services present in Slovakia also offer some IST-based service for shipment tracking.

## E.3. ICT in Education

An excellent overview of the deployment of IST in primary and secondary schools is provided by the State School Inspection. The Inspection found that in the school year 2001/2002, primary schools used in the educational process (in addition to PCs used for administrative purposes) on average 3 PCs, secondary grammar schools 18 PCs, secondary specialized schools 26 PCs and secondary vocation schools 16 PCs.

Internet connections were available at 20% of primary schools but 90% of secondary schools, while 20% of primary and 92% of secondary schools had an e-mail address. Only 8% of primary schools had their own website, compared to 38% of vocational schools, 73% of secondary grammar schools and 70% of secondary specialized schools.

With respect to the teaching of information technology subjects, only 35% of primary schools offered them (10% as mandatory, 4% as electives and 21% as optional). 65% of primary schools did not teach informatics at all.

In secondary schools, informatics is taught as a part of required curricula. On average, this subject is taught in two specialised classrooms in secondary grammar schools and vocational schools and three specialised classrooms in specialized schools, using an average of 8 PCs.

With respect to the use of computers in teaching other subjects, they are used on average in primary schools by 2 teachers in 1-2 subjects (particularly maths, natural sciences and foreign languages), in secondary grammar school by 10 teachers in 5-6 subjects (maths, natural sciences, foreign languages), in secondary specialized schools 6-7 teachers in 4 subjects (accounting, administration and correspondence) and 4-5 teachers in 5 subjects in vocational schools (same subjects as above).

PCs were mainly acquired as sponsorship gifts, followed by state budget financing and small project financing.

Universities in Slovakia vary in availability of Internet-connected PCs to students. All, however, offer some access. Some student residences are now connected to LAN networks, offering fast access. A number of Bratislava-based universities will be introducing smart student cards integrating access to buildings, public transport, libraries and other facilities.

An important source of computers in primary and secondary schools, as well as universities, has been the ***INFOVEK*** project initiated in 1998 by a civic association without direct ties to the government. Its aim was simple – to provide all primary and secondary schools within

[47] The government plans to transform the company into a joint-stock company during 2004.

four to five years with computers classrooms with some ten computers and an internet connection. There are training programmes being organized for Infovek teachers, and a centralized purchasing of hardware for the selected schools.

In some schools, the project has transformed IT education completely. Although not measured, the effect on computer literacy in Slovakia is undoubtedly immense, as most schools connected through Infovek would otherwise have neither access to computers, nor access to the internet. Although initially a civic initiative, in 1999 it became dependent on government funding combined with corporate sponsorship (Slovak Ministry of Education is responsible for overall project management with an annual budget of about 350 million SKK). In addition to providing computers, Infovek has begun organising teachers to jointly produce teaching materials using IT for a variety of subjects. At present, Infovek offers materials for language teachings, maths, biology, geography and a number of other subjects. The project also operates the www.infovek.sk portal, as a central resource for Infovek-connected schools.

The iAccess pillar of eSlovakia, the joint initiative of the government and Slovak Telecom, aims to connect all primary and secondary schools to the internet by the end of 2004 at speeds of 128kB/s, which will, however, be far too slow to take advantage of current multi-media applications. The project is coordinated with the Infovek initiative and plans to spend a billion SKK in 2004 on computers.

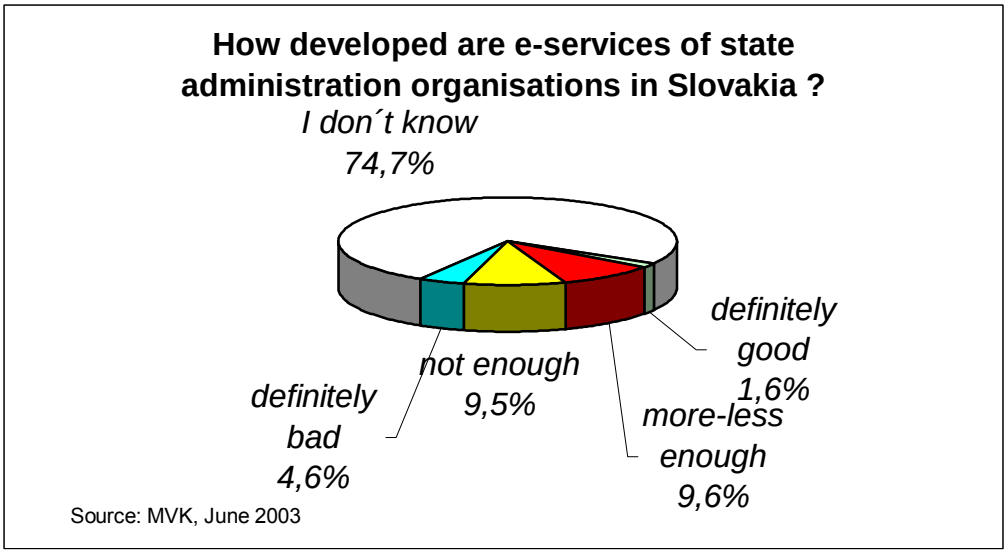
## E.4. E-Government

Looking at the mirror picture of e-government availability – the use of e-government services, we see figures below accessions countries' averages, but very close to the Czech Republic and Hungary.

According to the eEurope+ Progress Report, 12% of Slovaks used the Internet to download official forms and 5% to send filled forms back to public authorities, compared with 17% and 9% respectively in accession countries on average.

Significantly, the June 2003 MVK survey indicated that most Slovak simply do not know very much about e-government services (Figure 6.5).

**Figure 6.5** e-Government services: the state of the art




Provision of e-government services in Slovakia was still in its early stages in 2003. The availability of information was fragmented by various departments, each using its own structure, often developing overlapping applications separately. Services were available only to a very limited extent.

However, the year 2003 saw significant shifts in e-government development, with the key area of progress being the first integrated e-government portal www.obcan.sk, which evolved rapidly by adding more information and inter-linking various websites of national and local government offices. Dynamic developments also took place in a number of ministerial websites.

The key e-government services available and used include the Trade Register, which allows unlimited free online access to records for informative purposes (www.orsr.sk). Another key service, which has been functional, although data on use are not available, is the public commenting procedure. All draft laws and other materials debated by the government go through a mandatory public commenting procedure, which operates by publishing the materials on the internet as the sole distribution channel. Individuals and groups can then submit comments by e-mail or other means. The central government website contains information on all new documents for commenting with links to individual websites of the specific ministries, which contain the actual drafts.

Other key e-government resources used by the public include access to the so-called Collection of Laws, containing all valid laws, international agreements and other legal documents (jaspi.justice.gov.sk).

In early 2004, following years of planning, the Cadastre also became available on-line. There were concerns about the functionality of the payment system for Cadastral records, which required a deposit in advance to allow retrieval.

According to a recent public opinion survey by MVK Slovakia (June 2003), three quarters of adult population did not know if e-government services were developing well or not, with some 11% of them being relatively satisfied with the current situation. An international

comparative research by Taylor Nelson Sofres (TNS) in September 2002 found that only 14% of Slovak citizens accessed government services and procedures via the Internet in 2002.

Security of on-line work with official documents was questioned by more than 90% of the respondents in the MVK survey. The TNS survey found that 21% of respondents found it safe to use the internet to provide information to public administration bodies, with the share dropping with rising age of respondents.

There are currently several projects or initiatives which aim to provide certain types of e-government services in Slovakia:

***Portal "OBCAN" (Citizen)*** is a joint initiative of several IT companies and the Government Office aimed at bringing access to all information and services from the public administration together on a single web-site in the form of a "one-stop shop". Previously, there was no central portal allowing access to government information and services, with them being highly fragmented on a number of web-sites developed and administered according to individual ministries' rather than citizens' needs. The home page www.obcan.sk (a pilot version launched in April 2003, with a budget of approx. 15 million SKK) is organized around human life situations. It allows access to virtually all related central and local government servers, bringing together a vast array of on-line resources. The main barrier which the project promoters have to face is the limited internet use among the Slovak population.

***Portal NOTAR*** (www.notar.sk) operated by the Chamber of Public Notaries focuses on providing information on different registers (on legal entities, notary activities, voluntary auctions, survey of legal restrictions for chattel ownership). It is now a fully implemented project. The investment was about SKK 25 million.

***Portal "e-CUSTOMS DECLARATION"*** is a project implemented by several IT companies, the Customs Office, several local banks and service operator[48], since October 2001 (detailed information on e-customs procedure is available on following web side http://www.colnasprava.sk/cssr/www/CShome.nsf). Its commercial operation started in September 2002, with a planned investment budget of some SKK 250 million. It aims to provide for speeder and more secure customs procedure.

Other sources of public information and e-government resources on the Web include:

- Slovak Government portal - www.government.gov.sk (English version available) – contains extensive information on government sessions pursuant to the Freedom of Information Act, links to all government organs' websites. Also contains materials for public commenting, which can be commented on through e-mail.
- Taxes – pilot testing is taking place for filing of value added tax and corporate taxes
- DIS – Benefits Information System of the Ministry of Labour, Social Affairs and Family
- JASPI – jaspi.justice.gov.sk - all valid laws
- Slovak Parliament portal – www.nrsr.sk - legislative process tracking allowing user to follow draft laws as they pass through the parliament, live webcasts of parliament sessions

[48] (http://www.amonet.sk/Monex/IE5/Default.asp

- Business Register of the Slovak Republic - www.orsr.sk and Small Tradesmen Register of the Slovak Republic – zrsr.vs.sk
- Cadastre – as of January 2004, allow land registry records to be accessed electronically

The Freedom of Information Act from 2000 mandates all state offices to accept inquiries also by e-mail and recognizes the Internet as means of mass distribution of information from the state administration.

## E.5. SWOT analysis

Slovakia is located around regional averages for most indicators in the area of IST, according to recent surveys. Households are equipped with communication technology and PCs at comparable levels, creating conditions for IST take up.

Slovakia's telecom connection and use charges are among the highest in Europe in PPP terms, showing an increasing trend as well.

In terms of IST use in business, both statistical and anecdotal evidence show the most advanced level of IST take-up and use is found in the telecommunications (strong duopoly GSM market), banking, and manufacturing sectors.

E-government has suffered from fragmentation and lack of systematic content provision. However, recent initiatives show promise.

**Table 6.12** SWOT: IST Applications

| | |
|---|---|
| **Strengths**<br>• Dynamic and innovative mobile telecom and Internet services sectors<br>• High penetration of personal computers in households given income levels<br>• High share of internet use given income levels<br>• recognition of Internet as legitimate means of access to government information | **Weaknesses**<br>• Uneven distribution of ICT equipment and skills among social groups and geographical areas<br>• High fixed telephone and internet tariffs for citizens (PPP level)<br>• Prevalence of low-speed connections due to policies of the dominant operator |
| **Opportunities**<br>• Universal service legislation<br>• New legal framework for e-business<br>• New investment-promoting legal and regulatory regime "Acquis 2003" | **Threats**<br>• Growing "digital divide" due to social inequality of access and use of new IST<br>• Fragmentation of government resources and duplicity |

***swot analysIS***

The reported high penetration rates do not always mean that advanced usage patterns are established among the Slovak business and residential population. More developed business applications of ICT are typically found in the leading sectors of telecommunications and financial services. This is determined by a strong private foreign ownership in these sectors, with appropriate financial backing to adapt to the global business practice.

Further, average *purchasing power* limits individual consumers/citizens' ability to buy an appropriate terminal equipment to access available IST applications, such as e-banking, e-commerce or e-government. Moreover, the rising ("anti-Lisbon trend") telecom *connection and usage prices* (a policy of a dominant operator) significantly hinder on a more dynamic take-up in the residential IST penetration and use, with households now expending twice as much on their communications needs than was the case in the mid-1990s.

Surveys show no major regional *differences in regional access and use* of ICT. However, the data is available on a NUTS 3 level only, which masks important variations at the local level (towns and villages), where access and use is usually mediated by upgraded PC equipment in existing public facilities like libraries and schools. Among the social groups, the unemployed (some 15% of the country's productive-age population) and pensioners are among the least equipped and wired parts of the population.

Recently, to prevent digital divisions across social and geographical boundaries to widen, there are now strong political pressures in the government to ensure that everybody has a decent access to the new ICTs in his/her neighbourhood, with all types of *schools* identified *as the major "points of access"* in that respect. However, a sensible government policy will have to take account of the main trends reported above, for instance, that education facilities are the primary place of access for the younger and more technologically advanced only, and adapt there is promotion campaigns accordingly.

In terms of content provision for *e-government* the recent trends show greater integration and increased efforts by the government to provide useful and usable content. User surveys indicate the interest in the services exists and there is potential to start realising the potential benefits.

# F. INSTITUTIONAL CAPACITIES AND REGULATORY BACKGROUND

**Institutional and Regulatory Set-Up for Information Society**

The structure and responsiveness of national and sub-national institutions determine to a considerable degree the capacity of a given society to meet the challenges brought about by the new ICTs. Public policy-making and administrative issues related to IS development in Slovakia are therefore analysed in the following sub-sections. Besides telecommunications, privatisation and regulation of the other major infrastructure sectors are dealt with here, too.

## F.1. Telecommunications Policy and Administration

Telecom business in Slovakia is currently regulated by the *2000 Telecommunication Act*. It defines the powers of policy-making (Ministry of Transport, Posts and Telecommunications, MTPT) and regulatory (Telecommunication Office, Antimonopoly Office, and Council for Broadcasting and Retransmission) bodies.

*The Slovak Parliament* can influence the sector development through legislation, appointment of a regulatory body's chairman, or through democratic control of the Government and its policy implementing agencies.

*The Slovak Government* can influence the sector development through:

- implementing of specific policy measures,
- legal acts,
- government regulations,
- supervision of line ministries' activities,
- appointment of deputy chairman in telecom regulatory bodies,
- exercising ownership rights in the state-run and some privatised businesses.

*Ministry of Transport, Posts and Telecommunications* is the central government body responsible for telecom sector policy. Based on 2000 Telecommunications Act, MTPT is responsible for:

- design and implementation of state telecom policy;
- drafting of telecom legislation;
- representation of the Slovak Republic in international telecommunications organisation;
- drafting of National Frequency Spectrum Table;
- exercising ownership rights (34% stake) in the Slovak Telecom.

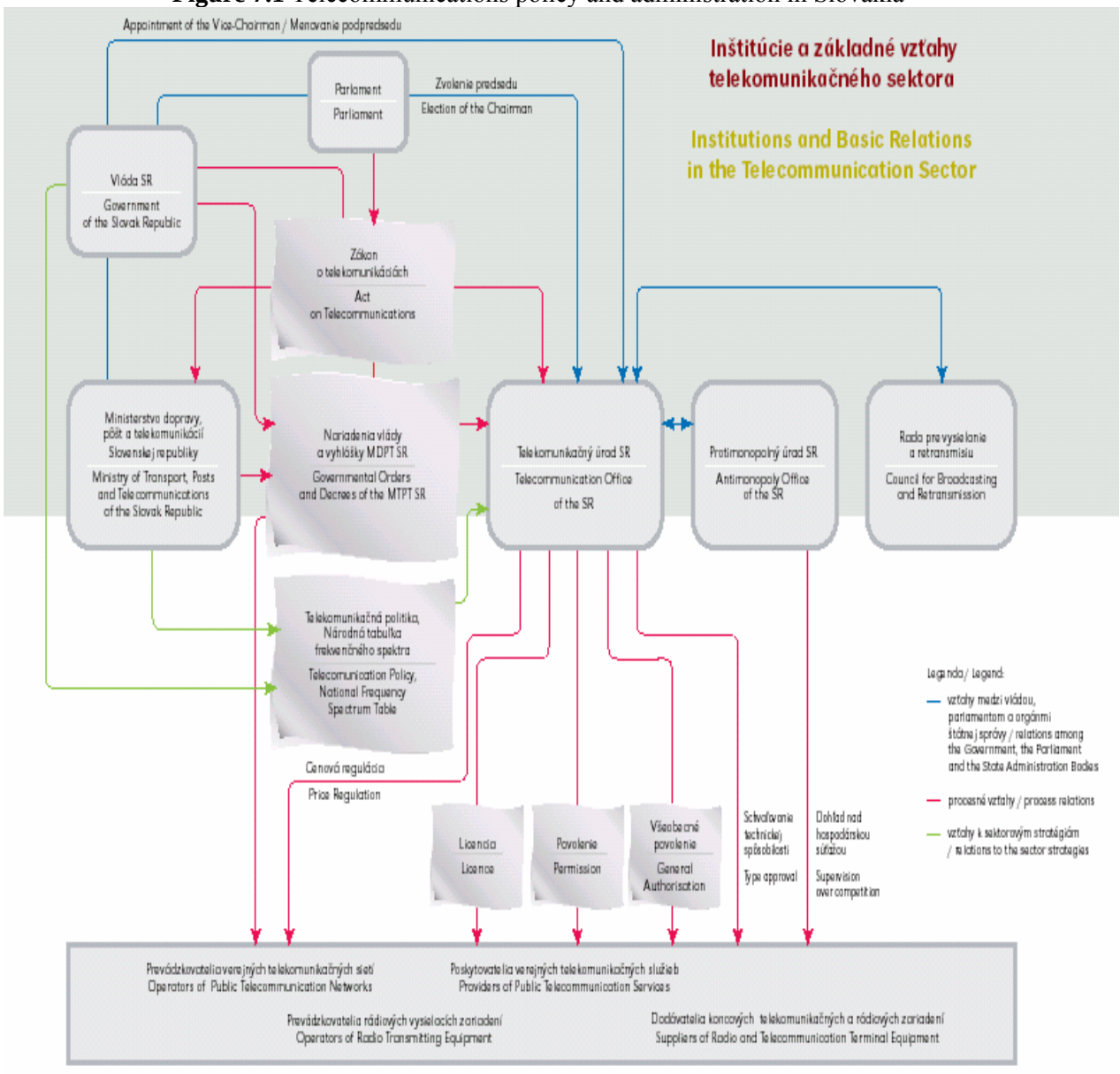
*Telecommunications Office of the Slovak Republic* was established on January 1, 1993. According to the 2000 Telecom Act, the Office is a state administration body, executing state regulation of the telecom sector. Headquartered in Bratislava, it receives state budget financing.

*Antimonopoly Office* is a state-financed office responsible for anti-trust law enforcement, located in the capital.

*Board for Broadcasting and Retransmission* is a regulatory body for licensing and content regulation of broadcasting and retransmission organisations. Its members are elected by the Parliament. The Board receives state budget financing, and is backed by an administrative secretariat, located in Bratislava.

*Regional governments*, established in January 2002, are political entities which are responsible for overall socio-economic development of their territories, including the development of telecom infrastructure and services. There are eight autonomous regions, each having its own administration and parliament. According to the respective 2001-2002 legislation, they have the power to establish their own service organisations to ensure provision of relevant public services, including telecommunications.

**Figure 7.1** Telecommunications policy and administration in Slovakia




Source: Ministry of Transport, Post, and Telecommunications (2002)

## F.2. Regulatory and Privatisation Policies Affecting IST Development

In Slovakia, the telecom and IT industry was fully liberalised market since 1990. Only specific parts of telecom sector were liberalised gradually:

- data services market liberalised (since 1992),
- mobile market partially liberalised (since 1996 - 2 operators, but frequency for up to three operators to be allocated),
- alternative infrastructure liberalised (since 1998),
- fixed telephony liberalised (since 2003).

In general, business activities in ICT sector are regulated by the Commercial Code. As already mentioned, telecom sector itself is regulated by the Act. 195/2000 Coll. on Telecommunications, which is harmonised with the "*1998 Acquis*". Adoption of the new EU directives *("2003 Acquis")* is underway. The Telecommunication Act was approved in May 2000 and entered into force on 1st July 2000. This Act has replaced the previous 36-years old telecom legislation. The main drawback of this act is that its provisions are not clear enough to ensure effective and timely law enforcement, and that it lacks sufficient flexibility to take advantage of the new technological developments. Also, definition of a licensing procedure is very complicated and hinders the course of the telecom market liberalization. In August 2002, the Slovak Parliament did not approve an amendment to the 2000 Telecom Act, incorporating the "local loop unbundling" regime. A new initiative of several MPs towards introducing LLU regime was recommended by the government for approval in April 20032003 but failed. Local loop unbundling is covered by the 2003 Telecom Act but had not yet been implemented.

The digital signatures regime is defined by the Act No. 215/2002 Coll. on digital signatures. New legislation on electronic business is in the drafting process, expected to be approved in 2004.

In Table 7.1 below we provide own assessment of policy implementation capacities, based on two main criteria – policy powers vested and resources available.

Main problems related to the administrative efficiency of *Telecommunications Office* include the lack of political independence from the government, lack of legal provisions to increase administrative authority of the office, existing staff pre-occupied with technical rather than economic aspects of sector regulation, high level of bureaucracy, lack of timely action, etc.

**Table 7.1** Policy implementation capacities: an assessment

| IMPLEMENTING AGENCY | COMPETENCE | RESOURCES | ASSESSMENT |
|---|---|---|---|
| Ministry of Economy | ICT sector policy maker | one specific department with approx. 6 staff | adequate |
| Ministry of Transport, Posts and Telecom-munications | ICT sector policy maker | telecom policy dept. with 8 staff; IS policy dept. with 6 staff (established in May 2003) | inadequate |
| Antimonopoly Office | competition policy | some 160 staff in total | adequate |
| Telecommunication Office | technical and price regulation of telecom sector | some 150 staff, but only 7 in the regulatory department | adequate in terms of staffing, but inadequate due to lack of language skills, specialised knowledge (e.g. telecom lawyers and economists), and internal coordination |
| Board for Broadcasting and Re-transmission | content regulation of TV and radio broadcasting (incl. CATV) | some 28 staff | adequate |
| National Security Office | digital signatures certification | some 10 staff | adequate |
| 8 Regional Governments | Regional development (incl. info-communication infrastructure) | total of approx. 50 staff (for regional development only) | adequate[49] |

Source: own elaboration

[49] As the autonomous regions exist only since January 2002, and have thus very limited administrative capacities as well as experience regarding the IS agenda, the assessment should be considered as very preliminary. However, as mentioned in Chapter 3, most of them have already included their IS priorities in their Programmes of Economic and Social Development. This has been motivated mainly by the possibility to apply for EU co-financing within this important priority as defined under the Operational Programme "Basic Infrastructure" (for more details, see also Chapter 3). However, at present, there are no IS strategies or IS authorities existing at the regional level.

***Privatisation***

In telecom sector, the former monopoly operator (Slovak Telecom) had not been privatised before 2000 (at present, a 51% stake is held by Deutsche Telekom). It is not clear when and how the rest of the shares will be privatised. The main reasons for privatisation of the company were as follows:

- strong strategic partner for Slovak Telecom (the goal has been achieved)
- transformation of the previous technology-oriented operator to customer-oriented company (up till now, the outcome was the decline of fixed telephony penetration from 31% in July 2000 to 26 in December 2002, low Internet penetration rate, and comparatively high tariffs in PPP terms);
- further infrastructure development (supported by an investment of EUR 1 billion up to 2004), to achieve 45% telephone density, and 100% digitalisation during period 2000-2004 (it is difficult to assess these goals, as there the relevant development indicators have not been defined for each year; however, according to media information the total investment commitment negotiated with Deutsche Telekom and the tele-density figures for 2004 will most likely not be met; ADSL services were launched in July 2003 only, and the digitalisation target is also questionable, because it reached only 78% in December 2002, and is growing by only 4% annually; moreover, as the privatisation contract between the Slovak Telecom and Deutsche Telekom is subject to commercial confidentiality since January 2001, it is impossible to learn about the legal remedies to address the current situation);
- transfer of know-how (during 2000-2003 productivity grew by more than 24%; total employment decreased by about 30%; total revenues in 2002 were maintained at 1999 level, while increasing EBITDA margin from 44.8% in 1999 to 49.8% in 2002; the net income margin increased from 8.8% to 18.4%, and more that 400% net profit was reported in 2002 over 1999).

In 2002, new telecom operator TRANSTEL was established with potentially significant influence by the Government through its shareholder rights in energy and gas companies (TRANSTEL was established as infrastructure and service operator based on telecom infrastructure of all energy and gas companies, while their privatisation share was a maximum of 49% to a strategic investor). A privatisation plan for TRANSTEL has not yet been made publicly available. Profiles and brief history of the other major telecom operators (including CATV) is presented both in Chapters 3 and 6 of this report.

## F.3. Regulation of IST-based Public Information and Services

Since 2001, the most important legislation in this sector is the Act No. 211/2000 Coll. on Free Access to Information. This Act ensures that citizens can access public information produced by central and local administration bodies. The Government, ministries and their agencies, regional and local authorities have since introduced a more transparent information policy, many of them taking advantage of Internet as a means of communication. Numerous watchdog NGOs (Transparency International Slovakia, Obcan a demokracia, etc.) help ensure enforcement of this fundamental law.

## F.4. Regulation of Main Infrastructure Sectors

The most important legislation for *electricity and gas supply sectors* is the Act No. 276/2001 Coll. on Regulation of Network Industries, designed with a considerable EU PHARE technical assistance, also establishing a separate Office to see to its enforcement. Electricity (power generation) sector has been partially liberalised since 2001 (in 2001 for the biggest business customers with consumption higher than 500 GWh per year, with consumption below 500 GWh per year to be deregulated from 2004).

***Privatisation***
*Electricity and gas supply*: maximum 49% shares privatised by German and French strategic investors during 2001-2002, only the largest producer of electric energy has not yet been privatised (planned for 2004).

*Transport sector:*

- public water transportation (privatised during 1995-1996),
- public airlines (after break-up of the former Czecho-Slovakia the state held a stake in Slovak Airlines, new companies with private investors only),
- state-run airports (privatisation expected in 2005)
- public inter-city bus transportation (majority of service companies privatised during 2002-2003, through offering a 49% share to a foreign partner),
- public railways transportation (not yet decided),
- public city transportation (companies owned by local governments, privatisation plans not yet published).

## F.5. SWOT analysis

**Table 7.2** SWOT: Institutional and Regulatory Set-Up

| **Strengths** | **Weaknesses** |
|---|---|
| • Successful telecom tariff re-balancing (in nominal terms)<br>• Good track-record in competition policy | • Limited regulatory capacities (bureaucratic preoccupation with technical rather than legal and economic aspects of regulation)<br>• Limited influence of regulatory authority (telecommunications)<br>• Delayed approval of legislation on digital signatures<br>• High telecommunications tariffs (PPP terms) |
| **Opportunities** | **Threats** |
| • New telecommunication legal framework "Acquis 2003"<br>• New legal framework for e-business (under preparation) | • Loss of reputation in case of continued regulatory failure (in telecoms)<br>• Political dependence of the telecom regulator on the government (through state budgetary chapter of MTPT)<br>• State capture by organised interest groups due to unclear separation of policy-maker and state owner functions |

***swot analysIS***

The *re-balancing of telecom tariffs* to remove cross-subsidies has taken place successfully, bringing tariffs to the same general levels as in EU member states, a step opening up the sector to competition, which can be viewed as a strength.

In this respect, Slovakia also enjoys a good track-record in competition policy – the Antimonopoly Office has adequate personal capacity, legal power and experience to ensure standard control of unfair competition.

Key weaknesses can be seen in overall *limited regulatory capacities of the state*, as officials regulating the telecom sector tend to be preoccupied with technical rather than legal and economic aspects of regulation. This problem also plagues the national telecom regulator – the Telecommunication Office created in 1992, which is yet to become a strong and independent regulatory body.

This results in limited influence of the regulatory authority in the area with potential positive influence on promoting telecommunication competition. The main causes are the quality of legislation in force, existence of (secret) privatisation agreements, limited professional staff (minority with legal and economic skills) and minimal courage to try improvement of valid legislation by own proposals to the parliament (while government initiatives were only on declarative level).

The regulatory environment and limited competition to the incumbent operator has resulted in *high telecommunication tariffs* in PPP terms, negatively affecting usage of fixed telephone services and internet. On the other hand, it probably has been a key factor promoting mobile penetration to its current high rates.

Delayed approval of legislation on digital signatures has been a key obstacle to development of a number of electronic services including e-government.

Only the adoption of new EU regulatory framework can dramatically improve the state of legislation and improve situation mainly in transparency, equal access to all operators in relevant markets, avoiding bureaucracy in the licensing processes, creating positive pressure to act on the national regulator.

Continued ineffective regulation could result in the *loss of reputation* with further potential harmful effects on competition in the telecom markets. Further threats are posed by the continued *lack of separation of shareholder and policy-making duties* of the Ministry of Transport in the telecom sector.

# G. EDUCATIONAL SECTOR

This section reviews the development of Slovakia's education system and policies, their financing and outcomes. The analysis is consistently looking at the ICT-related education and training, and provides unique data on sector- and region-specific educational supply and demand factors, which are thought to influence the country's IS development path in the coming years.

## G.1 Educational System

The Slovaks have traditionally held the quality of domestic education in high esteem. Slovakia has a very high educational attainment in secondary education[50], but the lowest in tertiary education among OECD countries with rates among population aged 25-64 at 11% in 2001, compared with the OECD average of 23%. This represents a key weakness and a challenge for the future.

Slovakia's educational system was shaped by decades of Communist rule. The educational system inherited from the Communist era had certain key strengths but also a number of major weaknesses. Traditionally, there was excellence in the natural sciences and related subjects at all levels of education. On the other hand, there was also heavy emphasis on memorisation and little room for creativity.

Since the fall of Communism in 1989, the system has been undergoing gradual change. From an exclusively state run system, it has opened up to private and parochial schools, both of which receive some state financing. Another key change came in the form of decentralisation: since 2002, responsibility for running primary schools has moved from the state to municipalities and for secondary schools to the eight self-governing regions. The state, however, remains responsible for curricular issues and a majority of the financing, including directly determining teachers' salaries.

## G.2. Education financing

Throughout the period of economic transition, schools have suffered from insufficient finances. For most of the nineties, the share of public expenditure on GDP stayed below 5% of GDP and saw a steady decline in 1997. The comparable OECD average in 1999 was 5.5%. The expenditure in constant prices has also declined steadily since 1997. Although the spending decline must be viewed against a backdrop of gradually declining numbers of students due to demographic developments, this decline was not matched by declines in numbers of schools and teachers. The state of education financing has affected both the quality of teachers (and the attractiveness of the profession to younger people who tend to be better-skilled in ICT related subjects) and the quality of teaching equipment, especially with respect to costly technology.

According to OECD statistics, education was financed almost exclusively from public sources – 97.8% of funding in 1999 compared to an OECD average of 88%, Czech Republic's 87.6%, and Hungary's 87.9%.

[50] The share of 25-64 year olds with upper-secondary education or higher was 85% in 2001 compared to the OECD average 67% - own calculations based on OECD Education at a Glance 2002, Table A3.1a.

**Table 8.1** Public Expenditure on Education as Share of GDP and State Budget

| Indicators: | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|
| Public expenditure on education as a % of GDP (current prices) | 5.21 | 4.39 | 5.31 | 4.84 | 4.97 | 4.68 | 4.59 | 4.31 |
| State budget expenditure (MoE SR) on education (constant prices) | 23.89 | 20.86 | 25.71 | 24.35 | 27.05 | 26.32 | 25.38 | 24.76 |

Source: authors based on data from Institute of Information and Forecasting in Education

For most of the nineties, almost all schools were so-called budgetary organisations. This meant they were allocated a budget for their operations by the state, but any additional income they made from using their facilities had to be remitted directly to the state budget. In effect, schools had no incentive to raise extra funding from sources outside of the state budget.

Primary and secondary schools have been financed according to a complex formula based mainly on the number of classes and the historical principle – budgets based on previous years' budgets. One of the key changes introduced by the current government should shift funding toward a per student principle. A system has been proposed and should come into operation as of the school year 2003/2004, but it allows schools several years to adjust, using caps to budget changes.

Attractiveness of the teaching profession has declined due to remuneration issues. There are both shortages of young teachers and of sufficiently qualified teachers in some areas.

The government's vision of school reform is laid out in the Millennium manifesto adopted by the previous cabinet in 2001. Millennium calls for sweeping changes in the curricula, getting rid of excess memorizing and doing more to impart essential skills and competencies. The Millennium, however, has only slowly been turned into action. In particular, the government has not made a commitment to finance the changes outlined in the document.

A key challenge to the educational system lies in the current demographic development. While the size of the age cohort entering into primary education has halved since the beginning of transition, the number of schools has declined only marginally. Although the result has been more favourable student-teacher ratios, other ways of spending the resources saved implicitly by the demographic changes may bring much greater effects on the margins.

***Primary Schools***

Primary schools run by municipalities offer nine years of education – corresponding to primary education and lower secondary education according to the international classification. In many smaller settlements there are schools only offering the first four years, which are often very small in size and expensive in terms of expenditure per student.

According to data from the Ministry of Education, the cost per student at some of the smaller schools exceeds SKK 60,000 per year, while the average cost is about SKK 23,000 per student per year and some schools make do only with 15,000 per student per year. Meanwhile, the subject offering and facilities at many of the smallest schools are far below average levels.

In the school year 2002/2003 there were 2,396 primary schools (of them 2,286 state schools) with 602,360 students and an additional 293 special schools for students with physical and mental handicaps with 25,737 students.

***Secondary schools***

The secondary school system consists of three basic types of schools: secondary grammar schools, which are university-track schools, secondary specialised schools and vocational schools. All secondary grammar schools and secondary specialised schools award the so-called maturita – state leaving exam, which is required to proceed to university level. Some vocational schools award the maturita as well.

In terms of numbers of schools, in the school year 2002/2003 there were 220 secondary grammar schools (of that 158 state schools) with 91,661 students, 275 secondary specialised schools (239 state schools) with 83,353 students and 299 vocational schools (279 state schools) with 89,137 students.

As far as preparation for the university track goes, the secondary specialised schools give students a lower chance of attending university, while the vocational schools reduce the chance to a minimum. Overall, in the school year 2002/2003 about a half of the 62,136 secondary school leavers had fulfilled the state leaving exam and had the option of applying for university study. The Millennium document on education policy mentioned above calls for an increase in the share of secondary school students ending with a state leaving exam to 80%. This is of crucial importance with respect to building a skilled labour force, as education without a state leaving exam severely limits potential of graduates for further education at post-secondary level.[51]

The state leaving exam has traditionally been carried out mainly through oral examinations organised by the individual schools in four subjects (with a limited choice of subjects). The Ministry of Education has announced the introduction of a unified state leaving exam, which would allow comparison between grades from various schools and possibly simplify university entrance proceedings. The new state leaving exam, to be introduced in 2005, will include five subjects and allow for two differentiated levels of difficulty in each subject (lower level exams are unlikely to be accepted by universities).

The participation in university track-grammar schools is unequally distributed regionally. It is almost one and a half to two times as high in Bratislava (39.01% in 2000) than in other regions (from 23.24% to 28.13%). This probably reflects issues of supply of this type of education and possibly also cultural patterns, as vocational education is sometimes still seen as preferable to academic education in terms of future job opportunities.

[51] The state leaving exam is a formal requirement for university study, according to the Law on Universities.

**Table 8.2** Share (%) of Secondary School Population in University Track Grammar Schools

| NUTS3 REGION | 1998 | 1999 | 2000 |
|---|---|---|---|
| Bratislavsky | 35.86 | 38.63 | 39.01 |
| Trnavsky | 22.91 | 24.06 | 25.14 |
| Trenciansky | 20.08 | 21.65 | 23.24 |
| Nitriansky | 23.93 | 25.59 | 26.02 |
| Zilinsky | 22.59 | 24.04 | 25.06 |
| Banskobystricky | 23.60 | 25.06 | 26.31 |
| Presovsky | 22.63 | 24.46 | 25.55 |
| Kosicky | 25.72 | 27.10 | 28.13 |
| Slovakia | 24.95 | 26.69 | 27.61 |

Source: SGI National Report on Education Policy (2002)

There are a number of issues concerning secondary vocational education. The process of economic restructuring during transition has broken traditional links between industry and vocational schools. Potential future employers have limited impact on the curricula and graduates of vocational schools suffer from particularly high unemployment levels. The government plans to gradually expand the general education content of vocational schools and merge them into the same school type with secondary specialised schools.

***Universities***

Universities have received extensive self-government authority at the beginning of transition in the 1990s. However, financing remains in the hands of the government, as does accreditation carried out by the government-appointed Accreditation Commission, which acts as an advisory body to the Ministry of Education. The Ministry makes the final decision and has occasionally acted against the Accreditation Commission's advice. There were in 2003 23 universities in Slovakia including one private university. The total number of full-time students in the school-year 2002/2003 was 98,461 and there were an additional 39,042 part-time students. The number of first-year students – 35,258, corresponds to about 38.9% of the graduating age group for first-year admission, a figure comparable with rates in other candidate countries. The expansion of part-time studies[52] shown in Table 8.3 reflects the fact that universities have been able to charge fees semi-legally for this type of study and have sometimes limited the number of full-time places so that even some fresh secondary school leaver enter into part-time study. Overall, between 1993 and 2001 the number of students in universities doubled.

[52] Part-time studies result in the same diplomas as full-time studies but are structured for students in full-time employment (in evenings and on weekends).

**Table 8.3** Number of Students of Full-Time and Part-Time Studies by Area 1993 – 2001

| | 1993 full-time | 1993 part-time | 1995 full-time | 1995 part-time | 1997 full-time | 1997 part-time | 1999 full-time | 1999 part-time | 2001 full-time | 2001 part-time |
|---|---|---|---|---|---|---|---|---|---|---|
| Arts | 1,135 | 62 | 1,462 | 10 | 1,780 | 46 | 2,141 | 68 | 2,775 | 380 |
| Teaching and pedagogy | 9,949 | 2,314 | 12,799 | 3,080 | 13,966 | 4,783 | 15,089 | 8,461 | 16,466 | 13,832 |
| Humanities and social sciences | 14,487 | 3,733 | 18,506 | 4,605 | 23,072 | 8,850 | 24,277 | 14,620 | 25,542 | 16,632 |
| Medicine and pharmacy | 5,005 | 23 | 5,068 | 90 | 4,769 | 251 | 4,703 | 437 | 4,688 | 605 |
| Agriculture | 4,152 | 592 | 5,805 | 757 | 5,773 | 1,230 | 6,878 | 2,011 | 7,678 | 2,328 |
| Technology | 21,613 | 1,614 | 25,879 | 1,915 | 29,094 | 2,609 | 29,910 | 3,117 | 30,253 | 4,273 |
| Natural sciences | 2,502 | 13 | 3,006 | 0 | 3,978 | 271 | 5,126 | 394 | 5,757 | 930 |
| Total | 58,843 | 8,351 | 72,525 | 10,457 | 82,432 | 18,040 | 88,124 | 29,108 | 93,159 | 38,980 |

Source: Institute of Information and Forecasting in Education

In terms of the popularity of areas of study, humanities and social sciences come first with 31.92% of students in 2001, followed by technical subjects with 26.13% and teaching with 22.93%. The trends over time indicate rising popularity of humanities and teaching, mainly at the expense of technological subjects, which may pose a threat to Slovakia's traditionally high numbers of qualified technology graduates seen as attractive for foreign investment and the development of a knowledge economy.

**Table 8.4** Percentage of Students According to the Area of Study

| Percentage | 1993 | 1995 | 1997 | 1999 | 2001 |
|---|---|---|---|---|---|
| Arts | 1.78% | 1.77% | 1.82% | 1.88% | 2.39% |
| teaching and pedagogy | 18.25% | 19.14% | 18.66% | 20.09% | 22.93% |
| humanities and social sciences | 27.12% | 27.85% | 31.77% | 33.18% | 31.92% |
| medicine and pharmacy | 7.48% | 6.22% | 5.00% | 4.38% | 4.01% |
| Agriculture | 7.06% | 7.91% | 6.97% | 7.58% | 7.57% |
| Technology | 34.57% | 33.49% | 31.55% | 28.17% | 26.13% |
| natural science | 3.74% | 3.62% | 4.23% | 4.71% | 5.06% |
| Total | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| Total | 67,194 | 82,982 | 100,472 | 117,232 | 132,139 |

Source: Institute of Information and Forecasting in Education

The 1990s saw rapid expansion with new universities consuming disproportionate amounts of resources – between 1990 and 2003 the number of accredited institutions rose from 16 to 24. Consequently, the supply of higher education is concentrated in several large cities across the country:

**Table 8.5** Regional higher education supply: number of full-time students

| NUTS3 REGION | 1998 | 1999 | 2000 |
|---|---|---|---|
| Bratislavsky | 35,598 | 35,341 | 34,852 |
| Trnavsky | 4,407 | 5,235 | 5,931 |
| Trenciansky | 1,055 | 1,363 | 2,009 |
| Nitriansky | 10,073 | 10,507 | 10,785 |
| Zilinsky | 7,720 | 7,985 | 7,920 |
| Banskobystricky | 7,639 | 8,371 | 9,028 |
| Presovsky | 4,863 | 4,868 | 5,245 |
| Kosicky | 14,387 | 14,522 | 15,493 |
| Slovakia | 85,742 | 88,192 | 91,263 |

Source: Slovak Statistical Office

Note: No data available on the region of permanent residence of students.

A number of universities also offer part-time or full-time study at branches in smaller cities. There are no separate statistics available on these, but they spread out the distribution of higher education supply more evenly than would seem from the above table.

The tuition for all full-time and part-time students is presently free, but many part-time students are required to make payments to universities through a variety of schemes (payment to NGOs associated with the university for "organisation of study"). The current big debate in higher education concerns the introduction of fees for higher education. The Ministry of Education is proposing introducing fees for all university students to be determined by universities in the range between 5 and 30% of actual expenditure per student, accompanied by a system of social scholarships and loans, but the adoption of necessary laws was postponed in early 2004 due to disagreements within the government.

Entry into universities is competitive, as universities operate on a "numerus clausus"[53] system. Most universities organize entrance examinations, although some fields, particularly in technological universities, accept all applicants due to low demand. Students are allowed to apply to several universities at the same time. Students apply for specific fields of study with very limited options of changing in mid-course.

Table 8.6 presents the ratio of numbers of applicants to available places for selected schools. It shows that the greatest demand overhang exists for arts academies and then for general universities, while technological universities are much less demanded – of the bottom five places three are occupied by technological universities.

[53] The term denotes a system where the number of places is limited in advance and only the top portion of applicants is accepted.

**Table 8.6** Accepted Applicants and Ratio of Applicants to Places in 2003 – Top and Bottom 5 Universities

| Higher Education Institution | Planned Number of Accepted Applicants | | | Number of Applications | | | Number of Applications per One Planned Position | | |
|---|---|---|---|---|---|---|---|---|---|
| | Full-time Study | Part-time Study | Total | Full-time Study | Part-time Study | Total | Full-time Study | Part-time Study | Together |
| Police Academy in Bratislava | 65 | 0 | 65 | 685 | 0 | 685 | 10.5 | x | 10.5 |
| Academy of Fine Arts and Design Bratislava | 89 | 0 | 89 | 499 | 0 | 499 | 5.6 | x | 5.6 |
| Academy of Arts in Banska Bystrica | 63 | 0 | 63 | 283 | 0 | 283 | 4.5 | x | 4.5 |
| Academy of Music and Dramatic Arts Bratislava | 197 | 15 | 212 | 680 | 40 | 720 | 3.5 | 2.7 | 3.4 |
| Trnavska University in Trnava | 771 | 1,065 | 1,836 | 2,579 | 3,730 | 6,309 | 3.3 | 3.4 | 3.3 |
| Alexander Dubcek University in Trencin | 775 | 480 | 1,255 | 1,419 | 688 | 2,107 | 1.8 | 1.4 | 1.7 |
| Catholic University in Ruzomberok | 936 | 595 | 1,531 | 1,445 | 1,007 | 2,452 | 1.5 | 1.7 | 1.6 |
| Zilinska University in Zilina | 2,645 | 410 | 3,055 | 4,416 | 585 | 5,001 | 1.7 | 1.4 | 1.6 |
| University of Veterinary Medicine in Kosice | 170 | 0 | 170 | 231 | 0 | 231 | 1.4 | x | 1.4 |
| Slovak University of Technology in Bratislava | 5,055 | 530 | 5,585 | 5,136 | 1 020 | 6 156 | 1.0 | 1.9 | 1.1 |
| Technological University of Kosice | 4,125 | 1,430 | 5,555 | 4,216 | 1 047 | 5 263 | 1.0 | 0.7 | 0.9 |
| Universities together | 31,986 | 10,090 | 42,076 | 65,146 | 19,711 | 84,857 | x | x | x |

Note: 0 Data not available, x Calculations irrelevant or impossible
Source: Institute of Information and Forecasting in Education

The table does not allow us to establish the actual numbers of applicants for tertiary education due to double-counting. No data are available showing the precise numbers of applicants. Pisut, Gregusova, Plesch and Srankova (2003) estimate that about 42% of applicants do not succeed in getting into full-time study and that most of them are likely to apply for paid part-time study.

Recent reforms in the system of higher education include the introduction of a credit system of study in accordance with the Bologna Declaration on higher education. In theory, the system should facilitate academic exchange and choice for students, but experience from the first two years of running has shown that universities did not mostly provide students with effective choice of subjects and still forced them down a narrow path.

Additionally, universities are now required to work within the three degree system – bachelor, master and doctor. Traditionally, very few universities had offered separate bachelors degrees

and most university students automatically went on to masters level. This tradition limited the availability of university study given funding limitations, as students had to remain for a minimum of five years. The government has declared an intention to increase the availability of non-university higher education at bachelor's level. This should allow universities to educate more people with the same amount of resources and better meet labour market demand. It is expected that some portion of demand for university-educated individuals could easily be met by individuals educated to the bachelor's level.

Financing of higher education has moved to a formula-based system reflecting numbers of students and cost of fields of study, as well as a number of other specific factors. Further funds are allocated to research and development, university development and social scholarships. Overall, according to OECD data, in 1999 Slovakia devoted 0.8% of GDP to the financing of tertiary education (both public expenditure and the negligible amounts of private expenditure), compared with an OECD average of 1.3%. The present government has made a commitment to bring this to the 1% of GDP level.

Levels of wages for academics and doctoral students have been very low throughout the 1990s. The average wage of university teaching staff in 2002 reached SKK 17,255,[54] compared to the national average of SKK 13,511. Despite recent increases, they remain at levels below the neighbouring countries. This has led to a drain of quality individuals from the Slovak academia into foreign educational institutions and the private sector. The age structure of academic institutions is heavily tilted towards older teachers or very young teachers, with a conspicuously missing middle age group.

Another source of brain drain in the universities has been the parallel existence of the Slovak Academy of Sciences. Institutes of the Academy provide doctoral teaching, but no teaching for lower academic levels. Effectively, the Academy drives away from universities many researchers who could otherwise be involved in teaching.

A growing number of Slovak students are studying at universities abroad. In particular, in the Czech Republic there are presently about seven thousand Slovak students (2002/2003) attracted by the closeness of language and culture, as well as the fact that the study is free for Slovak citizens.

## G.3. Life-long Learning

Under socialism, there was significant emphasis on continuing education, usually provided in an organised fashion within various branches of industry. At present, continuing education (or life-long learning) is provided by an estimated 3,500 providers. For formal recognition, accreditation is required from the Ministry of Education. The providers include universities, other schools, non-governmental organisations and for-profit firms.

Although no reliable data are available on the exact numbers of students in life-long learning or fields studied (other than the data on universities provided in Table 8.6), a 2000 survey by the Research Institute of Labour and Social Affairs affiliated with the Ministry of Labour, Social Affairs and Family, has indicated that computer education was a leading area of study, far ahead of foreign languages, professional upgrading and accountancy. The number of persons in life-long training in universities has been rising sharply in the past four years

[54] Based on data from the Institute for Information and Forecasting in Education (UIPS).

(1999-2002), from 270,115 persons to 390,254 persons. The increase has come particularly in the social sciences, possibly driven by increased teacher qualification requirements.

Life-long training is mentioned in the key policy documents (relevant education and employment laws) but it is recognised in Slovakia that a coherent national strategy is missing. Work in this area has been carried out in the process of EU accession negotiations.

**Table 8.7** Number of students in life-long training in universities by area of training

| | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| Natural Sciences | 19,988 | 12,550 | 13,882 | 12,410 | 25,164 |
| *per 1,000 persons* | *3.71* | *2.33* | *2.57* | *2.31* | |
| Technical Sciences | 66,274 | 55,245 | 54,264 | 50,777 | 62,048 |
| *per 1,000 persons* | *12.29* | *10.25* | *10.07* | *9.42* | |
| Agricultural and Forestry Sciences | 7,156 | 7,026 | 8,340 | 7,803 | 6,920 |
| *per 1,000 persons* | *1.33* | *1.30* | *1.55* | *1.45* | |
| Medical and Pharmaceutical Sciences | 10,906 | 9,207 | 8,014 | 12,139 | 17,332 |
| *per 1,000 persons* | *2.02* | *1.71* | *1.49* | *2.25* | |
| Social Sciences | 129,142 | 132,369 | 167,004 | 206,667 | 216,170 |
| *per 1,000 persons* | *23.96* | *24.55* | *30.98* | *38.34* | |
| Sciences about culture and art | 1,589 | 1,949 | 6,159 | 6,666 | 12,897 |
| *per 1,000 persons* | *0.29* | *0.36* | *1.14* | *1.24* | |
| Military and Security Sciences | 5,848 | 4,463 | 8,305 | 3,822 | 12,539 |
| *per 1,000 persons* | *1.08* | *0.83* | *1.54* | *0.71* | |
| Unsorted | 43,890 | 47,306 | 15,876 | 35,013 | 37,184 |
| *per 1,000 persons* | *8.14* | *8.78* | *2.94* | *6.49* | |
| TOTAL | 284,793 | 270,115 | 281,844 | 335,297 | 390,254 |
| *per 1,000 persons* | *52.83* | *50.06* | *52.19* | *62.33* | |

Source: Yearbooks of Education, Institute of Information and Forecasting in Education

In addition to universities, adult education is provided by numerous private institutions in programmes accredited by the Ministry of Education. Unfortunately, no statistical data are available on the number of courses offered or the numbers of participants.

## G.4. ICT-related Education and Training

Slovak students traditionally excel in international comparisons in math and science subjects, which lay a solid groundwork for education in ICT subjects. However, schools are poorly equipped with computer technology and the quality of computer training varies according to the schools teachers and available equipment.

Also, the flip side of intensive education in theoretical aspects, especially in natural sciences at primary school level and in secondary grammar schools, is that schools do not provide skills required by industry. A number of surveys of businesses have shown that they believe the educational system does not prepare students well for the workplace.

***Informatics in Primary Schools***

According to findings of the State School Inspection from the school year 2001/2002, only 35% of primary schools teach computing – 10% as compulsory, 4% as elective and 21% as

optional. There is no set curriculum for primary school informatics. Only 32% of these classes are taught by teachers with requisite qualifications in the subject.

***Informatics in Secondary Schools***

Informatics is a required subject for the first grade of secondary grammar schools. Other secondary schools do not always offer any education in informatics, which may promote a digital divide between those with better, university-track education and those with specialised secondary education or vocational education.

**Box 8.1** Informatics Curricula in Secondary Schools

Two hours are required per week and the following topics are covered:

- Information around us – applied to collection, simple manipulation and presentation of data. The aim is to understand that IT allows the processing of a variety of data (text, graphic, etc.)
- Computer Systems – computer as a universal data processing instrument. Methods and equipment for the collection, storage and presentation of data. The aim is to become familiar with basic IT terminology, know the limits of technology, and operate a computer and its peripherals.
- Algorithms and algorithmisation – formal description of automated data manipulation, characteristics, storage methods, connection to maths, programming languages. The aim is to master algorithmic solution of simple tasks using the computer.
- Areas of IT application – areas, in which IT is used. The aim is to be able to judge for the given problem, which IT elements may be useful in resolving it, know some common applications at the basic user level.
- Information society – cultural and social aspects, legal culture. The aim is to understand the legal protection of software, consequences of licence violations and perceive the impact of IT on society.

In further years, informatics is taught as an optional subject. The actual topics covered, however, vary with the expertise of teachers, as well as the schools' IT equipment.

The State School Inspection found in 2001/2002 that of all informatics teachers in grammar schools 61% were adequately qualified, 79% in secondary specialised schools and 64% in vocational schools.

Slovak students have performed extremely well in international Informatics Olympiads[55], which seems to reflect a tradition of excellence but is not necessarily reflective of the overall level of informatics teaching. Between 1995 and 2002, Slovak students have won 12 gold medals at International Olympiads in Informatics, matched only by Poland and ahead of all other East European candidate countries.

[55] see Olympiad results at http://olympiads.win.tue.nl/ioi/

***ICT-Related Subjects in Universities***

At university level, subjects related to informatics are taught at a number of universities, mostly ones specializing in technical subjects. Some management schools also include specialisation in IT management or Economic Informatics.

In universities, the Table 8.8 shows the numbers of students of informatics and related subjects in 2002. In total, these represent some 4% of the student population. One of the interesting features of the table is that it shows the level of fragmentation of study areas, which exists in all fields in Slovakia – the fragmentation reduces the comparability of studies in the same field at different universities.

**Table 8.8** ICT-related University Courses (2002)

| Subject | Students Bc level | Students MA level | Students PhD level |
|---|---|---|---|
| applied informatics and industrial automation | 574 | 124 | |
| applied informatics | 216 | . | 15 |
| applied informatics and information systems | 31 | . | . |
| automation | 665 | 185 | . |
| economic informatics | 107 | 914 | . |
| information and management systems | 11 | . | . |
| Informatics | 1,359 | 845 | . |
| informatisation of business and public administration activities | 593 | . | . |
| management technology and automation | 4 | 159 | . |
| computer technology and informatics | 112 | 815 | . |
| automation and management in engineering | . | 71 | . |
| information and security systems | . | 345 | . |
| equipment, information and automation technology | . | 83 | . |
| equipment, regulatory and automation technology | . | 174 | . |
| management, specializing in the management of information systems | . | 36 | . |
| automation and management | . | . | 45 |
| numeric analysis and scientific and technological computations | . | . | 4 |
| computer means and systems | . | . | 6 |
| programme and information systems | . | . | 16 |
| theoretical informatics | . | . | 2 |
| Total | 3,672 | 1,807 | 73 |

Source: own calculations based on data from the Slovak Ministry of Education

Total number of graduates in computer science-related subjects at all levels reached 1,299 in the school year 2001/2002. No data are available to gauge to what extent this meets the labour-market's needs.

There are several universities exclusively focused on technical subjects – the Slovak Technological University in Bratislava, the Technological University in Kosice, Technological University in Zvolen and the Zilina University. Together, these four universities accounted for 35.8% of all university students in full time study in the school-year 2000/2001.[56]

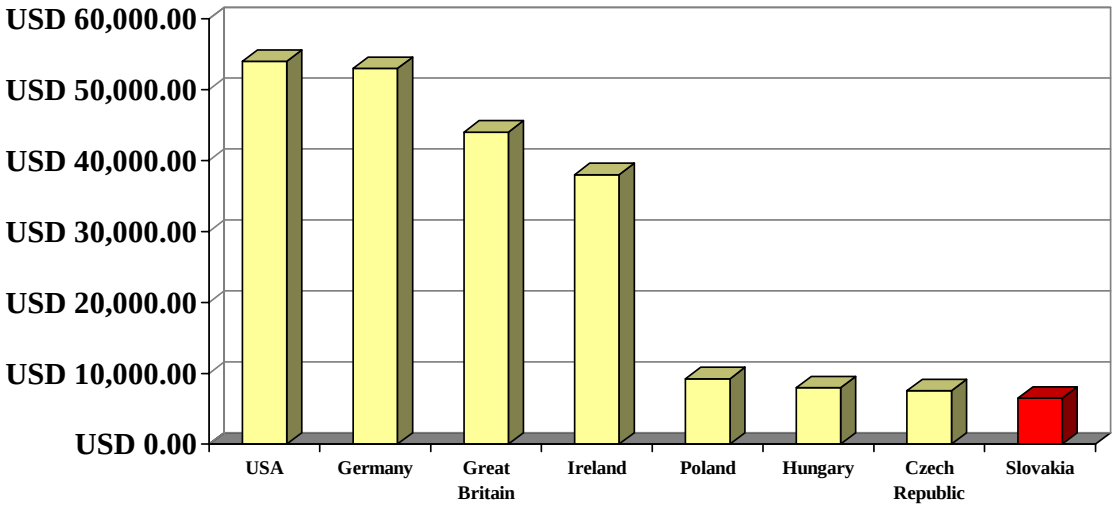
[56] Own calculations based on data from the Institute of Information and Forecasting in Education.

There is no systematic information available on linkages between business and the academia or the attractiveness of academia for foreign investment. Existing cases of linkages, however, are generally on a very small scale.

***Job market for IT specialists***

Recently trained graduates of informatics subjects are in high demand. According to anecdotal evidence, most already hold jobs while studying. The average salary in the IT sector is shown below in comparative perspective (Figure 8.1). No data was available on the shortage of ICT-trained graduates. Some evidence on shortages, albeit highly anecdotal, can be gathered from Slovakia's largest internet job portal www.profesia.sk. The category for IT Software related jobs is consistently one of the top two categories with most job offers posted (along with the broad category Services), with Telecommunications being another category with consistently high number of lucrative job offers (in 2001, telecom sector reported the highest average monthly salary in the national economy – 22,634 SKK or about 540 EUR).

**Figure 8.1** Annual Salary of Software Engineer with 3-year Work Experience




Source: Hay Management Business (October 2000)

Table 8.9 shows the development of salaries of programmers relative to average salaries of employees. Between 1996 and 2001, these rose by over 100% in nominal terms, outpacing both inflation and the growth in the average wage, which only increased by about 50% in nominal terms.

**Table 8.9** Wages of Programmers Relative to the Average Wage

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|
| Programmers | 11,681 | 20,498 | 16,908 | 18,298 | 17,216 | 23,601 |
| Overall | 8,154 | 9,226 | 10,003 | 10,728 | 11,430 | 12,365 |
| Ratio | 1.4 | 2.2 | 1.7 | 1.7 | 1.5 | 1.9 |

Source: Statistical Office, own calculations

In terms of English language preparedness no hard data is available. However, all students since the overthrow of Communism learn English as a second language starting in primary school. The quality of English teaching varies due to insufficient availability of qualified teaches, especially outside the larger cities.

## G.5. SWOT Analysis

- The Slovak educational system has its traditional strengths, especially in the area of teaching natural sciences and mathematics.
- On the other hand, the educational system is deficient in promoting creativity and teaching industry-relevant skills.
- More than a decade of insufficient financing and inefficient allocation of available funds has exhausted the quality of teaching staff and facilities at all levels of education.
- Slovakia has a clear need to expand the percentage of population with higher education, in light of its standing in this area compared to other EU and candidate countries.
- Early tracking in the school system, particularly at secondary school level where a significant portion of the students who go into vocational education have limited opportunity to pursue higher education, may prevent some students from realising their full potential.
- The existing government plans, particularly the Millennium, show how to remedy these deficiencies, the question is how rapidly and effectively these plans will be implemented.
- Unless more funding flows into education from both public and private sources, there is a major risk that the quality of educational outputs will decline.
- For universities, a major threat will be posed by EU accession – unless their quality improves, both qualified teachers and students will leave to pursue opportunities outside academia or abroad as restrictions on employment are abolished and students face the same conditions as nationals of EU states.

**Table 8.10** SWOT: Education and Training System

| **STRENTHGS** | **WEAKNESSES** |
|---|---|
| • Tradition of quality teaching in maths, natural sciences, informatics<br>• Pockets of excellence evidenced by success in international contests<br>• Achievement in theoretical technical subjects at university level | • Insufficient financing of the educational system, especially insufficient involvement of private financing<br>• Implicit debt of the education system in terms of quality of equipment<br>• Uneven standards of teaching of foreign language and IT skills throughout various types of schools and regions<br>• Excessive focus of education on memorizing, education stifling creativity, not supporting entrepreneurship<br>• Low portion of university educated population<br>• Declining levels of technology-related university enrolment (including ICT) |
| **OPPORTUNITIES** | **THREATS** |
| • Increased cooperation with industry of higher value added<br>• Multi-source financing of education<br>• Implementation of sweeping curriculum changes following the government document Millennium | • Declining public expenditure on education, combined with very low levels of private household expenditure on education<br>• Departure of qualified staff from the education sector due to insufficient remuneration<br>• Inability of universities to compete with those in the EU |

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Slovakia's traditional strength in terms of a high share of qualified technology graduates is currently *being undermined* by two major negative trends: first, *declining university enrolment in IT-related programmes*, and, second, *dramatic and very slowly decreasing ICT-related brain drain* (e.g. about 1,000 Slovak software engineers are said to be working in Germany and Austria for highly competitive compensation). Moreover, unequal and deteriorated standards of foreign language and IT education in elementary and secondary schools in the regions may be another serious threat to materialize in the coming future.

The opening up of the tertiary education system to European competition is likely to pose challenges, as more top quality domestic students will seek to study abroad. Universities must undergo reform to remain competitive, while also increasing capacities to meet goals in terms of higher enrolment. Otherwise, the low share of university graduates in the population may pose a problem for developing a knowledge-based economy. The changes must also involve greater cooperation with Slovak industry, as anecdotal evidence suggests, the extent of linkages is very limited

The lack of advanced equipment at schools, as well as the limited creativity and entrepreneurial spirit of the teaching process can be overcome by improved cooperation with the industry and other stakeholders. This medium-term opportunity is clearly recognized in strategic documents, which propose measures to ensure that by the end of the decade every Slovak child learns at least one foreign language and that there is at least one PC per four children available in schools across the country.

Overall, the education system must address the issue of financing by involving more private finances or raising state budget spending on schools, particularly to reverse the process of drain of qualified staff. Ambitious plans such as the Millennium must be backed by clear political and budgetary commitments.

# H. NATIONAL AND REGIONAL DEMOGRAPHIC DATA AND PROSPECTIVE

According to the Population and Housing Census conducted on May 26, 2001, there were 5,379,455 inhabitants with permanent residence in the Slovak Republic, of which 51.4% were women. The population increased by 105,120 persons, some 50% less than in 1991, due to deteriorated development of basic demographic indicators (Table 9.1), including a decline of marriage-rate, birth-rate, fertility, unfavourable trend of divorce-rate, stagnation of total mortality-rate, changes in abortion-rate and migration.

**Table 9.1** Slovakia's Demographic Profile

| Indicator | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|
| Total population (in 1,000s) | 5 379 | 5 388 | 5 393 | 5 399 | 5 403 | 5 379* |
| *of which:* | | | | | | |
| Males | 2 618 | 2 622 | 2 624 | 2 625 | 2 626 | 2 612* |
| Females | 2 761 | 2 766 | 2 769 | 2 774 | 2 777 | 2 767* |
| Population aged less than 15 years (%) | 21.7 | 21.1 | 20.4 | 19.8 | 19.2 | 18.6 |
| Population aged more than 60 (%) | 15.2 | 15.2 | 15.3 | 15.4 | 15.5 | 15.7 |
| Dependency ratio | 64.7 | 63.3 | 61.9 | 60.6 | 59.4 | 58.4 |
| Net population increase | 2.1 | 1.6 | 1.0 | 1.0 | 0.7 | -0.2 |
| Birth rate per 1000 inhabitants | 11.2 | 11.0 | 10.7 | 10.4 | 10.2 | 9.5 |
| Fertility rate | 1.47 | 1.43 | 1.38 | 1.33 | 1.30 | 1.20 |
| Net reproduction rate | 0.70 | 0.69 | 0.66 | 0.64 | 0.63 | na |
| Life expectancy at birth (years) | 72.84 | 72.81 | 72.66 | 72.99 | 73.18 | 73.40 |
| *of which:* | | | | | | |
| males | 68.9 | 68.9 | 68.6 | 69.0 | 69.1 | 69.5 |
| females | 76.8 | 76.7 | 76.7 | 77.0 | 77.1 | 77.6 |
| Life expectancy at age 60 (years): | | | | | | |
| males | 15.8 | 15.9 | 15.8 | 18.8 | 15.9 | 16.5 |
| females | 20.4 | 20.3 | 20.3 | 20.5 | 20.4 | 21.2 |
| Life expectancy at age 65 (years): | | | | | | |
| males | 12.9 | 12.9 | 12.8 | 12.9 | 12.9 | na |
| females | 16.4 | 16.4 | 16.3 | 16.5 | 16.4 | na |
| Net migration | 2,255 | 1,731 | 1,306 | 1,454 | 1,463 | na |

Note: * Data from the national Population and Housing Census (May 2001)

Source: Vagac and Haulikova (2002) based on data from Slovak Statistical Office and Eurostat

The highest number of population was reported by Presov region - 789,968, accounting for some 15% of the total. In comparison to 1991, the increase in this region - 50,704 persons - represents some 50% of the total national increase. Quite a significant increase was also reported in the other East-Slovak region of Kosice (24,796), and in the Central-Slovak region of Zilina (23,561). Declining population was reported in the regions of Bratislava (by 7,336) and Nitra (by 3,424). The lowest number of population was in the region of Trnava (551,003), which represented 10.3% of the total population in the Slovak Republic.

These *demographic differences* are even more pronounced, when geographical distribution of the population by districts (NUTS 4) is analysed. Of the total of 79 districts, overall, 26 districts reported population decrease compared to 1991 - by 39,194 persons. In 53 districts there was an increase by a total of 144,314 persons. In absolute terms, the highest decrease

was reported by the district Bratislava V (10,691 persons), Bratislava II (4,280), Bratislava I (4,220), and Nove Zamky (by 3,872). The highest absolute increase was found in the district of Presov (10,737), Bratislava IV (8,733) and Kosice-okolie (7,707 persons).

Geographically, population is highly concentrated in urban areas. There were 136 cities with the total population of 2,960,837 in May 2001, meaning an increase of *urban population* by 18 thousand compared to 1991 (i.e. 0.6%). The share of urban population on the total population slightly declined - from 55.8% in 1991 to 55% in 2001. *Rural population* totaled 2,418,618 persons, i.e. 87 thousand more than in 1991, accounting for some 83% of the total population increase.

## H.1. Age Patterns and Population Ageing

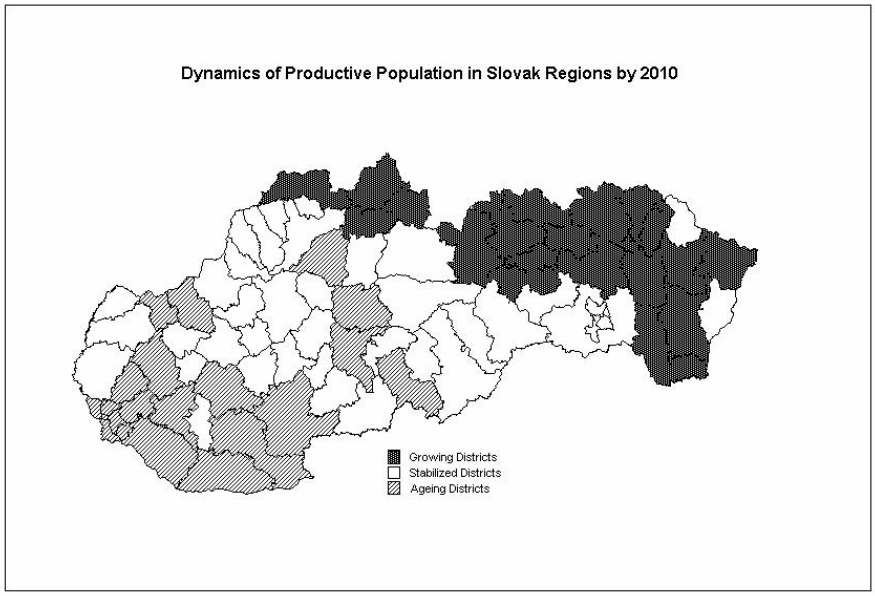
The age structure changed significantly after 1991. The share of persons in productive age increased hand in hand with the decline of the share of children up to 15 (as a consequence of sharply decreasing fertility rates[57]). The share of persons in post-productive age slightly increased, impacting negatively on the overall age structure of the population. The mean age of the total population increased from 33.6 (1991) to 36.1 (2001).

Number of children aged 15 and less declined by one third to 1,015 thousand, accounting for 18.9% of the total population (24.9% in 1991). It means an absolute decrease in this age group by 298 thousand in 10 years, which will definitely influence the development of the labour force pool in the near future. The highest demographic vitality is that of Presov region, where the share of children aged 15 and less represents 22.8%, followed by regions of Zilina (20.4%) and Kosice (20.3%). The share of this *pre-productive age* population decreased in all Slovak regions, the highest decline being reported by the regions of Bratislava (53 thousand) and Nitra (42 thousand).

Just the opposite trend was the development of population in *productive age*: the productive age group (men 15-59, and women 15-54 of age) slightly increased by 303 thousand to a total of 3,349 thousand (i.e. by 9.9%). Historically, the share of the productive-age group increased from 57.8% in 1991 to 63.1% in 2001. Again, the two East-Slovak regions benefited most: Presov (by 19%), and Kosice (by 14%).

[57] The numbers of livebirths reached historically the lowest level in 2001: 9.5 per 1,000 inhabitants. For the first time in history, more deaths have been reported than livebirths in 2001. The natural increase of 4 individuals per 1,000 in 1993 dropped to a decrease of -0.2 in 2001 (see also Table 9.1).

**Figure 9.1** Distribution of NUTS 4 Regions with Growing and Ageing Population




Source: adapted from Bucek et al., 2003

Number of population in *post-productive age* reached 967 thousand persons, which is an increase by 53 thousand compared to 1991. Its share increased from 17.3% in 1991 to 18% in 2001. Women contributed much more to this development than men, their increase representing 90.5% of the total. In the total increase of 53 thousand persons in post-productive age, Presov region accounted for 20%, followed by the region of Trencin (17%).

## H.2. Economic and Social Effects of Population Dynamics

The average age of the population is increasing with reductions in the population of children and growth of the numbers of productive and post-productive age individuals. In 2000, the mean age of males and females was 34.4 and 37.5 years, respectively. The ageing index defined as the ratio of post-productive population (men over 60 and women over 55 years of age) to pre-production age population (ages 0-14 years) keeps dramatically increasing in Slovakia, and showed an increase from 74.0 to 98.5 within 1993-2001. Worries are justified as to who will be supporting the subsistence of the elderly portion of the population although the government introduced a major pensions reform in 2004 to address the issue.

In Slovakia, this trend may have a specific social impact with respect to the ethnic structure of the population. The demographic behaviour of the *Roma population* (counting about 76 thousand in 1991, and increasing up to 90 thousand in 2001, according to Population and Housing Census data[58]), the majority of which lives in poor socio-economic conditions, differs markedly from that of the majority population. According to Vagac and Haulikova (2002), with its reproductive behaviour, the Roma population fills a certain demographic gap. As a result, many regions of Slovakia would be unable to sustain its population at a constant

[58] As the Romany nationality is concerned, the results of the Census show the fact not everybody used the possibility to report this nationality, but they reported the nationality with the prevailing position. The Romany nationality was reported by 90 thousand persons, which is 1.7% of the total population.

level if there were no growth of the Roma population[59]. Children below the age of 14 make up 43.4% of the Roma in Slovakia, compared to 25.5% for the Slovak population (Census, 1991). There are 4.2 children per one Roma woman in Slovakia, i.e. more than three times the average fertility rate of women in Slovakia (1.2 child per mother in 2001).[60]

The wide base of the Roma population pyramid becomes rapidly narrowed with the increasing age, due to high death rates of the Roma at relatively young age. The width of the age pyramid for the whole population of Slovakia therefore permanently exceeds the Roma pyramid since the age of 35 years. The top of the pyramid for Roma virtually ends at the age of 75 years since the Roma have a very short average life expectancy. Slovak Roma have been estimated to live 13 years (men) and even 17 years (women) in average shorter than the overall population of Slovakia. Only 3.6% of the total Roma population were individuals aged more than 60, the corresponding figure for the Slovak average being 14.8% (1991 Census).

Compounded with other factors such as isolation and segregation, long-term and permanent unemployment is rather widespread among the Roma population. Although statistics do not record poverty indicators by ethnic division, it is assumed that particularly Roma in isolated colonies (highly concentrated in the East Slovak regions of Kosice and Presov) are among the groups with highest risk of poverty. Table 9.2 illustrates the high unemployment rates of the Roma compared to the other ethnic groups in Slovakia.

**Table 9.2** Unemployment Rate by Ethnic Groups[61]

| | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|
| Total | 12.5 | 16.2 | 18.6 | 19.2 |
| Slovak | 10.9 | 14.9 | 17.5 | 17.9 |
| Czech | 7.6 | 11.5 | 13.3 | 23.9 |
| Hungarian | 18.1 | 22.4 | 25.5 | 27.1 |
| German | 11.4 | - | - | - |
| Polish | 2.0 | 5.5 | 23.9 | 19.9 |
| Russian, Ukrainian, Ruthenian | 15.1 | 21.6 | 22.0 | 17.6 |
| **Roma** | **83.2** | **77.5** | **73.5** | **72.6** |
| Moravian | 11.6 | 20.0 | - | - |
| Other | 8.1 | 17.5 | 2.4 | 16.5 |

Source: Labour Force Survey, Slovak Statistical Office

Note: Age group 15-64 years (in %)

[59] Geographically, among districts the highest share was reported in district of Kezmarok (8.8%), Levoca (7.1%), Vranov nad Toplou (6.9%), Gelnica and Revuca (each 6.8%). The highest number of Romany population lives in the district of Kezmarok (5,574 persons), Kosice-okolie (5,393 persons), Vranov nad Toplou (5,296 persons) and Spisska Nova Ves (5,100 persons). In comparison with 1991 a slight decrease of population with Romany nationality was reported only in region of Bratislava. The highest increase was in region of Presov - by 5 571 persons, i. e. by 21.4%, particularly in district of Kezmarok (by 2,332 persons) and Vranov nad Toplou (by 2,328 persons).

[60] The backward Roma colonies in Slovakia show as many as almost 8 children per family. According to WHO records, similar fertility rates are uncommon even in developing countries (Vagac and Haulikova, 2002).

[61] Some 520 thousand Slovak citizens reported Hungarian nationality in the 2001 Population and Housing Census (i.e. around 10% of the country's total population). By nationality reported, there were about 89,900 Roma people, 24,200 Ruthenians, 10,800 Ukranians, 44,600 Czechs, 5400 Germans, and 2600 Polish in Slovakia in 2001.

## H.3. SWOT analysis

- Slovakia still has a comparatively young population.
- The time-lagged ageing population trend in Slovakia was reinforced in the 1990s. This starts raising serious policy concerns as to who will be supporting the subsistence of the elderly portion of the population.
- Current trends may have a specific socio-economic impact with respect to the Roma ethnic minority (officially counting some 90 thousand inhabitants today, i.e. 2% of the total population), whose demographic behaviour differs markedly from that of the rest of the society.
- Poorer East-Slovakian regions show a higher demographic vitality than the richer ones in the western part of the country. Also, dynamics of their productive population assets will most likely continue to be positive for the whole period up to the year of 2010 at least, which is to be the turning point[62] on the natural population growth path in Slovakia.

**Table 9.3** SWOT: National and Regional Demography

| **Strengths** | **Weaknesses** |
|---|---|
| • Comparatively young population by European standards (mean age of 36) | • Ageing population trend established in 1990s<br>• Vulnerable demography of the Roma ethnic population |
| **Opportunities** | **Threats** |
| • High demographic vitality of the less well-off regions (East Slovakia) as a factor of economic development | • Adverse demographic impact of the current economic and social policy reforms |

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Relatively young population particularly in the Eastern Slovakia may be an important asset in an emerging society, where the most dynamic take-up and roll-out of new technologies is typical of the younger sections of the population. Unfortunately, the existing Internet surveys in Slovakia do not report on using habits and attitudes by major age groups, to be able to judge on IS-related impacts of this demographic trend.

On the other hand, the specifity of the Roma demographic behaviour can well be another major factor (besides their low levels of educational attainment, and extreme unemployment rates) contributing to their social inclusion and marginalisation, clearly jeopardising the universal service principle, around which the social fabric of advanced information societies is to be developed.

[62] This is the baseline scenario presented by the Slovak Demographic Research Centre at INFOSTAT, Institute of Informatics and Statistics of the Slovak Statistical Office in their "Population Projection of Slovakia until 2050", published in November 2002.

# I. CULTURAL AND SOCIOLOGICAL ASPECTS

There are several other important issues providing the wider context for the discussion of IS developments. Some of the most important for the Slovak IS context are reported and analysed in this section.

## I.1. Income Inequality and Poverty

Despite the trend of moderately growing *income disparities*, Slovakia remains a country with lowest levels of income inequality. Latest available comparable data show that the share of the poorest 20 percent of households on income is 11.9 percent, while being 31.4 percent for the richest 20 percent of households. Measures of income inequality (e.g. Gini index[63]) confirm that income inequality in Slovakia was the lowest world-wide in 1987-98.[64] The ratio of incomes of the richest decile and the poorest decile of the population oscillates around 4.5. This is also confirmed by a well-known World Bank study by Milanovic (1998:40), who reports that during the transition years inequality increased in all EU candidate countries, with the only exception being Slovakia.

**Table 10.1** Income distribution

| INDICATOR | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| Net monthly income per capita in the poorest 10% households (EUR, in PPS) | 60 | 74 | 70 | 66 | 73 |
| Net monthly income per capita in the richest 10% households (EUR, in PPS) | 285 | 328 | 340 | 293 | 337 |
| Ratio of highest decile to lowest decile | 4.75 | 4.40 | 4.86 | 4.47 | 4.62 |

Source: own elaboration based on data from Slovak Statistical Office

There is no explicit definition of the *poverty* line in Slovakia. The subsistence minimum may be considered as the unofficial poverty line since it reflects the implicit definition of poverty.[65] Based on 1996 data, World Bank (2001) has recently calculated poverty in Slovakia based on four poverty lines: 1 - subsistence minimum level; 2- 50 percent of median per equivalent adult income;[66] 3 - and 4 - two absolute poverty lines based on purchasing power parity to allow comparison of real values between countries: US$ 2.15 PPP per capita per day and US$ 4.30 PPP per capita per day. The results confirm that absolute poverty is relatively low in Slovakia (Table 10.2).

[63] Gini index measures the extent to which the distribution of income (or consumption) among individuals or households within a country deviates from a perfectly equal distribution. A value of 0 represents perfect equality, a value of 100 perfect inequality. The latest available figure for Slovakia is 0.250 (Luxembourg Income Study, 1995).

[64] UNDP: *Human Development Report 2000*. p. 172. World Bank data for individual countries refer to the most recent year available during the period 1987-1998.

[65] The subsistence minimum is defined as a socially recognised minimum level of income below which material distress occurs. It is set using the relative method based on income of individuals. Income characteristics were determined for households with the lowest 10 percent of income, based on subsistence minimum standards for individual components of food, other basic personal needs, and housing expenditures. Households with income below the subsistence minimum level calculated for that family are considered to be poor.

[66] using the Luxembourg Income Study

**Table 10.2** Poverty measures in the Slovak Republic

| Poverty line | % of households | % of individuals |
|---|---|---|
| Subsistence minimum | 7.9 | 10.1 |
| 50% median equivalent income | 5.9 | 5.8 |
| US$2.15 PPP per person per day | 2.1 | 2.6 |
| US$4.30 PPP per person per day | 6.3 | 8.6 |

Note: Poverty measure based on total income, including social transfers.
Source: World Bank (2001) based on 1996 Microcensus data.

**Table 10.3** Absolute poverty rates (selected EU candidate countries, % of individuals)

| COUNTRY | Year | At US$2.15 ppp/person/day | At US$4.30 ppp/person/day | GNP per capita |
|---|---|---|---|---|
| Slovenia | 1998 | 0.0 | 0.7 | 14,399 |
| Czech Republic | 1996 | 0.0 | 0.8 | 12,197 |
| Slovak Republic | 1996 | 2.6 | 8.6 | 9,624 |
| Hungary | 1997 | 1.3 | 15.4 | 9,832 |
| Poland | 1998 | 1.2 | 18.4 | 7,543 |
| Estonia | 1998 | 2.1 | 19.3 | 7,563 |
| Lithuania | 1999 | 3.1 | 22.5 | 6,283 |
| Latvia | 1998 | 6.6 | 34.8 | 5,777 |

Notes: Headcount Index. Data for the Czech Republic and the Slovak Republic based on income measures, all other countries are consumption measures. GNP per capita is from 1998 and is measured at purchasing power parity (PPP). Source: World Bank (2001) and Microcensus.

International comparisons reveal that although poverty in Slovakia does not appear to be widespread, there is a large portion of people at the very bottom of the income distribution: the share of population living on less than US$ 2.15 PPP per person per day is higher than in most countries of the region (see Table 10.3).

*The population group at the highest risk of poverty* is the unemployed, in particular the long-term unemployed, whose exclusion from the labour market often arises from insufficient education and qualification. Other groups traditionally at risk of poverty include children, incomplete families, and families with multiple children. Due to lower average income and pensions, women are more susceptible to poverty than men. All the aforementioned characteristics, particularly the low level of education and exclusion from the labour market, affect most markedly the *Roma population*. A significant portion of the Roma population suffers from poverty or even misery (Vagac and Haulikova, 2002).

## I.2. Social Mobility

A recent sociological analysis by Gonda and Timoracky (2002) shows that in Slovakia there is a prevalence of households with lower socio-economic status (about 62% of the total in 2001). Based on review of existing research and evidence, Vasecka (2002) states there is a weak and unstable tendency for this social stratification pattern to change over time, with a larger portion of households shifting up to the "middle class", than those moving down to the "lowest" social class. Moreover, this is a statistically insignificant trend, as due to available data, the "lower middle class" report income levels, which are very close to the households, being the major recipients of state social transfers (see Table 10.4).

**Table 10.4** Socio-economic status of Slovak households (1998-2001)

| Socio-economic class[67] | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|
| Highest class | 5.9 | 5.8 | 4.2 | 4.1 |
| Higher middle class | 8.7 | 7.8 | 8.9 | 8.9 |
| Middle class | 21.4 | 24.0 | 24.3 | 24.5 |
| Lower middle class | 21.4 | 18.4 | 19.5 | 19.2 |
| Lowest class | 42.6 | 44.0 | 43.0 | 43.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Vasecka (2002)

**Table 10.5** Blue-collar and White-collar Workers in Slovakia (1997-2001)

| CLASSIFICATION | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|
| Total | 2,205.9 | 2,198.6 | 2,132.1 | 2,101.7 | 2,123.7 |
| of which: | | | | | |
| 1. Legislators, senior officials and managers | 137.0 | 128.2 | 123.8 | 132.0 | 118.1 |
| 2. Scientists and brain workers | 188.6 | 210.2 | 222.4 | 215.0 | 217.3 |
| 3. Technical, medical, pedagogical and related fields professionals | 369.0 | 365.3 | 371.5 | 371.4 | 398.0 |
| 4. Administrative workers (officials) | 189.0 | 183.0 | 157.1 | 151.8 | 142.3 |
| 5. Workers in services and trade | 264.9 | 266.2 | 274.3 | 275.3 | 287.2 |
| 6. Qualified workers in agriculture, forestry and related fields | 47.1 | 42.2 | 31.4 | 27.5 | 23.1 |
| 7. Craftsmen and qualified producers, repairmen | 444.6 | 465.1 | 437.7 | 422.6 | 411.8 |
| 8. Plant and machine operators | 301.2 | 304.2 | 299.5 | 285.2 | 292.7 |
| 9. Supporting and non-qualified staff | 262.6 | 231.2 | 214.2 | 220.7 | 228.2 |

Source: Slovak Statistical Office (2002)
Notes: 1. Employment by Classification of Occupation ( ISCO-88 COM) based on LFS data;
2. Figures are average numbers in thousand persons

Comparing historical evidence on the type and quality of employment, which is continuously biased towards low-skilled jobs (see also Table 10.5), Vasecka (2002) concludes that unless technological and organisational innovation does not improve the quality and quantity of jobs, social structure of the Slovak society will become a threat to its cohesion. He singles out six major contributing factors as follows:

- *Predominance of households with low socio-economic status*;

[67] based on ESOMAR recommendation

- *Slovak people are not identified with life opportunities provided by the existing social structure (stratification)* Gyarfasova et al. (2001) report that 70% of respondents to their extensive sociological survey in 2000 stated they had been better off during socialist times. 70% is thought to be no more an indication of nostalgia for the past, but rather a disappointment of the present;
- *High rate and persistence of unemployment problem* brings about a social marginalisation of some 20% of population, threatening social cohesion, solidarity and dialogue across the society. Some people are forced to resort to various life strategies ranging from illegal work, through nepotism, to apathy;
- *Dissatisfaction with a real-life discrepancy between the socio-economic and cultural status among the high portion of the middle class* (in particular, those working in low-salaried, state-run education and healthcare sectors, and also older people). On the one hand, this can undermine the role of this class in guaranteeing social solidarity and political stability, while on the other, under certain circumstances, this can be a powerful source of social energy and creativity, capable of transforming parts of existing social structures.;
- *Potential conflict of generations*. The high unemployment among the young population can reinforce social pathology (in case of the low-qualified) and promote emigration behaviour (in case of highly educated);
- *Potential ethnical conflict* due to continuing social exclusion or even ethnic stigmatisation of the Roma.

Regarding *equal opportunities*, the weaker position of women in the labour market mostly shows as smaller average income and predominance of women in lower job positions and less remunerated sectors of the economy (health care, education, social welfare). On the average, women earn three quarters of what men receive, and their share on leading and managerial positions less than one third (2001). Female wage accounted for an average of 78.5% of male wage in 1997, while it decreased to 75% in 1999 and remained at this level in 2000 and 2001. Women have a marked share on unpaid work in the households. In this way, many women become financially dependent on men.

## I.3. Geographical Mobility

There are no recent sociological surveys available which would shed some light on the factors determining migration behaviour of the Slovaks. However, the possible causes of the relatively low levels of international migration of the Slovaks (reported below) can be extrapolated from the lack of their labour mobility inside their home country, which is the lowest of all OECD countries.[68]

***Intra-national migration***[69]

The lack of cross-border mobility can also be documented by the history of the former Czechoslovakia, when there were few, if any, cultural, religious, or linguistic barriers to labour mobility, as well as no legal restrictions on migration across the Czech-Slovak border. This has not changed after the break-up of Czechoslovakia, as the two countries agreed to preserve the common labour market indefinitely. Nevertheless, migration fell both internally,

[68] see also the recent OECD Economic Survey of the Slovak Republic (2002)
[69] Much of this section is based on research by Vagac and Sirak (2003)

and between the Czech lands and Slovakia, with only 0.01 and 0.06% of the Czechs and the Slovaks, respectively, crossing the new border in 1996.[70]

Significant regional income and unemployment differences in Slovakia were identified as one of the main problems of labour market development, in the Joint Assessment of Employment Priorities in the Slovak Republic[71], prepared by the EU and Slovak Republic. Despite pervasive regional labour market disparities, the mobility of the Slovak population[72] has significantly decreased in the recent two decades: while almost 120,000 people moved inter-regionally in the year 1980, only about 77,000 people reported a migratory move in 2000 (i.e. 14 people per 1000 inhabitants, see Table 10.6 and Figure 10.1). Short-distance moving dominates long-distance migration, which is a pattern observed in other candidate countries as well.[73]

**Table 10.6** Intra-national migration in Slovakia

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|
| Number of migrants ('000) | 85.0 | 82.6 | 68.3 | 80.2 | 82.5 | 84.8 | 79.0 | 76.9 | 79.9 |
| *of which:* | | | | | | | | | |
| within districts | 59.6 | 58.7 | 55.8 | 50.0 | 43.5 | 37.6 | 35.7 | 35.2 | 36.8 |
| within regions | 22.2 | 21.9 | 23.5 | 50.0 | 33.4 | 27.5 | 25.1 | 24.3 | 25.0 |
| across regions | 18.2 | 19.4 | 20.7 | na | 23.1 | 19.7 | 18.2 | 17.3 | 18.1 |

Source: Statistical Yearbook 2002, Slovak Statistical Office

Several explanations were suggested to account for this fall in mobility during the 1990s. First, the removal of some restrictions on the housing market during the transition resulted in sharp increases in rents and real estate prices. Second, commuting to work has become more common. Third, the formal requirement of reporting one's change of residence address is now more often ignored (see e.g. Fidrmuc et al., 1999, Fidrmuc, 2000[74], World Bank, 2001, OECD, 2002). Fourth, similar to countries like Italy and Spain, the existence of social networks and the importance of family and friends to finding jobs are thought to be responsible for the reluctance to move away from depressed regions in Slovakia. Fifth, an

[70] On the other hand, as reported by Fidrmuc et al (1999), some 59 thousand Slovak citizens, including commuters, were employed in the Czech Republic in 1995 and about 72 thousand in 1996. This corresponded to 2.3 and 2.8% respectively, of the Slovak labour force, and certainly helped mitigate the Slovak unemployment problem, with the Slovak unemployment rate standing at 13.1 and 12.8% in the respective years.

[71] Joint Assessment of Employment Priorities in the Slovak Republic (2001).

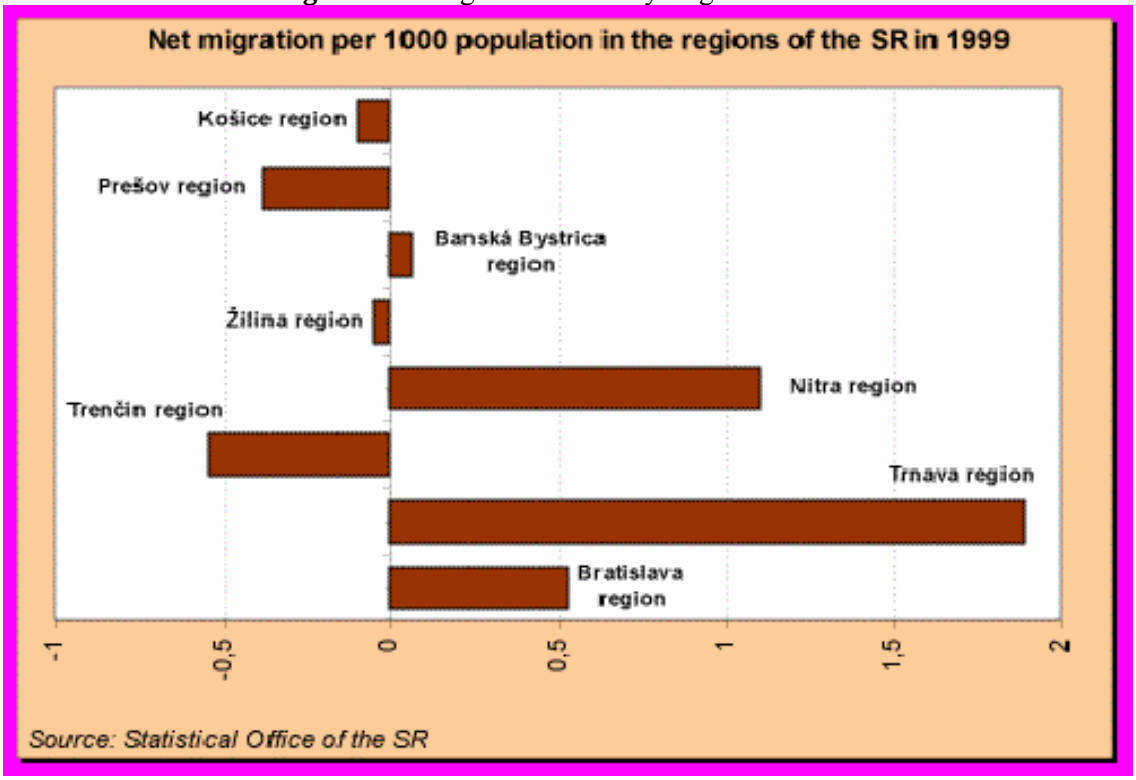
[72] measured by moving (i.e., formal change of permanent address)

[73] Analysing migration situation in the Czech Republic, Hungary, Slovenia and Slovakia for the period 1990-98, Huber (2001) finds that the migration rates in mid-1990s were not comparable to those of the EU, reporting even further decrease in the late 1990s. Also, Fidrmuc (2001) finds that there is a low effectiveness of migration on reduction of regional differences in transition economies. Differences in unemployment rates apparently do not affect migration flows among regions. However, an interpretation of the results must take account of the fact, that permanent address-based statistics are misrepresenting, because many people work on the long-term basis outside their home regions without changing their permanent address. This might be explained by a complicated housing situation in Slovakia.

[74] Fidrmuc (2000) provides an econometric analysis of the determinants of intra-national labour migration in Slovakia, based on data for the first half of the 1990s. He includes not only the traditional factors like differences in wages and unemployment, but also other economic (size of the private sector, shares of agricultural and industrial employment), social and demographic factors (educational, ethnic, religious and urban/rural structure of the population), which significantly affected the migration process in the respective period.

important barrier to commuting seems to be the relatively high transport costs in Slovakia (see World Bank, 2001:57-58)

**Figure 10.1** Migration Flows by Regions in 1999




***Inter-national Migration***

Based on the migration trends since the 1990s, Slovakia does not need to worry about the massive influx of labour from abroad,[75] with its labour market being attractive mostly to citizens of other CEE countries, the three most represented national groups of legal foreign workers being the Czechs, the Ukrainians and the Polish. Slovakia's cross-border migration flows are fairly limited both in size and frequency (short-term, seasonal workers dominate).

According to the quarterly statistics published by the National Labour Office (NUP), as of 31 December 2002 the number of working citizens of the EU candidate countries in the Slovak Republic was 2,386, of which from: Bulgaria 44, Cyprus 1, the Czech Republic 2,023, Estonia 0, Lithuania 0, Latvia 69, Hungary 87, Poland 119, Romania 32, and Slovenia 11. In the same period, there were 1082 EU citizens working in the Slovak Republic, of which: France 115, Germany 355, Austria 121, Italy 102, the United Kingdom 187, Belgium 26, Denmark 31, Finland 5, Netherlands 41, Portugal 5, Spain 54, Sweden 23, Ireland 14, and Greece 3.

[75] Recent public polls suggest that a massive emigration from Slovakia should not be feared, due to various psychological factors, geographical distance, low internal labour mobility, limited language skills, work qualifications, etc.

**Box 10.1** Free Movement of Labour in EU Candidate Countries

Based on the OECD research cited in Marcincin and Lubyova (2002), in the Czech Republic the share of foreigners on the total population was 2 percent in 1998, followed by Hungary with 1.5 percent. These figures are fairly close to those of some of the EU member states. Slovakia, with 0.5 percentage share, lagged also behind Bulgaria (1 percentage share), but was ahead of Poland (0.1%). Similar picture emerged from a comparison of the shares of foreign workers in total national employment: the Czech Republic was taking the lead with 2.4 percent, well ahead of Hungary (0.6 percent) and Slovakia (0.3 percent). In absolute terms, the Czech Republic reported the highest number of foreign nationals (219 thousand, of which 110 thousand being workers). The lowest number of foreign workers was reported

On the other side of the equation, the Slovaks migrate to jobs mostly to the neighbouring Czech Republic, Austria and Germany. Legal migration of Slovak workers to the Czech Republic and Germany is regularly monitored by NUP.[76] In the case of ***the Czech Republic*** and Slovakia, there is a substantial migration imbalance between the two countries: while more than 2,000 Czech citizens work in Slovakia legally, the number of Slovak workers in the Czech Republic has traditionally counted in tens of thousands, despite the decreasing volumes in recent years.[77]

**Table 10.7** Immigrants to Slovakia

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|
| European Union | 362 | 294 | 304 | 272 | 223 | 199 | 218 | 170 | 243 |
| EFTA countries | 61 | 57 | 67 | 48 | 54 | 51 | 30 | 41 | 38 |
| EU candidates | 7,406 | 3,371 | 1,692 | 1,320 | 1,075 | 965 | 1,048 | 1,408 | 1,116 |
| Ukraine & Russia | 411 | 503 | 499 | 357 | 455 | 359 | 266 | 217 | 156 |
| Continents: | | | | | | | | | |
| Africa | 30 | 48 | 28 | 31 | 29 | 25 | 37 | 33 | 21 |
| Asia | 193 | 149 | 82 | 112 | 133 | 133 | 163 | 70 | 118 |
| America | 227 | 192 | 203 | 173 | 141 | 137 | 127 | 192 | 202 |
| Australia & the Pacifics | 49 | 63 | 35 | 45 | 36 | 46 | 18 | 16 | 22 |
| Europe | 8,453 | 4,467 | 2,707 | 2,115 | 1,964 | 1,709 | 1,716 | 1,963 | 1,659 |
| Total | 9,106 | 4,922 | 3,055 | 2,477 | 2,303 | 2,052 | 2,072 | 2,274 | 2,023 |

Notes: 1. Breakdown by country of origin, 2. Turkey and Cyprus are included into both Asia and EU candidates
Source: Slovak Statistical Office

[76] However, some of the Slovak labour migration flows (e.g. short-term and illegal) to other countries is difficult to monitor by the Slovak statistical authorities, and may thus not show up in the official migration statistics. Estimations of Slovak workers abroad by receiving countries are therefore much more realistic than any estimations based on data reported in Slovakia, which indicate only a minimal number of legal Slovak workers abroad.

[77] The number increased from about 23,000 in 1993 to about 72,000 persons at the end of the year 1996. In the period 1997-2000 a declining trend was observed, with the figures falling to 61,000 persons (end of September 2000). This trend was matched by a parallel growth of the number of the Czech citizens working in the Slovak Republic from 1,200 to 2,200 persons during the period 1993 - 2000.

**Table 10.8** Emigrants from Slovakia

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|
| European Union | 31 | 25 | 47 | 70 | 226 | 245 | 247 | 348 | 397 |
| EFTA countries | 1 | 0 | 4 | 9 | 27 | 41 | 26 | 36 | 34 |
| EU candidates | 7,295 | 109 | 130 | 103 | 230 | 287 | 230 | 335 | 422 |
| Ukraine and Russia | 3 | 4 | 5 | 7 | 2 | 10 | 8 | 13 | 6 |
| Continents: | | | | | | | | | |
| Africa | 0 | 0 | 1 | 3 | 6 | 3 | 3 | 6 | 3 |
| Asia | 2 | 1 | 3 | 3 | 8 | 18 | 10 | 8 | 12 |
| America | 18 | 13 | 10 | 13 | 51 | 104 | 74 | 75 | 110 |
| Australia&Pacifics | 8 | 3 | 9 | 10 | 30 | 21 | 14 | 17 | 17 |
| Europe | 7,327 | 137 | 190 | 192 | 477 | 600 | 517 | 705 | 869 |
| Total | 7,355 | 154 | 213 | 222 | 572 | 746 | 618 | 811 | 1,011 |

Notes: 1. Breakdown by country of origin, 2. Turkey and Cyprus are included into both Asia and EU candidates
Source: Slovak Statistical Office

According to NUP data, a total of 9,065 Slovak citizens worked legally in ***Germany*** at the end of 2000, of which 8,151 on a short-term basis, and 914 had job contract lasting more than one year. The total number increased to 11,041 and 11,832 at the end of 2001 and 2002, respectively. According to the baseline projections in Boeri and Bruecker (2000),[78] the number of Slovak residents in Germany is estimated to be around 41 thousand in 2005, and about 70 thousand in 2010, if free movement of labour is introduced for all ten candidate countries (CEEC10) in 2002. The comparison of the actual (not reported here) and projected figures for the Slovak labour migration to Germany at the end of 2002 - 11,832[79] compared to 16,532 - suggests, first, that there are still important barriers to a genuine freedom of movement at the dawn of the Eastern enlargement of the EU, and, second, the Slovak migration will hardly pose any major challenge to the enlarged EU labour market.

**Table 10.9** Projected number of residents from Slovakia in Germany

| | START VALUE | 2002 | 2003 | 2005 | 2010 | 2015 | 2020 |
|---|---|---|---|---|---|---|---|
| Slovakia | 6,707 | 16,532 | 25,464 | 40,950 | 68,672 | 85,365 | 95,080 |
| CEEC10 | 535,899 | 754,329 | 952,131 | 1,292,799 | 1,890,933 | 2,235,498 | 2,420,513 |

Source: adapted from Boeri and Bruecker (2001)

Both measuring and controlling migration flows between Slovakia and ***Austria*** is a much more difficult task, which deserves a special attention here. Since the Slovak capital of Bratislava and its surrounding region is within the commuting distance from the City of Vienna, labour mobility is not confined just to migration. Rather, a much larger amount of Slovak labour in Austria may be daily or weekly commuters who will not show up in the official migration statistics, and will not be deterred by the administrative constraints on labour mobility. However, according to experts' opinions collected either in mid-1990s or quite recently, there are only about 8,000 Slovaks (mainly from the region of Western Slovakia) commuting to Lower Austria, of which about 3,000 commute directly from the capital city of Bratislava. The inflow of workers from Slovakia into Austria is thus surprisingly low despite enormous income differentials. To some extent this can be attributed to Austria's restrictive immigration policy. Another factor is that Austrian industry seems to

[78] see the study for the methodological assumptions for the projections
[79] a total of short-term (seasonal) and contract (more than one year) workers together (based on statistics from the National Labour Office, NUP)

rely on established channels (through personnel agencies) and recruits new foreign labour from the traditional countries of Ex-Yugoslavia and Turkey.[80]

## I.4. Cultural Production and Consumption

Overall, the 1990s have seen a slight decline of cultural consumption across all major social groups (employees, farmers, self-employed, pensioners). Most recently, in monetary terms, the share of household expenditure on recreation and culture decreased from 8% (1998) to 7.3% (2001). The following sub-section contains statistical data on culture consumption in the Slovak Republic, as reported by networks and activities of state, urban or municipal, and private cultural facilities (see Annex I, i4). In the period 1997-2001, the number of *theatres* in permanent operation increased by 7 - up to 43. The audience grew from 1.2 million to 1.4 million theatre-goers, and number of performances ranged from 4,796 to 5,925, with 39% to 45% of them taking place in Bratislava region.

In the *movie industry*, 73 to 94 movies were produced a year (most of them in 1997), of which short and medium length represented about 96% to 99%, which only 1 to 3 full-length films were produced annually. In 2001, in Slovak cinemas and movie clubs some 160 full-length film premieres from around the world took place, of which the majority made in the USA (57.5%), the Czech Republic (11.2%), and Great Britain (7.5%).[81]

*Public libraries* were the most common point of access to literature, despite a reduction in number of both their main and branch offices. In the second half of the 1990s., a decreasing tendency can also be observed both of ther reading stock, as well as their registered membership (by some 77 thousand between 1997-2001). Number of loans declined from 25,733 thousand to 24,702 thousand, while the number of loans per registered user ranged from 34–36.4 per year. *University libraries* had a special position, as they are specialised according to professional orientation of individual university. Reading stock of university libraries increased by 23.7 thousand library units compared to 1997, while loans to users increased by 8.9%. The number of registered users increased by some 7% or about 9,500 people. Loans per registered user ranged from 17.4 to 19. The Slovak system of *central scientific libraries* covers a network of 12 libraries with a growing library stock, where the number of registered readers declined (by 28 thousand), and loans per registered user varied between 28 to 33.

In the period surveyed, *newspaper and magazine titles within periodical press* increased by 348 titles (1.3% increase). The annual number of daily newspapers ranged from 16 to 24 titles. In 2001, 19 newspaper titles were published for citizens with Hungarian nationality[82], of them 1 daily newspaper, 4 weekly press and 14 newspapers with a lower periodicity and 29

[80] Among the several recent Austrian studies, relying on econometric modelling, Walterskirchen and Dietz (1998) estimated that the total of 150,000 CEE workers would commute to Austria over the period until 2015, 50,000 of them coming from Slovakia. However, some serious questions have been raised about the relevance of assumptions underlying such commuter number estimates. For example, were the geographic distance that relevant, majority of commuters would come from Bratislava, which is only an hour's drive from Vienna. But according to the experts' opinions mentioned above, a relatively few inhabitants of Bratislava actually contemplate such a move.

[81] Of the premiered movies, 45% were shown with the Slovak and 36% with the Czech subtitles.

[82] Some 520 thousand Slovak citizens reported Hungarian nationality in the 2001 Population and Housing Census (i.e. around 10% of the country's total population). By nationality reported, there were about 89,900 Roma people, 24,200 Ruthenians, 10,800 Ukranians, 44,600 Czechs, 5400 Germans, and 2600 Polish in Slovakia in 2001.

magazines, of which 3 were published weekly and 13 monthly. In addition, in a combined Slovak – Hungarian edition 23 newspaper titles were published, of which 5 weekly press and 18 newspaper titles with a lower periodicity and 10 titles of Slovak – Hungarian magazines. Also, 1 newspaper, 1 bi-monthly magazine and 1 bi-monthly magazines in Slovak – Ruthenian language were published for Ruthenian nationality in 2001. For the Roma population, 1 newspaper were published in a Slovak – Romany language combination in a lower periodicity and also 4 magazines in Slovak – Romany combination, of them one monthly, 1 bimonthly and 2 quarterly magazines were published in 2001. Of the other languages, there were 22 magazine titles published in English, 3 titles in Ukrainian, 2 titles in German, and 1 title for the Czech, Polish and French readership.

*Radio broadcasting* was characterised by a growing number of hours broadcast in radio stations with a nation-wide coverage. The number of private-owned radio stations increased from 19 to 21, while the number of transmitters reached the number of 91. The number of broadcast hours of nation-wide broadcasting increased 1.2 times during the period under scrutiny.

On terrestrial *television* channels with a nation-wide coverage, the time broadcast decreased, as one of the national TV stations discontinued its operations in 1999. However, the number of local TV stations increased from 5 to 8, resulting in a two-fold increase of the total of hours broadcast. The structure of the broadcasting time was dominated by the news programmes (41.2%), followed by the art and entertainment programmes (39.3%) in 2001. TV broadcasting for ethnic minorities increased nearly two-fold - from 42 hours up to 80. Of this, some 69% was broadcast in the Hungarian language, 16% in Romany language, and about 9% in the Ukrainian and Ruthenian languages.

## I.5. SWOT Analysis

There are several sociological factors, which are likely to affect IS development potential in Slovakia:

- Slovakia remains a country with lowest levels of income inequality.
- Although poverty is not widespread in Slovakia, comparatively large sections of population do live at the very bottom of the income distribution.
- Also, sociological evidence points towards a prevalence of households with lower socio-economic status, with a very weak and unstable tendency for improvement over time. This is also correlated with an occupational structure of the society, which is biased towards low-skilled jobs.
- Slovakia's intra-national labour mobility is among the lowest in Europe, and is believed to be one of the causes of the high and persistent unemployment problem.
- Regarding international migration trends, Slovakia does not need to worry about the massive influx of immigrant workers with its labour market being attractive mostly to citizens of other CEE countries (the Czechs, the Ukrainians and the Polish clearly dominate). Slovakia's cross-border migration flows are fairly limited both in size and frequency (short-term, seasonal workers dominate).
- There is a slight decline of cultural consumption across all major social groups (employees, farmers, self-employed, pensioners), most notable in the decrease of library users/visitors.

**Table 10.10** SWOT: Society and Culture

| | |
|---|---|
| **Strengths**<br>• Relatively balanced overall income distribution<br>• Importance of social networks and family and friends | **Weaknesses**<br>• Large portion of population at the bottom of income distribution<br>• Lack of social mobility<br>• Lack of geographical mobility of population<br>• Declining cultural consumption (across all major social groups) |
| **Opportunities**<br>• Integration of social and geographical mobility-enhancing ICTs into relevant public policies | **Threats**<br>• Population most at poverty risk deprived of access and use of new ICTs (growing digital divide)<br>Deterioration of social cohesion due to pending lack of social mobility |

***swot analysIS***

Of the *major sociological factors* identified above (i.e. predominance of households with low socio-economic status, high rate and persistence of unemployment, persisting dissatisfaction with a real-life socio-economic and cultural status among the high portion of the middle class, potential conflict of generations, and potential ethnical conflict) as posing a major *threat to social cohesion* in Slovakia in the coming years, all may have a profound impact on the extent and pace of adoption of new ISTs among the general population. This also means that effective policies to address them if well designed may have a considerable potential to become an important factor in the catching-up process towards Lisbon "social cohesion" targets.

# DIAGNOSIS OF FACTORS AND IMPACTS IN THE INFORMATION SOCIETY IN SLOVAKIA

This section is aimed to provide a more contextualised, cross-sectional and multi-factorial analysis of Slovakia to show which (economic) fundamental or (public) policy factors have been determining, and are most likely to determine Slovakia's information society development trajectory in the coming years.

The current *favourable macroeconomic environment* creates a solid basis and more space for strategic investment decisions by business sector in the area of technological development, including ICTs. Since 1998, Slovak Government's *FDI policy* have been a major contributing factor in raising the previously low levels of FDI in Slovakia, and attracting some of the high-value investment projects, including world-class automotive and consumer electronics multinationals. The new FDI strategy (designed with technical assistance from Irish FDI policy advisors) to be introduced in 2004 has the ambition to increase a diversity of the incoming multinationals, by targeting a few medium- and high-tech sectors with a high development potential in the coming future (most notably medical electronics, biotechnology, and software services).

*Slovakia's National Development Pl*an for 2004-2006 is heavily focused on physical infrastructure development (transport in particular), i.e. an investment priority, which has been a major contributing factor of the high gross capital formation throughout the 1990s. *IS-related structural investment* is to be targeted on "soft" (development of network and applications) rather than "hard" (physical construction) factors, its planned volume being substantially lower compared to the transport priority.

As far as *the low or limited institutional and policy creativity* in Slovakia is concerned, no major improvements can be expected, if the declared government priority does not translate into more state budget resources being allocated to IS activities. Second, even if the delayed adoption of IS-related legislation finally takes place, the other major drawbacks like e.g. weak inter-ministerial and intra-ministerial coordination, will hardly be overcome in the coming months and years, unless low implementation capacities of the key government agencies are effectively addressed.

Also, a repeated history of lacking transparency and alleged corruption affairs inside the Ministry of Transport, Posts and Telecommunications (MTPT) should be another major area of urgent reform, as the EU's Structural Funds now being introduced in the country will flow mostly to the transport and telecom development areas. The now rather limited regulatory influence should be balanced by more IS promotion activity on the part of the government to engage major operators in the awareness building for IS. A new series of training organised by the Slovak Telecom (under the eSlovakia Initiative) to stimulate the IST take-up among the older generation of its clients is a step in the right direction.

An improved consultation and cooperation between the government and a proactive and innovative NGO sector could further strengthen the overall IST governance framework, at least via improved agenda-setting process. The readiness of business sector for public-private partnership, the important source of the unique projects at the local level, is another factor, which should be utilized.

National IS institutional framework characterised by the substantial organisational inertia is, and will most likely be a major weakness, that can only be effectively addressed from the top management level. However, the responsible MTPT seems to be preoccupied with a more pressing and politically rewarding transport policy agenda, given that new roads and highways have become a major national development priority with planned state budget allocations to be massively co-financed from the EU Structural Funds.

At the sub-national level, the newly created regional governments have made considerable SF programming efforts to include IS component into their development strategies. However, despite ambitious visions of "intelligent regions," their real influence will remain rather limited in the coming years, with the SF managing authority being vested in the sector ministries in 2004-6 programming period. Regional and local IS development will therefore largely depend on the successful implementation of new SF-funded projects, and a further strengthening of financial base and administrative capacity of the autonomous regions to be able to play a more active role in that development beyond 2006. In the meantime, there is a substantial potential for local and regional authorities to develop location-specific content of the existing web-based initiatives.

The automotive industry has become the biggest employer and the most competitive exporter in Slovakia in the late 1990s and beyond 2000. With the envisaged annual production of cars of up to 800 thousand units (i.e. a combined output of VW, PSA and most likely Hyundai), the country may quite unexpectedly become the world's biggest producer in the sector. Other major industry sectors that are growing in importance include electrical engineering, and electronics, mainly due to strong presence of major global players coming from the U.S., Germany, Japan, and most recently from Korea. Traditional chemicals, metallurgy and heavy-engineering producers have embarked on a major restructuring path since the late 1990s, mainly due to the competitive pressures of the EU single market. Their medium-term destiny is difficult to assess at present. Overall, Slovakia's manufacturing production structures can be assessed as fairly close to those operating in the EU.

Regarding the services sector, its international competitiveness is very fragile, reflecting also its comparatively lowest (among CEECs) share in the country's total gross value added and international trade. Slovakia's comparative advantage remains in the transportation of gas and crude oil between the "East" and "West", now heavily controlled by the foreign (Russian, German and French) capital. The rising share of industry, with its low-technology content and an excessive reliance on cost-based competition factors, together with a relatively weak services sector may well combine to increase an overall vulnerability of the Slovak economy to external fluctuations in the coming years.

Despite overall positive growth and convergence trends, recent dynamics of industrial development do not - in the medium term at least - provide a reliable case for IS strategies based solely on major competitive strengths either in ICT-manufacturing or ICT-services. This is because the current patterns of (mainly cost-based) industrial competitiveness and geography - of the ICT-manufacturing (electronics industry in particular) - cast some serious doubts on whether industrial and regional structures will be able to adjust successfully to inevitable relocation processes (further eastwards) as the EU integration proceeds.

In that respect, the highly interesting *case of Alcatel Slovakia*, which started its operations in early 1990s in the manufacturing electronics business, with completely focusing on software services in late 1990s, suggests, that any policy attempt to replicate "Silicon Valley" models

in Slovakia would require (besides the necessary time to evolve) substantial industrial modernisation effectively promoting both indigenous industry development, as well as a stronger "local embeddedness" of incoming global players, which follow their own internationalisation strategies. The former (sectoral) element is already incorporated in the new FDI strategy being drafted, while the latter (spatial) element should be more explicitly addressed by the regional policy-makers.

The most promising exception from the rule seems to be the *growing Slovak software services industry*. Its key strengths include, first, the presence of world-class companies (e.g. Hewlett-Packard, Siemens, Alcatel, IBM, Dell, Accenture) operating substantial facilities in Slovakia at the upper end of the value chain in the services industry. Second, there is a very strong (and growing) domestic industry at all levels in software development. Third, a large local pool of university graduates as well as quality managers (both Slovak and foreign) capable of running these operations is another contributing factor. Fourth, advanced educational system with close links to the industry, particularly Technological Universities in Bratislava and Kosice, and technical faculties in Zilina, and Trencin. Slovakia already has established a track record in software development and shared services in both the foreign and domestic sectors. Slovakia may already be one of the top centres in CEE for this type of services industry, which is a "first mover advantage" to be also strongly promoted world-wide by the new FDI strategy. The new and existing investment incentives and financial engineering schemes (which are currently rather limited) will have to be specially tailored to the needs of this industry (particularly training and employment grants) as the capital investment in this sector will not be on the same scale as a manufacturing operation. Last but not least, growing pay levels of Slovak IT specialists working for both indigenous and foreign-operated companies are believed by some analysts to act as a buffer against a more dramatic brain drain towards Germany and Austria, so typical for the 1990s. However, this salary convergence process is still very slow.

The pressing need to embed (integrate) the footloose ICT-related activities is one of the major challenges, which can effectively be addressed through various supportive *framework measures* (including S&T and innovation policies) as well as well-designed *selective financial incentives*. Measures promoting IST technology transfer may well assist traditionally large chemical and metallurgy enterprises in successfully restructuring and transforming their business for the modern times (e.g. chemicals/pharmaceuticals towards biotechnology). National and regional *systems of innovation* in Slovakia during the transition period characterized by adverse macroeconomic factors made it difficult either to design or to pursue efficient industrial and R&D policies. Despite recent improvements, Slovakia is still facing difficulties on both the supply and the demand side of the market for innovations. Declining GERD have compelled state-funded industrial research institutes towards applied research and demand-side orientation; such an applied orientation still have to be promoted in the traditional institutes attached to the Slovak Academy of Sciences. Furthermore, there is currently *very little co-operation between research institutes and the universities or industry* and organisational structure is often poor, with very few joint projects developing into e.g. centres of excellence or other types of institutionalised linkages. Too little is known about the inner workings of existing R&D organizations, the motivations of R&D personnel (it does not seem to be the salaries which are on average very low in the sector) and how best they can be channelled to useful activities. Although accreditation, economics and foresight have ensured improving performance, there has been relatively little concentration on whether the structure and management of the R&D system (which tends to be a blend of old and new institutions) itself is effective.

Turning to the private business sector, evidence (though rather weak at the moment) of the *lacking cooperative culture* may be cause of concern in a networked society, where industrial and regional competitiveness is increasingly based on more intangible factors like social capital and social networks mediated through the new digital technologies. This concern is growing in importance, given that the role of the Government is shifting from a regulator to a facilitator of the transformation towards IS. The Slovak government would essentially have to engage more in *awareness-building* exercise, in order to make visible economic benefits of cooperation and trust. At present, it is doubtful if the Government will have the adequate capacity to assume such a creative, non-interventionist role in the coming years. The RIS concept promoted by the European Commission, and piloted in Slovakia by the Nitra region, if implemented successfully, can provide a source of inspiration and organisational learning.

To address the declining though still relatively high levels of business R&D expenditure, the catalysing potential of risk capital schemes (including venture capital) will have to be utilised. The possibility to put *risk capital financing* in support of industrial and regional development, *with participation of the EU's Structural Funds*, has recently been strengthened by the respective Community law. The access to Structural Funds, but perhaps more importantly the Slovak banking sector (successfully restructured, currently over-capitalised, and clearly dominated by investors from Austria and Italy) can stimulate the growth of risk capital industry, providing more resources to promote a more dynamic IST take-up and roll-out.

In Slovakia, a lack of correlation between the relatively high penetration of PCs and Internet on the one hand, and "immature" usage patterns on the other may well be explained by lacking investment (business market) or consumption (residential market) capacity. More developed business applications of ICT are typically found in the leading sectors of telecommunications and financial services. This is clearly determined by a strong private foreign ownership in these sectors, with appropriate financial backing to adapt to the global business practice.

Regarding *e-government* applications, unlike business, citizens are much more concerned with the *security issue*, in particular when personal and financial information is to be transmitted over the Internet. Furthermore, average *purchasing power* limits individual consumers/citizens' ability to buy an appropriate terminal equipment to access available IST applications, such as e-banking, e-commerce or e-government. Moreover, the rising ("anti-Lisbon trend") telecom *connection and usage prices* (a policy of a dominant operator) significantly hinder a more dynamic take-up in the residential IST penetration and use, with households now spending twice as much on their communications needs than was the case in the mid-1990s.

Surveys show no major *regional differences in access and use* of ICT. However, the data is available on a NUTS 3 level only, which masks important variations at the local level (towns and villages), where access and use is usually mediated by upgraded PC equipment in existing public facilities like libraries and schools. Among the social groups, the unemployed (some 20% of the country's population) and pensioners are among the least equipped and wired parts of the population.

In order to prevent digital divisions across social and geographical boundaries from widening, there are strong political pressures in the government to ensure that everybody has a decent access to the new ICTs in his/her neighbourhood, with all types of *schools* identified *as the major "points of access"* in that respect. However, a sensible government policy will have to

take account of the main trends reported above, for instance, that education facilities are the primary place of access for the younger and more technologically advanced only, and adapt its promotion campaigns accordingly.

High *technology achievement* ranking of Slovakia as reported by the U.N. has traditionally been due to the high share of tertiary level IT graduates, higher than that of the technology leaders like the U.S and Finland. However, this traditional strength is currently *being undermined* by two major negative trends: first, *declining university enrolment in IT-related programmes*, and, second, *dramatic and very slowly decreasing ICT-related brain drain.* Moreover, unequal and deteriorated standards of foreign language and IT education in elementary and secondary schools in the regions may be another serious threat to materialize in the coming future. Also, not all students, especially in primary and secondary education have access to ICTs. Given that computer technology in these schools has depended more on sponsorship finance than on state-budget funding, it is likely that the availability of equipment copies regional wealth divisions. Again, the new FDI strategy has been able to recognize these alarming trends, proposing appropriate measures to ensure that by the end of the decade every Slovak child learns at least one foreign language and that there is at least one PC per four children available in schools across the country. These will have to be complementary to measures under the Millennium Plan in order to stimulate change in the foreseeable future.

The *relatively young population in Slovakia* may be an important development asset in an information society, where the most dynamic take-up and roll-out of new technologies is typical of the younger sections of the population. Unfortunately, the existing Internet surveys in Slovakia do not report on using habits and attitudes by major age groups, to be able to judge on IS-related impacts of this demographic factor.

On the other hand, the specifics of the Roma demographic behaviour can well be another major factor (besides their low levels of educational attainment, and extreme unemployment rates) contributing to their social exclusion and marginalisation, clearly jeopardising the universal service principle, around which the social fabric of advanced information societies is to be developed.

Referring to wider societal impacts, of the major *sociological factors* identified above (i.e. predominance of households with low socio-economic status, high rate and persistence of unemployment, dissatisfaction with the cultural status among the high portion of the middle class, potential conflict of generations, and potential ethnical conflict) as posing a major threat to social cohesion in Slovakia in the coming years, all may have a profound impact on the extent and pace of adoption of new ISTs among the general population. This also means that effective policies to address them if well designed may have a considerable potential to become an important factor in the catching-up process towards Lisbon "social cohesion targets."

The key observation (made both in chapters on economic developments and society/culture) that due to low labour mobility the pressing regional unemployment and wages differentials will not be eliminated by the migration process itself, means that public policy makers may now be in a position to try and integrate the new IST into existing labour market policies, e.g. via improving the general accessibility and responsiveness of existing job-matching databases. Such policies would need to recognize that the social groups most at the double risk of poverty and of becoming "information-poor" in IS are their traditional recipients - the

unemployed, incomplete families (single mothers), families with multiple children and the Roma.

# SCENARIOS FOR FUTURE DEVELOPMENT

Based on the previous analysis and diagnosis exercise, scenarios of possible future development are presented below. For each group of factors earlier identified as being key driving forces behind IS development, three possible trajectories of change are outlined: *baseline* scenario shows where the current trends would lead in the period up to 2010, unless any specific event or policy (domestic or EU) transforms those trends. The other two scenarios suggest *negative or positive divergence*, bringing the country further from/closer to the Lisbon targets.

The scenarios are built around developments in four key areas:

- Economic Developments,
- Demography and Society,
- IS Policy and IST Environment,
- and Research, Technological Development and Innovation (RTDI),

which have been identified in the report as the drivers of IS developments.

**Baseline Scenario**

This scenario is built primarily on the extrapolation of present trends, reflecting expected policy changes.

***Economic Developments***

In the baseline scenario, GDP will continue growing at a rate above EU levels, but only allowing for very gradual convergence with the EU. Some portion of mainly EU-origin green-field FDI projects (attracted by both improved economic fundamentals, and also availability of spill-overs from Structural Funds) will go into more sophisticated production, but the majority will still be based on low labour costs. Consequently, unemployment will continue to decline slowly, towards the 10% level in the medium-term, although it will remain a serious problem. Elimination of severe regional disparities is unlikely: even the depressed regions will grow, but not as fast as the rich regions. Tax and labour market reforms will improve the business environment, but the economy will remain burdened with excessive regulation. The state administration will slowly move towards greater efficiency in keeping with present trends, but corruption will remain a major problem and will continue hurting the business environment.

The rest of the decade is expected to be a period of major industrial adjustment, leading to further structural convergence with the EU. Mechanical machinery is likely to contract by almost 50%; however, the released resources will quickly be employed to seize the expanded supply opportunities stemming from the growing automotive sector. Electrical engineering and electronics will continue improving its performance, but remain dependent on cost-sensitive supplies to the automotive sector. Auto parts and assembly industry will experience the highest growth rates ever in its Slovak history only to see a natural decline beyond 2010, when VW operations completely relocate to Ukraine and further east. Software services are likely to receive increased attention, and a wide range of policy tools will be designed and implemented to improve the industry's competitive strengths in the CEE region.

The domestic auto components supply sector should finally benefit from improved cross-border cluster linkages with the north-west Hungary, and Lower Austria. Growth in specialised industrial parks should then spill-over to their hosting regions. However, this is likely to be a short-term development. In order to sustain the original industry mix in those parks a major industrial modernisation policy push from the government is required.

The supply sector dominated by SMEs will find it hard to face foreign competition and integrate on equal terms into pan-European production networks without an appropriate financing and institutional support from Slovak Government or the European Commission.

***Demography and Society***

Natural population increase will not peak before 2010. Productive age population will continue growing throughout the whole decade under the baseline scenario, benefiting the East Slovak regions. Most of the Roma families living in poor conditions will be forced and able to adjust to the new socio-economic conditions following the EU accession, but this adjustment process needs to be strongly aided by the national and EU resources to be successful.

Major education policy reforms will be carried through and Slovakia will slowly increase its share of university-educated population, but the share of university enrolment in technical fields is likely to continue to fall and undermine the traditionally high technology achievement ranking.

The on-going reforms and restructuring of the Slovak education system (triggered by a declining spending on education by households and the state, as well as global labour market pressures) will lead to a strengthening of the role of private-sector providers. Multi-source financing and other education system reforms (Millennium Plan) will succeed in bringing the much needed entrepreneurial focus to existing curricula development.

Inter-regional labour mobility will improve with gradual housing market liberalisation, and EU-aided modernisation of public transport. This will considerably increase employability of the Slovak labour force. However, pending administrative barriers (e.g. mutual recognition of qualifications) and regional adjustment process beyond 2004 will work against further improvement of the trend. The government could further support labour mobility by working to remove existing administrative barriers on the domestic side.

Some portions of marginalized population will successfully break out of the poverty cycle as new job opportunities arise. Thanks to a more responsive social welfare system, the current level of income inequality will not compromise the politically agreed directions of the national IS development. The most disadvantaged groups should become a focus of continued policy attention of the Government.

High unemployment will continue to be a major factor threatening the social and political order in the country. While the digital divide at regional level will be effectively addressed, the dramatic and persisting differences at household level and among social groups is likely to undermine political viability of IS strategies.

### *IS Policies and IST Environment*

Early 2004 saw the adoption of key and long delayed IS Strategy, which should stimulate the passage of legislation and regulation by 2005. This should allow Slovakia to slowly catch up with eEurope deadlines. Implementation capacities will improve as envisaged in the IS strategy, but ineffective inter-ministerial coordination will still continue to impede a more integrated IS policy development.

The central government will continue to dominate the country's IS policy development. Regional authorities will still be disadvantaged by inappropriate financial and administrative capacity. Co-ordination of national and regional actors and policies will improve, however.

Business IST penetration will converge slowly to the EU levels. SMEs will slowly grasp the new opportunities offered by IST. This process would benefit from substantial support from the Government mainly via the reformed tax system.

EU-informed legal framework and favourable investment environment will start contributing to wider IST use among the private business sector. "Security issue" should be addressed by an explicit government policy, which would increase the number of e-government services provided, and of "e-citizens" served. However, the major catching-up with the EU is unlikely to occur before the end of the decade.

Introduction of new competition, an improved regulation, and enhanced formal co-operation between the public and private stakeholders of the Slovak Telecom (incumbent operator) should lead to an improved and more socially beneficial IS policy development in Slovakia.

The residential market demand is likely to continue to stagnate as telecom prices are likely to remain high (with only a very slow declining trend), further reinforcing inequality of access and use of new IST among the social groups.

### *Research, Technological Development and Innovation*

The trend of declining GERD is likely to come to a halt, slowly recovering at the end of the decade, reflecting the growing recognition by the government of the need for increased research support.

Business sector will establish more clearly its leading position as a major IST investor. Regional differences in GERD will be reinforced, with Bratislava clearly becoming the region with the highest innovation potential in the CEE region (see also chapter 5).

The continued low levels of co-operation as well as a lack of genuine cross-sector partnership among the key IS policy actors will prevent wider take-up and roll-out of more sophisticated and socially beneficial IST applications.

The government will take advantage of the Structural Funds, although not all allocated funding will be absorbed and some projects will fail due to insufficient administrative capacity.

**Pessimistic Scenario**

***Economic Developments***

Under the pessimistic scenario, the overburdened economy will grow only very slowly, perhaps at EU levels, but not fast enough to catch up. Ambitious reforms launched could fail, tax income will tumble and reforms will be reversed.

Slovakia will remain dependent on a limited range of exports, mostly with low value added and dependent on the business cycle in Western Europe. Moreover, FDI drawing solely on low labour costs will move further east. "Branch plant" structure of trade and FDI will be reinforced.

Unemployment will return to levels between 15 and 20%, with economic growth generating very few jobs. The situation of marginalized regions and groups of the population will decline further and differences with the Bratislava region will increase.

Accumulation of structural problems in the declining segments of the chemical sector, unable to stand the competitive pressure of the Single Market, will lead to its contraction. Mechanical machinery will have undergone major consolidation by 2005, with the foreign-owned sector further strengthening its dominant position and reinforcing the country's external dependency.

Except the emerging regional cluster around Poprad-Spisska N. Ves, consisting of mechanical engineering and consumer electronics, the other less-favoured Slovak regions will, under the pessimistic scenario, fail to integrate into global production chains, and will soon be de-industrialised.

Even the most dynamic segments and firms of ICT-manufacturing will remain in the lower end of the value-chain, with command-control domination by major EU MNEs. The FDI policy will fail to attract major OEMs/CEMs to diversify the local industrial base, and weaken external dependency.

***Demography and Society***

Under the pessimistic scenario, mass emigration to the Czech Republic of those currently working there (followed by their families) will start undermining human capital formation in the country.

The prevalent demographic behaviour (the high fertility rates, in particular) of the Roma will continue to work to their disadvantage in terms of education attainment, job skills, and labour market prospects. This could trigger another wave of Roma migration to the EU in 2004-5.

Share of adult population with university degree will continue to lag behind as reforms in the education sector will not progress at sufficient pace. Slovak Government and Slovak households will continue spending less and less on education, with this negative trend threatening quality standards and sheer existence of numerous institutional providers of education and training. Education reforms fail to deliver the positive results promised.

Labour mobility will remain low due mainly to an over-regulated housing market, only the most technologically advanced will enjoy the extended job opportunities within the EU.

The situation of the population at the bottom of income distribution will worsen due to them being excluded from the benefits of the emerging IS. Most of the Roma ethnic minority will get locked-in a most negative socio-economic situation. This will not improve without EU-level policy action, following a repeated Roma emigration wave after the opening of the external borders.

Fragility of the social cohesion will be even more undermined after the ambitious and demanding economic and social policy reforms fail to deliver the desired results, in particular, substantial decrease of the number of unemployed. The most affected younger population will lose incentive to promote active life careers, including the enhancing opportunities brought about by IST.

***IS Policies and IST Environment***

IS policy makers will continue to fail meeting their own deadlines and propositions, and still rely heavily on EU policy developments, with very few signs of independent initiative and creativity inside the administration.

Regional governments will be unable to generate their own financial base (e.g. due to slow pace of planned fiscal decentralisation) sufficient enough to stimulate the much needed critical mass of new IS projects in the first SF-programming period.

IST penetration will stagnates in the business sector, due to prevailing conservative attitudes towards IST and fall in residential population due to high telecom charges and declining purchasing power in the period following accession.

Low levels especially of e-government services due to the lack of confidence in network security; low in e-commerce and e-signature due to delayed legislation. The high telecom tariffs charged for connection and use will further inhibit the market for potential new IST applications, making Slovakia one of the serious laggards among the new EU member states.

Continued regulatory failure of the Slovak telecom authorities will result in a series of legal interventions by the EU Commission in 2004-5. Also, lack of both real regulatory influence and negotiating power will leave the strong private lobby inside the incumbent operator crowd out the public interest.

Digital divide in terms of terminal equipment will be reinforced by unequal access to network (technologies): the most dramatic across social groups, less so between geographical areas.

***Research, Technological Development and Innovation***

Under the pessimistic scenario, Slovakia's GERD will decrease below the levels of some of the non-OECD countries, thus seriously limiting innovation capacities of indigenous sectors and less-favoured regions.

By the end of the decade, the country will then inevitably lose its high technology achievement ranking. Slovak firms will not be able to maintain the key staff, and universities will lose talented young academics to the business sector or abroad.

The low levels of "social capital stock" will continue to inhibit IS technology transfer within and between sectors of industry and society, thus preventing the long-overdue structural changes, policy innovations, R&D infrastructure upgrading, etc.

Structural Funds from the EU will benefit mainly rent-seeking projects and will lead to little permanent and sustainable change.

**Optimistic Scenario**

***Economic Developments***

Under the optimistic scenario, high rates of GDP growth will bring the country close to EU levels of per capita wealth rapidly, stimulated by the recent tax reductions and labour market liberalisation. The state administration will become leaner and much more effective in the provision of public services. By improving the business environment and promoting structural changes, Slovakia will attract increasing levels of foreign investment, also in areas with higher value added.

Slovakia could then become the major East European gateway of EU multinationals planning to enter CIS and Asian markets. GDP growth will be highly job creating, mainly in the services sector and unemployment will steadily fall to EU levels.

Regional differences will decline and the situation of marginalized area will slowly improve.

Chemical sector will undergo a successful restructuring and modernisation, substantially aided by a responsive FDI policy, maintaining only a few high-value added projects. These will become the core of the new biotechnology-driven sector, which will benefit from the previous pharmaceuticals tradition in industry and education. The traditional specialisation in metallurgy and textile/clothing will further diminish, with the excessive labour being quite easily absorbed by the market services sector and the flourishing environmental technologies industry (including recycling) especially in the East Slovak regions. By 2010, Slovakia's national ICT cluster will have emerged, based on competitive strengths and improved trade performance of the domestic electronics and software industries.

The competitive ICT cluster will mainly localise in the western (Bratislava) and northern (Zilina) regions, while generating quality and sustainable jobs for IT specialists and business professionals throughout the country.

Slovak industries will be sufficiently equipped to "go international". Economic/FDI policy-makers will be able to strike and sustain a balance between the opportunities posed by globalisation (incl. EU integration) on the one hand, and the risks of too much dependency on the other.

***IS Policies and IST Environment***

All major internal shortcomings in IS policy design and implementation will be successfully eliminated, with IS policy becoming the top government priority of the decade, backed by solid medium- and longer-term plans and sufficient financial and human resources. Solidity of the governance framework will be considerably strengthened with an improved practice of consultation with actors outside administration.

Regions will take over the leading role in IS development at sub-national level by the end of the decade.

Majority of people will have an access to PC/Internet via public access points, like libraries and schools. Demand for a more advanced IST (requiring customised broadband connection) will continue to be hampered due to limited household consumption capacity in the first years after accession, with a modest catching-up later (with rising purchasing power beyond 2006).

Overcoming market bottlenecks though technological advancement and targeted government policy, the wider take-up of major IST applications in business and government will accelerate, and be sustained at benchmark levels by the end of the decade.

Effective implementation and enforcement of the EU law in the area of IS will strongly and positively influence the regulatory environment in Slovakia towards the Lisbon targets.

Digital divide of the population will not be eliminated by the end of the decade. However, a more proactive and focused government policy - in cooperation with the business sector - will ensure that the universal service for modern IST remains a key political goal throughout the decade and beyond.

***Demography and Society***

Despite slowly deteriorating trends, the demography will not pose any major burden on the national labour market as well as the government's social policy in Slovakia before 2010.

Through a more integrated IS policy development, reinforcing education-industry cooperation at all levels, a pool of ICT-related students will be increased to previously high levels.

An increased emphasis by the government and the business on VET and LLL (with availability of EU funding boosting the growth of private educational organisations) since 2004 onwards will help increase average employment rates up to 65% by 2010. Training opportunities for the older population will be extended to include IST skill development.

Slovak work labour mobility will remain low despite the introduction in all EU countries of a complete freedom of movement well before 2007. The highest-qualified professionals will be free to migrate for EU jobs, but majority will find satisfying employment in the domestic economy.

While the varying income levels will continue to limit socio-economic access to broadband IST services and applications, the universal service will include a decent access to the Internet made available in every local library or public school. The rising purchasing power will help ensure that access and use of basic e-commerce and e-government applications would be affordable to the majority of the Slovak population.

The generation of higher-quality and higher-salaried jobs though a more widespread application of IST will raise job satisfaction levels, and effectively channel potentially damaging conflicts in the society.

***Research, Technological Development and Innovation***

The political priority to increase GERD on par with Slovakia's V4 neighbours will turn into a more solid economic growth performance in 2006 onwards, catching up with the less prosperous EU member states. This will also materialize in rising share of ICT spending on GDP, catching up with the EU's more prosperous small open economies by the end of the decade.

The improved climate of co-operation and mutual trust will help generate the necessary critical mass of new innovative projects, thus keeping the investment momentum and securing continued financing for longer-term IS development priorities.

Structural Funds will make a significant contribution to economic and social developments and bring useful know-how from EU countries.

The following tables summarise, per theme, the major arguments developed in the above scenarios. They offer a comparative view about each theme, across those scenarios:

| ECONOMIC DEVELOPMENTS | NEGATIVE SCENARIO | BASELINE SCENARIO | POSITIVE SCENARIO |
|---|---|---|---|
| Economic Growth Performance | The overburdened economy will grow only very slowly, perhaps at EU levels, but not fast enough to catch up. | GDP will continue growing above EU levels, but only allowing for very gradual convergence. | High rates of GDP growth will bring the country close to EU levels of per capita wealth rapidly. |
| Foreign Trade and Foreign Direct Investment | Slovakia will remain dependent on a limited range of exports, mostly with low value added and dependent on the Western European business cycle. Moreover, FDI drawing solely on low labour costs will move further East. "Branch plant" structure of trade and FDI will be reinforced. | Some portion of mainly EU-origin green-field FDI projects (attracted by improved economic fundamentals, and availability of/spill-overs from Structural Funds) will go into more sophisticated production, but most will still be based on low labour costs. | Slovakia becomes the major East European gateway of EU multinationals planning to enter CIS and Asian markets. |
| Labour Market Performance | Unemployment will return to levels between 15 and 20%, with economic growth generating very few jobs. | Unemployment will go on declining slowly, towards the 10% level in the medium-term, although it will remain a serious problem. | GDP growth will create many jobs, mainly in the services sector and unemployment will steadily fall to EU levels. |
| Economic Geography | Situation of marginalized regions and population groups will decline further and differences with the Bratislava region will increase. | Even the depressed regions will grow, albeit not as fast as the rich regions. | Regional differences will decline and the situation of marginalized area will slowly improve. |
| Economic Reform | Ambitious reforms will fail, tax income will tumble and reforms will be reserved. | Tax and labour market reforms will improve the business environment, but the economy will remain burdened with excessive regulation. The state administration will slowly move towards greater efficiency, but will remain corrupt and continue impeding business. | Recent tax reductions and labour market liberalisation will stimulate economic growth. By improving the business environment and promoting structural changes, Slovakia will attract growing levels of foreign investment, in areas with higher value added. The state administration will become leaner and more effective in the provision of public services. |

| IS POLICIES | NEGATIVE SCENARIO | BASELINE SCENARIO | POSITIVE SCENARIO |
|---|---|---|---|
| NATIONAL | IS policy makers will continue to fail meeting their own deadlines and propositions, and still rely heavily on EU policy developments, with very few signs of independent initiative and creativity inside the administration. | The key and long delayed IS-relevant legislation and regulation will have been adopted by 2005. Slovakia will slowly catch up with eEurope deadlines. Implementation capacities will improve with ineffective inter-ministerial coordination still impeding a more integrated IS policy development. | All major internal shortcomings in IS policy design and implementation will be successfully eliminated, with IS policy becoming the top government priority of the decade, backed by solid medium- and longer-term plans and sufficient financial and human resources. Solidity of the governance framework will be considerably strengthened with an improved practice of consultation with actors outside administration. |
| REGIONAL | Regional governments will be unable to generate own financial base (e.g. due to slow pace of planned fiscal decentralisation) sufficient enough to stimulate the much needed critical mass of new IS projects in the first SF-programming period. | Central government will dominate the country's IS policy development. Regional authorities will still be disadvantaged by inappropriate financial and administrative capacity. Co-ordination of national and regional actors and policies will improve, however. | Regions will take over the leading role in IS development at sub-national level by the end of the decade. |

| INDUSTRIAL DEVELOPMENT | NEGATIVE SCENARIO | BASELINE SCENARIO | POSITIVE SCENARIO |
|---|---|---|---|
| GROWTH AND COMPETITIVENESS | Accumulation of structural problems in the declining segments of the chemical sector, unable to stand the competitive pressure of the Single Market, will lead to its contraction. Mechanical machinery will have undergone major consolidation by 2005, with the foreign-owned sector further strengthening its dominant position and reinforcing the country's external dependency. | The rest of the decade will be a period of major industrial adjustment, leading to further structural convergence with the EU. Mechanical machinery will contract by almost 50%; however, the released resources will quickly be employed to seize the expanded supply opportunities stemming from the growing automotive sector. Electrical engineering and electronics will continue improving its performance, but remain dependent on cost-sensitive supplies to the automotive sector. Auto parts and assembly industry will experience the highest growth rates ever in its Slovak history only to see a natural decline beyond 2010, when VW operations completely relocate to Ukraine and further east. Software services will receive priority attention, and a wide range of policy tools will be designed and implemented to improve the industry's competitive strengths in the CEE region. | Chemical sector will undergo a successful restructuring and modernisation, substantially aided by a responsive FDI policy, maintaining only a few high-value added projects. These will become the core of the new biotechnology-driven sector, which will benefit from the previous pharmaceuticals tradition in industry and education. The traditional specialisation in metallurgy and textile/clothing will further diminish, with the excessive labour being quite easily absorbed by the market services sector and the flourishing environmental technologies industry (including recycling) especially in the East Slovak regions. By 2010, Slovakia's national ICT cluster will have emerged, based on competitive strengths and improved trade performance of the domestic electronics and software industries. |
| GEOGRAPHY | Except the emerging regional cluster around Poprad-Spisska N. Ves, consisting of mechanical engineering and consumer electronics, the other less-favoured Slovak | The domestic auto components supply sector will finally benefit from improved cross-border cluster linkages with the north-west Hungary, and Lower Austria. | The competitive ICT cluster will mainly localise in the western (Bratislava) and northern (Zilina) regions, while generating quality and sustainable jobs for IT |

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|---|---|---|---|
| | regions will fail to integrate into global production chains, and will soon be de-industrialised. | Growth in specialised industrial parks will then spill-over to their hosting regions. However, this will be a short-term development, and the original industry mix in those parks will not be sustained without major industrial modernisation policy push from the government. | specialists and business professionals throughout the country. |
| INTERNATIONA-LISATION | Even the most dynamic segments and firms of ICT-manufacturing will remain in the lower end of the value-chain, with command-control domination by major EU-based MNEs. The FDI policy will fail to attract major OEMs/CEMs to diversify the local industrial base, and weaken external dependency. | The supply sector dominated by SMEs will find it hard to face foreign competition and integrate on equal terms into pan-European production networks without an appropriate financing and institutional support from Slovak Government or the European Commission. | Slovak industries will be sufficiently equipped to "go international". Economic /FDI policy-makers will be able to strike and sustain a balance between the opportunities posed by globalisation (incl. EU integration) on the one hand, and the risks of too much dependency on the other. |

| INVESTMENT AND FINANCING | NEGATIVE SCENARIO | BASELINE SCENARIO | POSITIVE SCENARIO |
|---|---|---|---|
| R&D EXPENDITURES | Slovakia's GERD will decrease below the levels of some of the non-OECD countries, thus seriously limiting innovation capacities of indigenous sectors and less-favoured regions. By the end of the decade, the country will inevitably lose its high technology achievement ranking. Slovak firms will not be able to maintain the key staff, and universities will lose talented young academics to the business sector or abroad. | GERD declining trend will come to a halt, slowly recovering at the end of the decade. Business sector will establish more clearly its leading position as a major IST investor. Regional differences in GERD will be reinforced, with Bratislava clearly becoming the region with the highest innovation potential in the CEE region. | The political priority to increase GERD on par with Slovakia's V4 neighbours will turn into a more solid economic growth performance in 2006 onwards, catching up with the less prosperous EU member states. This will also materialize in rising share of ICT spending on GDP, catching up with the EU's more prosperous small open economies by the end of the decade. |
| COOPERATION AND TRUST | The low levels of "social capital stock" will continue to inhibit IS technology transfer within and between sectors of industry and society, thus preventing the long-overdue structural changes, policy innovations, R&D infrastructure upgrading, etc. | The continued low levels of co-operation as well as a lack of genuine cross-sector partnership among the key IS policy actors will prevent wider take-up and roll-out of more sophisticated and socially beneficial IST applications. | The improved climate of cooperation and mutual trust will help generate the necessary critical mass of new innovative projects, thus keeping the investment momentum and securing continued financing for longer-term IS development priorities. |
| EU FUNDING | Structural Funds from the EU will benefit mainly rent-seeking projects and will lead to little permanent and sustainable change. | The government will take advantage of the Structural Funds, although not all allocated funding will be absorbed and some projects will fail due to insufficient administrative capacity. | Structural Funds will make a significant contribution to economic and social developments and bring useful know-how from EU countries. |

| IST ENVIRONMENT | NEGATIVE SCENARIO | BASELINE SCENARIO | POSITIVE SCENARIO |
|---|---|---|---|
| PENETRATION | Stagnates in business, due to prevailing conservative attitude towards IST; lowers in residential population due to high telecom charges and declining purchasing power in the period following accession. | Business IST penetration will converge slowly to the EU levels. SMEs will slowly grasp the new opportunities offered by IST, with substantial support from the Government mainly via the reformed tax system. | Majority of people will have an access to PC/Internet via public access points, like libraries and schools. Demand for a more advanced IST (requiring customised broadband connection) will continue to be hampered due to limited household consumption capacity in the first years after accession, with a modest catching-up later (with rising purchasing power beyond 2006). |
| APPLICATIONS | Low levels especially of e-government services due to the lack of confidence in network security; low in e-commerce and e-signature due to delayed legislation. The high telecom tariffs charged for connection and use will further inhibit the market for potential new IST applications, making Slovakia one of the serious laggards among the new EU member states. | EU-informed legal framework and favourable investment environment will start contributing to wider IST use among the private business sector. "Security issue" will be addressed by an explicit government policy, which will increase the number of e-government services provided, and of "e-citizens" served. However, the major catching-up with the EU will not occur before the end of the decade. | Overcoming market bottlenecks though technological advancement and targeted government policy, the wider take-up of major IST applications in business and government will accelerate, and be sustained at benchmark levels by the end of the decade. |
| REGULATION | Continued regulatory failure of the Slovak telecom authorities will result in a series of legal interventions by the EU Commission in 2004-5. Also, lack of both real regulatory influence and negotiating power will leave the strong private lobby inside the | Introduction of new competition, an improved regulation, and enhanced formal co-operation between the public and private stakeholders of the Slovak Telecom (incumbent operator) will lead to an improved and more | Effective implementation and enforcement of the EU law in the area of IS will strongly and positively influence the regulatory environment in Slovakia towards the Lisbon targets. |

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| | incumbent operator crowd out the public interest. | socially beneficial IS policy development in Slovakia. | |
| DIGITAL DIVIDE | Digital divide in terms of terminal equipment will be reinforced by unequal access to network (technologies): the most dramatic across social groups, less so between geographical areas | The residential market demand will continue to stagnate mainly due to the high telecom prices (with only a very slow declining trend), further reinforcing inequality of access and use of new IST among the social groups. | Digital divide of the population will not be eliminated by the end of the decade. However, a more proactive and focused government policy - in cooperation with the business sector - will ensure that the universal service for modern IST remains a key political goal throughout the decade and beyond. |

| HUMAN RESOURCES | NEGATIVE SCENARIO | BASELINE SCENARIO | POSITIVE SCENARIO |
|---|---|---|---|
| DEMOGRAPHY | Mass emigration to the Czech Republic of those currently working there (followed by their families) will start undermining human capital formation in the country. "Abnormal" demographic behaviour of the Roma will continue to work to their disadvantage in terms of education attainment, job skills, and labour market prospects. This will trigger another wave of Roma migration to the EU in 2004-5. | Natural population increase will not peak before 2010. Productive age population will continue growing throughout the whole decade, benefiting the East Slovak regions. Most of the Roma families will be forced to adjust to the new socio-economic conditions following the EU accession, with this adjustment process being strongly aided by the national and EU resources. | Despite slowly deteriorating trends, the demography will not pose any major burden on the national labour market as well as the government's social policy in Slovakia before 2010. |
| EDUCATION ATTAINMENT | Share of adult population with university degree will continue to lag behind. | By implementing major education policy reforms, Slovakia will slowly increase its share of university-educated population, but the share of university enrolment in technical fields will continue to decrease, undermining the traditionally high technology achievement ranking. | Through a more integrated IS policy development, reinforcing education-industry cooperation at all levels, a pool of ICT-related students will be increased to previously high levels. |
| EDUCATION AND TRAINING SUPPLY | Slovak Government and Slovak households will continue spending less and less on education, with this negative trend threatening quality standards and sheer existence of numerous institutional providers of education and training. Education reforms fail to deliver the positive results promised. | The on-going reforms and restructuring of the Slovak education system (triggered by a declining spending on education by households and the state, as well as global labour market pressures) will lead to a strengthening of the role of private-sector providers. Multi-source financing and other education system reforms (Millennium Project) will succeed in bringing the much | An increased emphasis by the government and the business on VET and LLL (with availability of EU funding boosting the growth of private educational organisations) since 2004 onwards will help increase average employment rates up to 65% by 2010. Training opportunities for the older population will be extended to include IST skill development. |

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|---|---|---|---|
| | | needed entrepreneurial focus to existing curricula development. | |
| LABOUR MOBILITY | Labour mobility will remain low due mainly to an over-regulated housing market, only the most technologically advanced will enjoy the extended job opportunities within the EU. | Inter-regional labour mobility will improve with gradual housing market liberalization, and EU-aided modernisation of public transport. This will considerably increase employability of the Slovak labour force. However, pending administrative barriers (e.g. mutual recognition of qualifications) and regional adjustment process beyond 2004 will work against further improvement of the trend. | Slovak work labour mobility will remain low despite the introduction in all EU countries of a complete freedom of movement well before 2007. The highest-qualified professionals will be free to migrate for EU jobs, but majority will find satisfying employment in the domestic economy. |

| SOCIAL COHESION | NEGATIVE SCENARIO | BASELINE SCENARIO | POSITIVE SCENARIO |
|---|---|---|---|
| INCOME INEQUALITY | The situation of the population at the bottom of income distribution will worsen due to them being excluded from the benefits of the emerging IS. Most of the Roma ethnic minority will get locked-in the unpleasant socio-economic situation. This will not improve without EU-level policy action, following a repeated Roma emigration wave after the opening of the external borders. | Some portions of marginalized population will successfully break out of the poverty cycle as new job opportunities arise. Thanks to a more responsive social welfare system, the current level of income inequality will not compromise the politically agreed directions of the national IS development. The most disadvantaged groups will become a focus of continued policy attention of the Government. | While the varying income levels will continue to limit socio-economic access to broadband IST services and applications, the universal service will include a decent access to the Internet made available in every local library or public school. The rising purchasing power will help ensure that access and use of basic e-commerce and e-government applications would be affordable to the majority of the Slovak population. |
| SOCIAL MOBILITY | Fragility of the social cohesion will be even more undermined after the ambitious and demanding economic and social policy reforms fail to deliver the desired results, in particular, substantial decrease of the number of unemployed. The most affected younger population will lose incentive to promote active life careers, including the enhancing opportunities brought about by IST. | High unemployment will continue to be a major factor threatening the social and political order in the country. While the digital divide at regional level will be effectively addressed, the dramatic and persisting differences at household level and among social groups will undermine political viability of IS strategies. | The generation of higher-quality and higher-salaried jobs though a more widespread application of IST will raise job satisfaction levels, and effectively channel potentially damaging conflicts in the society. |

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# ANNEX – TABLE OF CONTENTS

# A. NATIONAL AND REGIONAL ECONOMY

**Table A11.1** Real GDP Growth

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| Real GDP growth (1995 prices) | 5.2 | 6.5 | 5.8 | 5.6 | 4.0 | 1.3 | 3.2 | 3.3 | 4.4 | 4.2 |

Source: Slovak Statistical Office (2003) Macro-Economic Indicators of Quarterly National Accounts and Value Added for 1st - 4th quarter 2002. p. 4 "Gross Domestic Product and its Components - Indices"

**Table A11.2** Nominal GDP Level

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal GDP (at current prices in Mio EUR/ ECU) | 11,299.56 | 12,814.68 | 14,796.44 | 16,366.07 | 18,641.44 | 19,569.28 | 18,944.15 | 21,338.87 | 22,842.76 | 25,143.75 | 28,820.00 |

Source: Slovak Statistical Office (2003) Macro-Economic Indicators of Quarterly National Accounts and Value Added for 1st - 4th quarter 2002, p. 3 "Gross Domestic Product and its Components"

**Table A11.3** GDP in Purchasing Power Parity

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| Purchasing Power Parity (at current prices in Mio EUR/ECU) | 1,040.47 | 1,059.06 | 1,121.79 | 1,237.04 | 1,356.73 | 1,378.12 | 1,282.61 | 1,315.59 | 1,362.93 | 1,478.17 |

Source: Slovak Statistical Office (2003) Macro-Economic Indicators of Quarterly National Accounts and Value Added for 1st - 4th quarter 2002, p. 3 "Gross Domestic Product and its Components". PPP index - Statistical Office of the Slovak Republic. Calculated as GDP in SKK / PPP index / Exchange rate

**Table A21** Supply Side of Growth: Major Sectors of Production

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|
| Agriculture | 0.0 | -2.1 | 9.7 | 5.4 | 0.3 | -0.2 | -5.0 | 10.9 |
| Industry | 10.8 | 5.0 | -5.5 | 3.2 | 5.1 | -5.5 | 3.6 | 4.0 |
| Construction | -8.9 | 60.5 | -1.5 | -15.6 | -29.9 | 2.7 | -1.5 | 11.0 |
| Services | 6.4 | 3.4 | 12.0 | 6.2 | 2.3 | 5.8 | 4.1 | 3.8 |

Source: Slovak Statistical Office (2003) Macro-Economic Indicators of Quarterly National Accounts and Value Added for 1st - 4th quarter 2002, p. 17 "Development of Gross Domestic Product by Branches at Constant Prices 100 = 1995 - Indices"

**Table A22.1** Demand Side of Growth

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | na | 1.5 | 3.6 | 9.1 | 6.0 | 5.8 | 2.9 | -1.8 | 4.0 | 5.4 | -5.5 |
| G | na | -10.1 | 2.1 | 17.4 | -4.5 | 11.5 | -7.7 | 1.3 | 5.1 | 4.0 | 14.4 |
| I | na | -11.7 | 34.7 | 36.0 | 6.4 | 5.1 | -20.2 | -0.7 | 16.5 | 4.1 | -67.6 |
| X* | -626.6 | 724.9 | 253.0 | -1,494.5 | -1,276.1 | -1,783.6 | -367.4 | -37.6 | -662.7 | -626.0 | 158.7 |

Source: based on Macro-Economic Indicators of Quarterly National Accounts and Value Added for 1st - 4th quarter 2002, Slovak Statistical Office (2003) Notes: 1/annual growth (1995 prices), 2/ *Absolute numbers in Mio EUR/ECU, (C= Consumption of Households, G=Government Spending, I=Investment, X=Net Export)

**Table A22.2** GDP by Expenditure Components

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| C | 54.3 | 52.4 | 51.2 | 52.5 | 52.6 | 53.8 | 54.8 | 56.2 | 53.1 | 53.4 |
| G | 25.2 | 21.6 | 20.7 | 22.9 | 20.7 | 22.2 | 20.3 | 19.8 | 20.4 | 20.4 |
| I | 25.0 | 21.0 | 26.5 | 34.1 | 34.3 | 34.7 | 27.3 | 26.5 | 29.9 | 29.8 |
| X | -4.5 | 5.2 | 1.7 | -9.5 | -7.7 | -10.7 | -2.4 | -0.3 | -4.0 | -3.6 |

Source: based on Macro-Economic Indicators of Quarterly National Accounts and Value Added for 1st - 4th quarter 2002, Slovak Statistical Office (2003), Note: in 1995 prices, (C= Consumption of Households, G=Government Spending, I=Investment, X=Net Export)

**Table A22.3** Changes in Demand Side Contributions to Growth

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|
| C | 15.29 | 32.14 | 77.04 | 53.45 | 83.41 | 136.42 | -79.48 | 58.57 | 54.73 |
| G | -49.02 | 6.94 | 61.50 | -18.15 | 60.39 | -129.18 | 20.58 | 29.18 | 16.02 |
| I | -56.53 | 112.30 | 163.56 | 38.52 | 44.00 | -531.35 | -15.97 | 124.92 | 23.92 |
| X | 190.26 | -51.38 | -202.10 | 26.19 | -87.80 | 624.14 | 174.87 | -112.67 | 5.33 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.04 | 100.00 | 100.00 | 100.00 |

Source: based on Macro-Economic Indicators of Quarterly National Accounts and Value Added for 1st - 4th quarter 2002, Slovak Statistical Office (2003); Note: 1995 prices, (C= Consumption of Households, G=Government Spending, I=Investment, X=Net Export)

**Table A31.1** Average Annual Rate of Unemployment

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| Average annual registered unemployment rate – LFS | 12.7 | 14.6 | 13.8 | 12.6 | 12.9 | 13.7 | 17.3 | 18.3 | 18.2 | 17.8 |
| Average registered unemployment rate – NLO | 12.86 | 14.39 | 13.77 | 12.62 | 12.97 | 14.69 | 18.39 | 19.22 | 19.31 | 18.97 |

Source: Statistical Office of the Slovak Republic. Statistical Yearbooks 1997, 1999, 2002
Note: based on Labour Force Survey (LFS) and National Labour Office (NLO) data

**Table A31.2** Average Annual Rate of Unemployment by Regions

| Region | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| Bratislava Region | 4.49 | 6.17 | 6.80 | 6.09 | 5.68 |
| Trnava Region | 11.44 | 14.50 | 15.26 | 15.39 | 14.41 |
| Trenčín Region | 9.12 | 12.07 | 13.09 | 12.71 | 11.54 |
| Nitra Region | 15.82 | 19.36 | 21.65 | 22.25 | 21.58 |
| Žilina Region | 12.05 | 16.29 | 17.00 | 16.15 | 15.15 |
| Banská Bystrica Region | 16.91 | 21.28 | 21.82 | 22.56 | 23.27 |
| Prešov Region | 19.44 | 23.82 | 22.98 | 23.30 | 23.35 |
| Košice Region | 19.05 | 24.13 | 24.92 | 25.23 | 24.52 |

Source: National Labour Office, based on administrative data
Note: Before 1998, the administrative structure of the country was different. Earlier data for the current administrative structure is thus not available.

**Table A31.3** Share of Various Age Groups on the Unemployed

| Age | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 to 19 | 16.99 | 16.26 | 16.06 | 16.16 | 16.02 | 15.1 | 13.3 | 12.3 | 9.8 | 7.6 |
| 20 to 24 | 15.91 | 15.10 | 14.36 | 15.04 | 15.91 | 17.1 | 18.5 | 19.3 | 18.5 | 17.9 |
| 25 to 29 | 14.31 | 13.88 | 13.11 | 12.41 | 12.13 | 12.1 | 12.3 | 12.7 | 13.0 | 13.3 |
| 30 to 34 | 14.28 | 14.43 | 14.08 | 13.41 | 12.79 | 11.9 | 11.2 | 10.7 | 10.7 | 11.0 |
| 35 to 39 | 13.45 | 13.32 | 13.22 | 12.68 | 12.22 | 11.7 | 11.4 | 10.9 | 11.1 | 11.2 |
| 40 to 44 | 10.83 | 11.45 | 11.84 | 11.87 | 11.81 | 12.0 | 11.9 | 11.3 | 11.4 | 11.4 |
| 45 to 49 | 7.47 | 8.08 | 9.11 | 9.74 | 10.17 | 10.9 | 11.4 | 11.3 | 11.7 | 12.2 |
| 50 to 54 | 4.76 | 5.26 | 5.76 | 6.05 | 6.39 | 6.7 | 7.3 | 8.4 | 9.9 | 10.9 |
| 55 to 59 | 1.87 | 2.09 | 2.32 | 2.49 | 2.44 | 2.5 | 2.6 | 3.0 | 3.9 | 4.4 |
| over 60 | 0.12 | 0.12 | 0.13 | 0.13 | 0.13 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 |

Source: National Labour Office, based on administrative data

**Table A32.1** Labour Supply

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| Participation ratio | 62.1 | 60.3 | 59.8 | 60.1 | 59.9 | 59.9 | 60 | 60.3 | 60.7 | 60.2 |
| Employees and tradesmen in industry | 627,467 | 614,279 | 628,720 | 637,609 | 608,873 | 583,886 | 566,737 | 548,921 | 554,353 | 555,379 |

Source: Statistical Office of the Slovak Republic, Statistical Yearbooks (various years)
Notes: 1/Participation rate (%) = number of economically active persons (working persons including women on maternity and additional maternity leave + registered applicants for a job) / number of the population of productive and post-productive age)*100; 2/Industry = mining and quarrying + manufacturing + electricity, gas and water supply

**Table A33** Labour Productivity in Industry

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| Labour productivity in industry (SKK) | 438,385 | 468,095 | 506,870 | 519,334 | 528,063 | 559,994 | 576,319 | 630,766 | 703,448 | 1,096,200 |
| Labour productivity in industry (change) | na | 109.1 | 105.8 | 101.0 | 106.5 | 110.6 | 106.0 | 113.0 | 110.4 | na |

Source: Statistical Office of the Slovak Republic, Statistical Yearbooks (various years)
Notes: 1/in 1995 prices (year 2002 at December 2000 prices); 2/ own calculations (previous year = 100)

### *A4 Major Structural Changes*

Major structural changes can be observed in late 1990s and beyond 2000. *Sectoral structure of employment* shifted in favour of the tertiary sector, whose share increased from 51.5% in 1997 to 56.2% in 2001, while decreasing shares of employment in secondary (by 1.7%) and primary (by 3.1%) sectors were reported in period under scrutiny (1997-2001).

**Table A51.1** Changes in Cross-Border Capital Flows

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| Financial Account Balance | 496.33 | 162.15 | 892.68 | 1,757.24 | 1,596.01 | 1,797.18 | 1,818.77 | 1,383.90 | 1,920.46 | 5,487.46 |

Source: National Bank of Slovakia: Monetary Survey (various years), Note: in Mio ECU/EUR

**Table A52.1** FDI Inflows by Sectors

| SECTOR OF ECONOMIC ACTIVITY: | Mio USD | % |
|---|---|---|
| Mining, Quarrying | 3.2 | 0.7 |
| Manufacturing | 130.6 | 43.0 |
| Electricity, gas and water supply | 68.1 | 0.2 |
| Construction | 1.4 | 0.6 |
| Wholesale, retail trade | 105.6 | 11.3 |
| Hotels, Restaurants | 5.4 | 0.7 |
| Transport, storage, communication | 48.3 | 13.9 |
| Financial intermediation | 774.3 | 26.2 |
| Real estate, renting and business activities | 25.0 | 2.9 |
| Public administration and defence; compulsory social security | 2.9 | 0.3 |
| Health care | 0.2 | 0.0 |
| Other community, social and personal service activities | 19.4 | 0.0 |
| TOTAL | 1,186.1 | 100.0 |

Source: OECD Economic Outlook: Slovak Republic (2002), Note: 2001 data

**Table A52.2** FDI Inflows by Regions

| Sector: | Corporate | | Banking | | Total | |
|---|---|---|---|---|---|---|
| Region: | USD Mio | % | USD Mio | % | USD Mio | % |
| Bratislava | 227.0 | 54.1 | 1,244.2 | 100.0 | 3,471.1 | 64.7 |
| Trnava | 233.2 | 5.7 | 0.0 | 0.0 | 233.2 | 4.3 |
| Trenčín | 168.0 | 4.1 | 0.0 | 0.0 | 168.0 | 3.1 |
| Nitra | 151.5 | 3.7 | 0.0 | 0.0 | 151.5 | 2.8 |
| Žilina | 220.0 | 5.3 | 0.0 | 0.0 | 220.0 | 4.1 |
| Banská Bystrica | 170.8 | 4.1 | 0.0 | 0.0 | 170.8 | 3.2 |
| Prešov | 122.3 | 3.0 | 0.0 | 0.0 | 122.3 | 2.3 |
| Košice | 827.2 | 20.1 | 0.0 | 0.0 | 827.2 | 15.4 |
| Total Foreign Capital Inflow | 4,120.0 | 100.0 | 1,244.2 | 100.0 | 5,364.2 | 100.0 |

Source: National Bank of Slovakia, Note: as of 30 June, 2002

**Table A53** Evolution of Trade Flows (ICT-related)

| | Harmonised System Classification | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|
| IMPORTS | 85. Electr. machinery and equipment; television image, sound recorders and reproducers | 18,318 | 24,524 | 39,618 | 50,238 | 50,224 | 79,631 | 61,563 | 85,580 |
| | 90. Optical, photographic, cinematographic, measuring | 7,166 | 9,143 | 9,838 | 11,187 | 11,039 | 15,939 | 12,951 | 16,290 |
| | Total imports in Mio SKK | 25,484 | 33,667 | 49,456 | 61,425 | 61,263 | 95,570 | 74,514 | 101,870 |
| | Total imports in Mio EUR/ECU | 663 | 877 | 1,301 | 1,551 | 1,389 | 2,207 | 1,750 | 2,386 |
| EXPORTS | 85. Electr. machinery and equipment; television image, sound recorders and reproducers | 11,634 | 13,814 | 22,643 | 29,482 | 35,168 | 56,553 | 44,357 | 62,132 |
| | 90. Optical, photographic, cinematographic, measuring | 3,394 | 3,111 | 3,742 | 3,193 | 3,051 | 5,212 | 3,988 | 5,676 |
| | Total exports in Mio SKK | 15,028 | 16,925 | 26,385 | 32,675 | 38,219 | 61,765 | 48,345 | 67,808 |
| | Total exports in Mio EUR/ECU | 391 | 441 | 694 | 825 | 866 | 1,426 | 1,135 | 1,588 |

Source: Statistical Office of the Slovak Republic: Statistical Yearbooks (various years)
Note: NACE-based data not available

# B. NATIONAL AND REGIONAL INFORMATION SOCIETY POLICIES

**Table B1** Institutional Settings and Their Influence on IS Policies

| | |
|---|---|
| ICT policy powers | 1993-1998: Statistical Office (general informatics), Ministry of Transport, Posts, and Telecommunications (telecom policy and regulations), Ministry of Economy (ICT industry), Government Office (informatics of state administrations), Office for the Strategy of Development of Society, Science, and Technology (information society dimensions, operated between 1997 and mid-1999) |
| | 1999-2000: Ministry of Transport, Posts, and Telecommunications (telecom policy and regulations, general informatics), Ministry of Economy (ICT industry), Government Office (informatics of state administrations) |
| | 2000-2003: Ministry of Education (information society), Ministry of Transport, Posts, and Telecommunications (telecom policy), Telecommunication Office (regulation), Ministry of Economy (ICT industry), Government Office (informatics of state administrations), National Security Office (e-signature) |
| | May 2003: Ministry of Transport, Posts and Telecommunications (telecom policy and information society), Telecommunication Office (regulation), Ministry of Economy (ICT industry), Government Office (informatics of the state administration), National Security Office (e-signature) |
| Division of powers/tasks among the state administration bodies | Ministry of Transport, Posts and Telecommunications (state telecom policy, state information society policy and coordination) |
| | Telecommunication Office (price and technical regulation) |
| | Antimonopoly Office (antimonopoly regulation) |
| | Ministry of Economy (state ICT industry policy) |
| | Government Office (coordination of informatisation for state administration, responsibilities for public administration are not clear due to the cancellation of the former GOVNET project in 2002) |
| Higher Territorial Units (Self-governing regions) | 8 regional governments – elected bodies (regional economic development, including local telecommunication infrastructure development) |
| Association of Towns and Villages (ZMOS) competence | association of local municipalities and cities co-ordination of informatics activities towards improving electronic communications with citizens, also partner for general informatics projects) |
| Official government policy documents | project GOVNET - approved in May 1993 and later developed (cancelled in 2002) |
| | Concept of Communications Development in the Slovak Republic (1993-2000) - approved in August 1993 |
| | State Telecom policy 1996-2000 - approved in December 1995 |
| | State Telecom policy 2000-2002 - approved in June 2000 |
| | State IS policy - approved in June 2001 |
| | State Telecom policy 2003 - approved in March 2003 |
| | National Strategy for IS (2004) |

**Table B2** Chronological Description of National and Regional IS Policies and Projects

| | |
|---|---|
| GOVNET (1993 – 2002) | The GOVNET project (the state administration data network) aims to interconnect all state administration bodies and other important organisations. Future activities within this project are to also connect regional and local state administration offices in all regions within Slovakia. |
| Concept of Communications Development in the Slovak Republic (1993-2000) | According to the experiences, analyses and studies gathered, development goals were set by the Concept for the short-term (1993-1995) and medium-term (1996-2000) horizons. Its main objective was to achieve significantly increase the quality as well as the quantity of postal and telecommunication services. |
| State Telecom policy 1996-2000 | The document provides an analytic and synthetic view on the current and future state of telecommunication in Slovakia, taking into account the Development Concept of Communications by 2000, Telecommunication Project II and Slovakia's commitments in the EU association agreements. |
| State Telecom policy 2000-2002 | The document defines a strategy of development of telecommunications particularly in the area of public telephone service, price policy and regulation, satellite communications, mobile and personal communications, interconnection, leased line services, utilisation of frequency spectrum, development of land analogue and digital radio and TV broadcasting, numbering of telecommunication networks and telecommunication services, Information Society and international co-operation. |
| State IS policy (2001) | Government Resolution declares the importance of complex solutions for information society as one of the government's main goals and involves Slovak Republic in eEurope+ activities. Resolution also gives responsibility to the deputy prime minister for the economy to co-ordinate activities related to information society together with the minister of education. |
| State Telecom policy 2003 | The document sets priorities for the provision of all requirements of the Slovak economy in the period of fully liberalised telecommunication services and infrastructures environment. |
| National Strategy for IS (2004) | Three different versions of this document were prepared in 2001 – 2003. The final version was approved by the Slovak Government in January 2004. |

**Table B31** Driving Motivations for IS Policies

| | |
|---|---|
| GOVNET (1993 – 2002) | Creation of important information databases and "local terminal centres for citizens" by using ICT applications to improve communication and information distribution systems between the government and citizens. There was also another intent, to interconnect local government information networks |
| Concept of Communications Development in the Slovak Republic (1993-2000) | For telecommunications in the short-term (1993-1995), the following priorities were set:<br>• international co-operation,<br>• liberalisation of telecommunication services,<br>• legislation,<br>• transformation of the state-owned enterprise Slovak telecom,<br>• technological development |
| State Telecom Policy 1996-2000 | In the document the following priority areas of telecommunications policy are stressed:<br>• adaptation of legislation,<br>• liberalisation of telecommunications services,<br>• regulatory framework,<br>• transformation of the telecommunication operator,<br>• acceleration of the physical infrastructure development |
| State Telecom policy 2000-2002 | The document defines a strategy of development of telecommunications particularly in the area of public telephone service, price policy and regulation, satellite communications, mobile and personal communications, interconnection, leased line services, utilisation of frequency spectrum, development of land analogue and digital radio and TV broadcasting, numbering of telecommunication networks and telecommunication services, Information Society and international co-operation. |
| State IS Policy (2001) | The document assigns the obligation to prepare a strategy for information society (before the end of October 2001) and Action plan implementing eEurope+ activities (approved by EU summit in Gothenburg, Sweden, on June 16, 2001) in the Slovak Republic. |
| State Telecom Policy 2003 | Priorities:<br>• harmonisation of legislation with the EU,<br>• state regulation,<br>• competitive environment,<br>• universal service,<br>• protection of end-user right,<br>• information security,<br>• implementation of information society services |
| National Strategy for IS (2004) | The Strategy includes the following six priorities:<br>• creating a fully competitive environment within the info-communication infrastructure and services sector<br>• improving communication of public administration with citizens and business through e-government,<br>• education to take advantage of IS opportunities,<br>• facilitating e-commerce and e-business development<br>• stimulating IT research and development and commercial applications<br>• providing a secure and trust-conducive digital environment |

**Table B32** Objectives and Results of IS Policies

| | |
|---|---|
| GOVNET (1993 – 2002) | interconnection of all state administration bodies, the project was discontinued in 2002 (legal disagreements between the Government Office and the project implementation company) |
| Concept of Communications Development in the Slovak Republic (1993-2000) | • international co-operation (full integration of the Slovak Republic into international telecom activities was sought after the split of the former Czecho-Slovakia),<br>• liberalisation of telecommunication services (only the liberalisation of data services was implemented),<br>• legislation (new Telecom act under preparation),<br>• transformation of the state-owned enterprise Slovak Telecom from a state enterprise to a joint stock company fully owned by the state (not implemented because of the lacking political will to privatise certain enterprises deemed as strategic during 1993-1995),<br>• technological development (rapid development of the Slovak Telecom's infrastructure: density (increase by more than 40% compared to 1992 rates), starting network digitalisation (from 0% in 1993 to 25% in 1995) and investments per capita (increase by more than 80% compared to 1992 volumes). For telecommunications development in 1993 - 1995, a total of 18 billion SKK was invested (original expectation was 15 billion SKK), of which 45% were raised and financed through loans from international development banks (World Bank, EBRD, EIB) with government guarantees and through credits from suppliers of technology. The investment was directed primarily into new digital exchanges, optical digital lines, digital transmission systems, increase of fixed-line penetration and initial steps in improving the quality of local networks. |
| State Telecom Policy 1996-2000 | The implementation of the priorities can be summarised as follows:<br>• adaptation of legislation (new Telecom Act approved in May 2000, replacing the obsolete Telecom Act of 1964, designed strictly for a monopoly telecom market, preparation having been assisted by the Slovak Telecom's privatisation advisor),<br>• liberalisation of telecommunications services (liberalisation of data services, and infrastructures, including the second mobile operator of GSM 900 network in 1996, but introduction of the third mobile operator of GSM 900 did not take place, as two public tenders in 1998-1999 failed (in 1999, the frequencies reserved for the third mobile operator were divided and sold to the two existing GSM operators),<br>• regulatory framework (implementing EC directives, particularly on liberalisation of all types of telecom services and networks, introduction of universal service obligations, harmonisation of frequencies, etc.),<br>• transformation of the telecommunication operator (transformation to joint stock company took place April 1999, privatisation of 51% shares Slovak Telecom took place in July 2000 to Deutsche Telekom),<br>• acceleration of the physical infrastructure development (expansion of the Slovak Telecom infrastructure: density (increased by 50% from 1995), network digitalisation (from 25% in 1995 to 70% in 2000) and investment per capita (increased only during 1996-1997, later decreased because of absence political will for privatisation of Slovak Telecom). |
| State Telecom Policy 2000-2002 | Implementation of the priorities can be assessed as follows:<br>• public telephone service (relevant legal provisions made, but the present licensing process lacks transparency - it is quite common that licensing conditions are not made public and clear for prospective operators; |

| | |
|---|---|
| | privatisation agreement between the government and Deutsche Telekom has not been made publicly available; there is a principal conflict of interests inside the Ministry of Transport, Posts and Telecom because of its dual function of policy-maker and owner of 34% shares of Slovak Telecom),<br>• price policy and regulation (transfer of powers from Ministry of Finance to the Telecommunication Office – a separate national regulatory authority established in 1993, a move consistent with accepted practice in regulation policy),<br>• satellite communications (improved regime),<br>• mobile and personal communications (improved regime, but continued failure of public tender in 2002 to sell a licence for the 3rd mobile operator GSM/UMTS),<br>• interconnection (relevant legal provisions made, but the present licensing process lacks transparency, with prices being subject to commercial secrecy),<br>• leased line services (enabling enhanced competition for international and long-distance levels, but problems of the "last mile" because of the lack of implementation of "unbundling local loop" into Slovak legislation during 2002),<br>• utilisation of frequency spectrum (improved regime allocating frequencies for UMTS and satellite services),<br>• development of terrestrial analogue and digital radio and TV broadcasting (improved regime and the launch of several pilots for digital TV broadcasting),<br>• numbering of telecommunication networks and telecommunication services (relevant legal provisions introduced, but the present licensing process is not harmonised with "Acquis 1998" regime),<br>• Information Society (targeted Slovak Telecom's activities supporting education system in Slovakia, e.g. Infovek project),<br>• international co-operation (standard levels of international co-operation achieved). |
| State IS policy (2001) | required documents (National Strategy, Action eEurope+ Plan) have not been prepared as of August 2003 |
| State Telecom policy 2003 | Main priorities include:<br>• harmonisation with EU legislation (one amendment of the current telecom law was rejected by Parliament after a presidential veto in July 2003, a new e-communication law should be submitted to Parliament in October 2003);<br>• state regulation;<br>• promotion of competitive environment;<br>• universal service development;<br>• end-user rights protection;<br>• information security;<br>• implementation of information society services |
| National Strategy for IS (2004) | National IS Action Plan (annexed to the IS Strategy document) includes survey of all tasks from the eEurope+ (legislative and other framework improvements, internet accessibility, human capital investment, stimulating internet use) and eEurope 2005 (implementation of a detailed structured action plan) with setting of responsible national coordination organisations and deadlines (2003-2005). Financing of national IS action plan for 2004 had not been included in the 2004 budget. |

**Table B33** The Institutional Setting behind IS Policies

| | |
|---|---|
| NGO activities: | PARTNERSHIPS FOR PROSPERITY (PPP) is a Slovak non-profit NGO registered in June 2001 (www.p3.sk). The basic philosophy of the PPP is to provide a continuous forum for co-operation and communication between the political (decision-making) level and the civil society. A formation of such public-private partnerships under the auspices of a non-profit, non-governmental organisation is considered by many as the best solution for transparent co-operation in society-profit projects. Its main objectives are to help:<br>• provide a forum for interest brokerage between government, business and science partners in the field of IT,<br>• forge economically viable partnerships between the interested parties,<br>• enhance the perspective for a more dynamic advancement of IT in areas of Education (e-learning), Government (e-government) and Business (e-business) in Slovakia. |
| | INTERNET FOR ALL (IPV) is a Slovak non-profit NGO founded in January 2002 (www.inet.sk). The basic philosophy of IPV is to:<br>• ensure speedier, cheaper and more secure internet;<br>• accelerate establishment of basic pillars for information society;<br>• promote wider using of internet;<br>• support investments for education |
| | eSLOVAKIA is an association created through a joint personal initiative of the Slovak Prime Minister and the CEO of Slovak Telecom in May 2002. The move was in part a response to calls for the government to step in and influence the rising internet access tariffs. The main objectives of eSlovakia as presented by the partners were:<br>• acceleration of information society in Slovakia,<br>• enlightenment of information society for public,<br>• creation of a strategic partnership between the main players,<br>• support of well-prepared projects.<br>Three main pillars of eSlovakia are as follows:<br>• iAccess,<br>• iContent,<br>• iEducation. |
| Specific voluntary sector organisations | Slovak Electrotechnic Society (voluntary professional association supporting telecommunication activities and the systematic distribution of information to its own members and to the public) |
| | Slovak Informatics Society (voluntary professional association supporting informatics activities and the systematic distribution of information to its own members and also to the public) |
| | The Association of Telecommunication Users in Slovakia, established in 1997, is a consumer protection association of telecom users, including PC users. |

| | |
|---|---|
| Professional associations | *API* (Association of Internet Service Providers) was founded in April 1999. The association has been active in criticising the policies of the incumbent operator in the area of internet access policies and prices.<br>ATO (Association of Telecom Operators) founded in 2001 has been active in supporting liberalisation of the telecom markets, commenting on laws and policies.<br>ITAS (Association of IT companies in Slovakia) aims at promoting the spread of information technologies.<br>ATM Association (established in 1997)<br>ISDN Association (established in 1998)<br>APKT (Association of Cable TV operators)<br>SAKT (Slovak Association for the Cable Telecommunications)<br>SAEC (Slovak Association for Electronic Commerce) has been promoting the development of the framework for electronic commerce. |

**Table B34** The Commitment of Private and Public Actors

| | |
|---|---|
| Infovek ("InfoAge") | In 1999, a group of enthusiasts from universities and the state administration launched a capacity-building project to connect primary and secondary schools into the Internet, and to equip the teachers with appropriate, up-to-date skills. As of February 2003, nearly 850 schools had internet connections, during 2003 further 800 schools were planned to be connected as well (by the end of 2003 35% of all schools will have been connected). |
| eSlovakia | eSlovakia (NGO created by initiative of the Slovak prime minister and president of Slovak Telecom in May 2002) in response to criticism over rising dial-up costs aims at accelerating information society developments in Slovakia by creating a strategic partnership between public and private actors and supporting projects in this area.<br>Three main stated pillars of the eSlovakia are as follows:<br>• iAccess,<br>• iContent,<br>• iEducation. |
| Portal "Obcan" ("Citizen") | Portal "Obcan" is a joint initiative of several IT companies and the Government Office launched in April 2003, testing a web-information system aimed at improving information for citizens in relation to different state administration procedures. Now fully operational. |
| project ISOMI | was launched in early 2002 and aimed to improve public administration at the local level - local governments in Slovakia. The key project partners are ZMOS (Union of Towns and Villages), Slovak Telecommunications and several major IT companies. The project runs a unified database of information on and for local governments. |

**Table B35** Specific Important Actors

| | |
|---|---|
| Slovak Telecom | dominant (former monopoly) telecom operator |
| SANET | Slovak Academic NETwork (special high-performance infrastructure operator providing internet services to the academic community) - positive influence on research and university centres |
| API | Professional association (often in conflict with the dominant operator) |
| ATO | Professional association |
| ITAS | Professional association |
| NGOs | e.g. PPP, IPV, eSlovakia |

# C. INDUSTRIAL DEVELOPMENT AND COMPETITIVENESS

**Table C11.1** Industry and Services: Sectoral Output

| NACE | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|
| INDUSTRY (C-E) | 12,779 | 13,521 | 15,737 | 17,146 | 18,422 | 18,704 | 17,460 | 21,691 |
| Mining and quarrying | 307 | 300 | 297 | 303 | 323 | 378 | 309 | 320 |
| Manufacturing | 9,925 | 10,705 | 13,111 | 14,009 | 15,189 | 15,583 | 14,387 | 18,164 |
| Electricity, gas and water supply | 2,547 | 2,516 | 2,329 | 2,834 | 2,910 | 2,743 | 2,764 | 3,207 |
| | | | | | | | | |
| Construction | 2,134 | 2,098 | 2,445 | 3,343 | 4,028 | 3,963 | 3,128 | 3,964 |
| Internal trade | 3,683 | 3,796 | 4,032 | 4,375 | 5,487 | 6,029 | 5,625 | 6,219 |
| | | | | | | | | |
| SERVICES (H-P) | | | | | | | | |
| Hotels and restaurants | 572 | 408 | 475 | 523 | 570 | 592 | 571 | 658 |
| Transports, storage, post and telecoms | 1,961 | 2,515 | 2,789 | 3,445 | 4,134 | 4,279 | 4,318 | 5,217 |
| Financial intermediation | 712 | 724 | 1 019 | 939 | 1,220 | 1,157 | 1,053 | 1,181 |
| Real estate, renting and business activities, R&D | 2,365 | 2,251 | 2,834 | 3,342 | 4,060 | 4,397 | 4,702 | 5,081 |
| Public administration and defence; social security | 1,286 | 1,173 | 1,257 | 1,917 | 1,762 | 1,877 | 1,746 | 2,957 |
| Education | 721 | 599 | 610 | 675 | 732 | 782 | 737 | 588 |
| Health and social work | 576 | 637 | 739 | 769 | 1,103 | 1,071 | 1,024 | 840 |
| Other community, social and personal service activities | 582 | 645 | 699 | 821 | 988 | 1,036 | 1,021 | 1,047 |
| TOTAL (A-P) | 29,572 | 30,490 | 34,742 | 39,616 | 45,047 | 46,337 | 43,565 | 51,664 |

Source: Selected Indicators of Economic Development of the Slovak Republic: 1991-2001 Period, Slovak Statistical Office (2002) , Note: in Mio EUR (current prices)

**Table C11.2** Industry and Services: Sectoral Share

| NACE | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|
| INDUSTRY (C-E) | 43 | 44 | 45 | 43 | 41 | 40 | 40 | 42 |
| Mining and quarrying | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| Manufacturing | 34 | 35 | 38 | 35 | 34 | 34 | 33 | 35 |
| Electricity, gas and water supply | 9 | 8 | 7 | 7 | 6 | 6 | 6 | 6 |
| | | | | | | | | |
| Construction | 7 | 7 | 7 | 8 | 9 | 9 | 7 | 8 |
| Internal trade | 12 | 12 | 12 | 11 | 12 | 13 | 13 | 12 |
| | | | | | | | | |
| SERVICES (H-P) | 30 | 29 | 30 | 31 | 32 | 33 | 35 | 34 |
| Hotels and restaurants | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Transports, storage, post and telecoms | 15 | 19 | 18 | 20 | 22 | 23 | 25 | 24 |
| Financial intermediation | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 |
| Real estate, renting and business activities, R&D | 8 | 7 | 8 | 8 | 9 | 9 | 11 | 10 |
| Public administration and defence; social security | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 6 |
| Education | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| Health and social work | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Other community, social and personal service activities | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| TOTAL (A-P) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Selected Indicators of Economic Development of the Slovak Republic: 1991-2001 Period, Slovak Statistical Office (2002), Note: share in %

**Table C11.3** Industry and Services: Gross Value Added per Employee

| NACE | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| INDUSTRY (C-E) | | | | | |
| Mining and quarrying | 4,387 | 3,679 | 4,420 | 4,932 | 6,289 |
| Manufacturing | 6,426 | 6,879 | 7,060 | 7,497 | 8,773 |
| Electricity, gas and water supply | 12,182 | 12,050 | 11,585 | 14,249 | 14,412 |
| | | | | | |
| Construction | 5,946 | 6,140 | 6,195 | 5,000 | 8,356 |
| Internal trade | 9,532 | 11,604 | 11,506 | 11,215 | 11,282 |
| | | | | | |
| SERVICES (H-P) | | | | | |
| Hotels and restaurants | 19,533 | 30,459 | 30,605 | 31,024 | 31,128 |
| Transports, storage, post and telecoms | 9,532 | 11,604 | 11,506 | 11,215 | 11,282 |
| Financial intermediation | 20,603 | 25,960 | 20,411 | 17,037 | 19,075 |
| Real estate, renting and business activities, R&D | 19,533 | 30,459 | 30,605 | 31,024 | 31,128 |
| Public administration and defence; social security | 7,149 | 5,796 | 6,517 | 6,181 | 12,946 |
| Education | 2,855 | 3,364 | 3,731 | 3,510 | 2,665 |
| Health and social work | 3,255 | 5,159 | 5,056 | 4,435 | 2,579 |
| Other community, social and personal service activities | 3,571 | 5,870 | 6,759 | 6,586 | 4,900 |

Source: own calculations based on data from Slovak Statistical Office (2002), Note: in EUR

**Table C12.1** Industrial Geography: Regional Shares of Total Manufacturing

| Regions: | BA | TT | TN | NR | ZA | BB | PO | KE |
|---|---|---|---|---|---|---|---|---|
| Sectors: | | | | | | | | |
| Food and beverages | 19.68 | 14.30 | 11.08 | 14.6 | 9.18 | 13.35 | 9.42 | 8.39 |
| Tobacco | I | . | . | . | . | . | . | . |
| Textiles | 4.44 | 5.29 | 16.65 | 16.05 | 33.48 | 5.31 | 15.53 | 3.25 |
| Wearing apparel | 1.68 | 9.28 | 44.97 | 7.46 | 2.87 | 8.17 | 18.93 | 6.63 |
| Leather and leather products | 2.83 | 2.45 | 29.57 | 22.95 | 29.54 | 1.63 | 9.86 | I |
| Wood and wood products | 1.69 | 3.1 | 4.55 | 3.24 | 12.22 | 44.12 | 27.94 | 3.14 |
| Pulp, paper and paper products | 2.21 | 6.37 | I | 15.38 | 52.41 | 5.89 | 6.81 | 10.68 |
| Publishing, printing and reproduction | 56.76 | 2.68 | 3.48 | 6.26 | 14.65 | 7.31 | 4.28 | 4.58 |
| Coke, refined petroleum products, nuclear fuel | 96.85 | I | . | . | . | I | . | I |
| Chemicals and chemical products | 12.63 | 21.2 | 11.5 | 21.5 | 5.88 | 6.81 | 8.23 | 12.23 |
| Rubber and plastic products | 7.15 | 4.79 | 52.41 | 10.02 | 1.75 | 0.86 | 21.31 | 1.72 |
| Other non-metallic mineral products | 28.24 | 10.85 | 16.04 | 8.1 | 2.85 | 24.02 | 1.23 | 8.68 |
| Basic metals | I | 5.29 | 1.62 | . | 5.06 | 22.22 | I | 65.76 |
| Fabricated metal products | 8.11 | 29.98 | 17.74 | 13.93 | 9.98 | 7.27 | 5.35 | 7.64 |
| Mechanical machinery | 5.95 | 1.52 | 21.89 | 8.39 | 17.37 | 10.26 | 21.59 | 12.93 |
| Office machinery and computers | 43.06 | 28.82 | I | . | . | . | . | I |
| Electrical machinery | 21.95 | 4.22 | 25.15 | 20.77 | 5.05 | 1.54 | 1.28 | 20.04 |
| Radio, TV and recording equipment | 9.01 | 39.86 | 1.32 | 4.34 | 36.48 | I | I | . |
| Medical, precision and optical instruments | 49.12 | 5.82 | 23.61 | I | I | I | 10.51 | 6.24 |
| Motor vehicles, trailers and semi-trailers | 92.36 | 2.26 | 1.36 | 1.35 | 1.33 | 0.62 | 0.57 | 0.14 |
| Other transport equipment | I | I | 7.57 | 1.81 | 16.15 | I | 37.13 | I |
| Other manufactured products, incl. furniture | 27.26 | 9.53 | 9.3 | 7.05 | 35.9 | 6.75 | 2.04 | 2.17 |
| Recycling | . | . | . | . | I | . | 15.52 | 82.26 |

Source: 2001 Yearbook of Industry (Slovak Statistical Office, 2001); Notes: 1/shares in %, 2000 data; 2/I - data not available due to individual data protection; 3/Regions (NUTS 3 level): BA - Bratislava Region, TT - Trnava Region, TN - Trencin Region, NR - Nitra Region, ZA - Zilina Region, BB - Banska Bystrica Region, PO - Presov Region, KE - Kosice Region.

**Table C12.2** Industrial Geography: Regional Specialisation in Manufacturing

| NACE | REGION: / SECTOR | BA | TT | TN | NR | ZA | BB | PO | KE |
|---|---|---|---|---|---|---|---|---|---|
| 15 | Food and beverages | 1.24 | 1.46 | 0.49 | 1.50 | 0.83 | 1.22 | 1.01 | 0.87 |
| 16 | Tobacco | na | na | na | na | na | na | na | na |
| 17 | Textiles | 0.52 | 0.44 | 0.66 | 1.56 | 2.32 | 0.62 | 1.77 | 0.55 |
| 18 | Wearing apparel | 0.23 | 1.14 | 1.96 | 0.75 | 0.28 | 0.73 | 2.17 | 0.64 |
| 19 | Leather and leather products | 0.14 | 0.45 | 2.29 | 1.58 | 1.12 | 0.38 | 1.48 | na |
| 20 | Wood and wood products | 0.09 | 0.31 | 0.29 | 0.45 | 1.51 | 2.90 | 2.40 | 0.46 |
| 21 | Pulp, paper and paper products | 0.30 | 0.68 | na | 1.57 | 3.38 | 0.83 | 1.05 | 0.62 |
| 22 | Publishing, printing and reproduction | 3.76 | 0.59 | 0.20 | 0.55 | 1.32 | 0.70 | 0.65 | 0.62 |
| 23 | Coke, refined petroleum products, nuclear fuel | 7.43 | na | na | na | na | na | na | na |
| 24 | Chemicals, chemical products, man-made fibbers | 0.96 | 2.31 | 0.72 | 1.97 | 0.36 | 0.75 | 1.05 | 0.83 |
| 25 | Rubber and plastic products | 0.60 | 0.61 | 2.63 | 1.47 | 0.34 | 0.16 | 1.65 | 0.15 |
| 26 | Other non-metallic mineral products | 1.33 | 0.81 | 0.96 | 0.75 | 0.40 | 3.02 | 0.43 | 0.67 |
| 27 | Basic metals | na | 0.92 | na | na | na | na | na | 4.27 |
| 28 | Fabricated metal products | 0.66 | 1.79 | 1.19 | 2.25 | 0.89 | 0.72 | 0.72 | 0.53 |
| 29 | Machinery, excluding electrical | 0.52 | 0.20 | 1.25 | 1.03 | 1.70 | 1.11 | 1.38 | 0.94 |
| 30 | Office machinery and computers | 2.46 | 3.53 | na | na | na | na | na | na |
| 31 | Electrical machines and equipment | 1.06 | 0.72 | 1.23 | 3.49 | 0.64 | 0.17 | 0.23 | 1.02 |
| 32 | Radio, TV, communication equipment | 0.18 | 1.77 | 0.28 | 0.53 | 3.34 | na | na | na |
| 33 | Medical, precision and optical instruments | 2.29 | 0.68 | 2.15 | na | na | na | 1.76 | 0.54 |
| 34 | Motor vehicles, trailers and semi-trailers | 4.36 | 0.58 | 0.72 | 0.84 | 0.72 | 0.22 | 0.65 | 0.16 |
| 35 | Other transport equipment | na | na | na | na | na | na | na | na |
| 36 | Other manufactured products, incl. furniture | 0.55 | 1.29 | 0.92 | 1.12 | 2.53 | 0.83 | 0.41 | 0.44 |
| 37 | Recycling | na | na | na | na | na | na | na | 5.72 |

Source: own calculations based on data from 2002 Yearbook of Industry (Slovak Statistical Office, 2002)
Notes: 1/2001 data; 2/Specialisation measured by location quotient; LQ>1,2 indicates strong regional specialisation in a given industry; 3/Regions (NUTS 3 level): BA - Bratislava Region, TT - Trnava Region, TN - Trencin Region, NR - Nitra Region, ZA - Zilina Region, BB - Banska Bystrica Region, PO - Presov Region, KE - Kosice Region.

**Table C41.1** Industry and Services: Investment (Volume)

| NACE | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|
| INDUSTRY (C-E) | 1.584 | 1.505 | 1.709 | 2.226 | 2.494 | 3.060 | 2.280 | 2.752 |
| Mining and quarrying | 0.058 | 0.063 | 0.109 | 0.177 | 0.182 | 0.086 | 0.036 | 0.063 |
| Manufacturing | 1.051 | 0.738 | 0.905 | 1.273 | 1.460 | 1.697 | 1.544 | 1.815 |
| Electricity, gas and water supply | 0.475 | 0.704 | 0.694 | 0.776 | 0.852 | 1.278 | 0.700 | 0.873 |
| | | | | | | | | |
| Construction | 0.114 | 0.132 | 0.133 | 0.185 | 0.210 | 0.179 | 0.107 | 0.110 |
| Internal trade | 0.125 | 0.166 | 0.200 | 0.388 | 0.600 | 0.662 | 0.728 | 0.812 |
| | | | | | | | | |
| SERVICES (H-P) | 1.545 | 1.613 | 2.031 | 3.291 | 3.807 | 3.654 | 2.870 | 3.252 |
| Hotels and restaurants | 0.031 | 0.026 | 0.039 | 0.076 | 0.084 | 0.063 | 0.068 | 0.096 |
| Transports, storage, post and telecoms | 0.328 | 0.411 | 0.525 | 0.836 | 0.994 | 0.881 | 0.592 | 0.615 |
| Financial intermediation | 0.278 | 0.353 | 0.445 | 0.651 | 0.679 | 0.654 | 0.583 | 0.740 |
| Real estate, renting and business activities, R&D | 0.392 | 0.356 | 0.377 | 0.529 | 0.668 | 0.710 | 0.694 | 0.749 |
| Public administration and defence; social security | 0.156 | 0.169 | 0.252 | 0.656 | 0.768 | 0.747 | 0.503 | 0.564 |
| Education | 0.061 | 0.061 | 0.107 | 0.156 | 0.171 | 0.164 | 0.118 | 0.134 |
| Health and social work | 0.094 | 0.092 | 0.130 | 0.195 | 0.226 | 0.210 | 0.129 | 0.157 |
| Other community, social and personal service activities | 0.206 | 0.145 | 0.156 | 0.193 | 0.216 | 0.225 | 0.184 | 0.197 |

Source: own calculations based on data from Slovak Statistical Office (2002), Note: volumes in Mio EUR

**Table C41.2** Industry and Services: Investment (Change)

| NACE | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|
| INDUSTRY (C-E) | - | 100.2 | 115.1 | 130.1 | 110.9 | 127.8 | 83.0 | 116.5 |
| Mining and quarrying | - | 114.3 | 175.0 | 161.9 | 101.5 | 49.3 | 47.1 | 168.8 |
| Manufacturing | - | 74.1 | 124.3 | 140.5 | 113.5 | 121.1 | 101.3 | 113.5 |
| Electricity, gas and water supply | - | 156.1 | 100.0 | 111.6 | 108.7 | 156.2 | 61.1 | 120.4 |
| | | | | | | | | |
| Construction | - | 122.0 | 102.0 | 139.2 | 112.7 | 88.8 | 66.2 | 100.0 |
| Internal trade | - | 140.0 | 122.2 | 193.5 | 153.0 | 114.9 | 122.5 | 107.8 |
| | | | | | | | | |
| SERVICES (H-P) | - | 104.4 | 125.9 | 162.0 | 115.7 | 96.0 | 78.5 | 113.3 |
| Hotels and restaurants | - | 90.9 | 150.0 | 193.3 | 110.3 | 78.1 | 120.0 | 136.7 |
| Transports, storage, post and telecoms | - | 132.2 | 129.5 | 158.9 | 117.8 | 92.3 | 74.8 | 100.4 |
| Financial intermediation | - | 134.0 | 127.6 | 146.2 | 103.2 | 100.4 | 99.2 | 122.6 |
| Real estate, renting and business activities, R&D | - | 95.7 | 107.4 | 140.0 | 125.1 | 110.6 | 108.9 | 104.2 |
| Public administration and defence; social security | - | 114.3 | 151.6 | 259.8 | 115.9 | 101.4 | 75.0 | 108.1 |
| Education | - | 104.5 | 178.3 | 146.3 | 108.3 | 100.0 | 80.0 | 109.6 |
| Health and social work | - | 102.9 | 142.9 | 150.0 | 114.7 | 96.5 | 68.7 | 117.5 |
| Other community, social and personal service activities | - | 74.3 | 109.1 | 123.3 | 110.8 | 108.5 | 91.0 | 103.7 |

Source: own calculations based on data from Slovak Statistical Office (2002); Note: previous year = 100

**Table C51** ICT Market Value (Size)

| ICT MARKET SEGMENTS: | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| ICT market total | na | 393 | 533 | 640 | 900 | 1,060 | 1,242 | 1,342 | 1,640 | 1,925 |
| Telecommunications market | na | 205 | 290 | 390 | 582 | 744 | 827 | 882 | 1,104 | 1,340 |
| IT market | na | 188 | 243 | 250 | 319 | 315 | 415 | 460 | 536 | 585 |

Source: ITO Book (2002); Note: in Mio EUR

*C52: International Cooperation and Competition*

Majority of local ICT industry companies produce specific components only, with the several ICT companies with end-products being mainly oriented on digital exchanges and TV sets. Majority of companies in 2001 increased their revenues in comparison with 2000; only 8 of 27 had negative revenue balance. Local market competition among ICT industry companies is minimal because of different types of products offered (small competition is only in cable products, TV sets and phone sets). Majority of ICT products and/or components have high competitive value on international markets (components are mainly produce for top ICT industry players on international level).Local SW companies have permanently progressive trend in revenues during last few years. Local IT companies had generally also positive trend in revenues in 2001(only 9 of 70 had negative revenue balance).

*C53: Regional Cross-Country Agreements*

No specific multi- or bi-lateral agreements on regional basis on ICT concluded; only several bilateral agreements between national line ministries and incumbent operators on technical cooperation in telecommunication exist.

**Table C6** Major Sectors of Innovative Activity in Manufacturing

| NACE | SECTOR | %* |
|---|---|---|
| 15 | Food and beverages | 29.5 |
| 17-18 | Textiles and wearing apparel | 14.2 |
| 21 | Pulp, paper and paper products | 12.5 |
| 22 | Publishing, printing and reproduction | 20.7 |
| 23 | Coke, refined petroleum products, nuclear fuel | 50.0 |
| 26 | Other non-metallic mineral products | 29.9 |
| 27-28 | Metal and metal products | 16.1 |
| 29 | Machinery, excluding electrical | 23.1 |
| 31 | Electrical machines and equipment | 26.6 |
| 32 | Radio, TV, communication equipment | 13.9 |
| 33 | Medical, precision and optical instruments | 37.5 |
| 34-35 | Motor vehicles, trailers and semi-trailers | 20.0 |
| 36 | Other manufactured products, incl. furniture | 12.5 |

Source: Slovak Statistical Office (2001): 1997-99 European Innovation Survey of Manufacturing in Slovakia
Notes: 1/ *Share of innovating enterprises in manufacturing (1997-1999), 2/Survey results for NACE 30 (Office machinery and equipment) were not published by SU SR for unspecified reasons

**Table C74** Trade Balance of ICT Industry

| CPA | SELECTED ICT MANUFACTURING | EXPORTS | | | IMPORTS | | | BALANCE | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2001 | 2000 | 2001/2000 | 2001 | 2000 | 2001/2000 | 2001 | 2000 |
| 3001 | Office machinery and parts thereof | 14.472 | 13.633 | 107.9 | 29.176 | 24.706 | 120.1 | -14.705 | -11.073 |
| 3002 | Computers and information processing equipment | 90.804 | 111.207 | 83.0 | 362.551 | 296.530 | 124.3 | -271.747 | -185.323 |
| 3110 | Electric motors, generators, transformers | 239.111 | 219.659 | 110.7 | 203.464 | 155.112 | 133.4 | 35.647 | 64.547 |
| 3120 | Electricity distribution and control apparatus | 70.334 | 52.149 | 137.2 | 239.213 | 187.598 | 129.7 | -168.879 | -135.449 |
| 3130 | Insulated wire and cable | 74.216 | 64.508 | 117.0 | 167.808 | 135.735 | 125.7 | -93.592 | -71.227 |
| 3140 | Accumulators, primary cells and primary batteries | 4.795 | 3.553 | 137.2 | 29.627 | 22.539 | 133.7 | -24.832 | -18.985 |
| 3150 | Lighting equipment and electric lamps | 67.120 | 52.939 | 128.9 | 57.706 | 43.619 | 134.5 | 9.414 | 9.320 |
| 3161 | Electrical equipment for engines and vehicles n.e.c. | 334.527 | 280.600 | 121.2 | 131.960 | 142.117 | 94.4 | 202.566 | 138.483 |
| 3162 | Other electrical equipment n.e.c. | 22.393 | 26.188 | 87.0 | 61.594 | 45.745 | 136.9 | -39.201 | -19.557 |
| 3210 | Electronic valves and tubes and other electronic components | 155.947 | 114.409 | 138.6 | 297.316 | 248.324 | 121.8 | -141.369 | -133.915 |
| 3220 | TV and radio transmitters; telegraphy apparatus | 49.158 | 42.124 | 118.7 | 207.135 | 147.741 | 142.6 | -157.977 | -105.617 |
| 3230 | TV and radio receivers; sound or video recording … | 248.773 | 148.897 | 169.9 | 209.940 | 147.509 | 144.7 | 38.833 | 1.388 |
| 3310 | Medical and surgical equipment and orthopaedic appliances | 43.499 | 30.433 | 145.3 | 97.366 | 78.054 | 126.9 | -53.867 | -47.621 |
| 3320 | Instruments and appliances for measuring, checking, testing | 60.518 | 47.567 | 129.4 | 228.980 | 192.574 | 120.9 | -168.462 | -145.007 |
| 3340 | Optical instruments and photographic equipment | 2.215 | 2.945 | 76.5 | 30.319 | 23.074 | 133.6 | -28.104 | -20.129 |

Source: own calculations based on data on Foreign Trade of the Slovak Republic in 2001, Slovak Statistical Office (2002), Note: trade volumes in Mio EUR, 2001/2000 change in %

**Table C81** The Role and Presence of Multinational Enterprises (MNEs) in ICT

| ICT-MANUFACTURING /SERVICES | COMPANY NAME | LOCATED | EMPLOYING | EST. | PARENT HQ |
|---|---|---|---|---|---|
| Automotive cable harness assembly | VW Elektrosystemy | NR | 4,000 | 1996 | Germany |
| | Siemens Automotive | KE | 2,500 | 1993 | Germany |
| | Yazaki | TN | 3,134 | 1994 | Germany |
| | Leoni | TN | 2,600 | 1993 | Germany |
| | Kromberg&Schubert | NR | 1,600 | 1996 | Germany |
| | Punch | ZA, TT | 1,500 | 1998 | Belgium |
| | Sews (Sumitomo) | NR | 1,000 | 1997 | Japan |
| | Delphi | TT | 450 | 2001 | USA |
| | Todenco | TN | 150 | 2001 | Japan |
| Electronic components/Connectors and circuit boards (incl. semiconductors/diodes) | Sony | TT | 990 | 1996 | Japan |
| | Matsushita | ZA | 1,060 | 1997 | Japan |
| | On Semiconductors | TT | 300 | 1998 | USA |
| | Molex | KE | 480 | 1997 | USA |
| | Semikron | TT | 150 | 2000 | UK |
| | Electronika Slovensko | TT | 320 | 1992 | Germany |
| | Samsung | TT | na | 2002 | South Korea |
| Electric motors | Emmerson Electric | TN | 1,765 | 1993 | USA |
| | BSH | KE | 980 | 1993 | Germany |
| Software development/Support services | Alcatel Slovakia | BA, ZA | 596 | 1999 | France |
| | Siemens Software House | BA | 550 | 1996 | Germany |
| | Novitech | KE | 140 | 1989 | Finland |
| | SAP Slovensko | BA | 42 | 1998 | Germany |
| | Fujitsu Services | BA | 60 | 1992 | Japan |
| | Cisco Systems | BA | 10 | 1998 | USA |
| | Hewlett Packard | BA | na | 1993 | USA |
| Shared services centre | IBM Slovakia | BA | 340 | 1992 | USA |
| Internet service provider | Nextra | BA | 150 | 1998 | Norway |

Note: Regions (NUTS 3 level): BA - Bratislava Region, TT - Trnava Region, TN - Trencin Region, NR - Nitra Region, ZA - Zilina Region, BB - Banska Bystrica Region, PO - Presov Region, KE - Kosice Region.

*C82: The Contribution of MNEs to IST-related*

There are several well-known examples of foreign-owned ICT-based companies, which are developing links with other sectors of economy, including university sector. A good example is the U.S. company *ON Semiconductors* (a daughter of Motorola Corp.), which has developed strong links with the Slovak Technological University (STU) and funds four engineers undertaking research at the STU Design Laboratory since June 2000. Students from STU undertaking training projects are at the plant as part of their studies. In addition, the company has also commenced a Linkage Programme with Vocational School in Piestany (in Western Slovakia, where the company is located since 1998) to further develop special technical competencies in the community.

*Alcatel Slovakia* is another big (foreign) investor, that is generating spill-overs to the wider economy, not only through the implementation of substantial ICT projects for the government sector (the above-mentioned Telecommunications Projects in the 1990s, Slovak Railways in 2002-2004), but also via linkages with the education system. After Alcatel Slovakia in Liptovsky Hradok re-focused on software development business in 1999 (see Box 4.1 on the activities of the company in 1990s), it has considerably strengthened its co-operation with the education system - Slovak Technological University in Bratislava, University of Zilina and Technological University in Kosice. The Military Academy in Liptovsky Mikulas has become a major source of IT graduates for the company. The company has two software centres in Slovakia: the one in Bratislava employs 200, with the other one in Liptovsky Hradok employing 130. The balance of Alcatel's staff provide telecom-related services (a total employment of 495 was reported in 2002). In addition, over 100 Slovak engineers form the heart of an elite corps of Alcatel support staff permanently based abroad servicing world wide customers (SARIO, 2002b).

In ***cross-border*** perspective, various players in electronics and IT business established their CEE head offices in Vienna (including Siemens, IBM, Hewlett Packard). It appears that Vienna is becoming a bridging platform for this sector to the CEE region. Both in areas of software development and digital technologies, there is an unsatisfied demand for highly-qualified workers, produced by the CEE education systems. Networking and "cooperation initiation" as well as creation of transnational regional infrastructures (e.g. the so-called BioTech- or NanoTechValleys) are currently a primary component of European innovation policies. Cross- and transnational cooperation is relevant also to the *automotive industry.* Organising of the transnational links of the successful automotive cluster in Lower Austria with Central Europe has become an important regional location factor across the western borders of Slovakia. The growth of the two global high-tech industries has stimulated a strong industrial interest (also from the leading IT multinationals mentioned above) in establishing ***EUROVALLEY*** (www.euro-valley.sk), a state-of-the-art industry and technology park, the modern facilities of which are already being constructed in the border region of Malacky, about 30 km from Bratislava City. Having a gateway location, it is of strategic importance for Bratislava region to develop cross-border links with the neighbouring areas. Much has already been said and published about the vision of an integrated functional urban region Vienna-Bratislava. However, it is only quite recently that a genuine planning of specific actions has started, mainly with financing from the Austrian government and a contribution from the AEU's Interreg initiative and Phare CBC.

# D. PRESENCE OF THE MOST RELEVANT ECONOMIC ACTIVITIES FOR IST APPLICATIONS

*D12: Level of ICT Investment in Industry*

According on IDC data, Slovakia's 2002 spending on information technologies reached almost $600 million, representing some 2.5 % of GDP. Although low in per capita terms ($109 compared with the Czech Republic's $212 or Hungary's $152), the share on GDP is reportedly the second highest in the region (after the Czech Republic's 3.1 %).

Specific data on IT investment in industry is not available. Anecdotal evidence shows that levels of IT investment in industry vary vastly, with higher investment levels in larger and foreign owned firms.

*D13: Level of ICT Investment in Services*

Based on information from Slovakia's leading business research agencies (TREND Analyses, Symsite Research), the total annual ICT investment in services in Slovakia is approx. 20 billion SKK, of which 80% is made by telecom operators. Official data on total ICT investment in services is not collected by the national statistics authorities.

Official data on total ICT investments in public administration (PA) is not collected by the national, software (SW) investment has recently been reported only for corporations with more than 20 employees, as part of the intangible fixed assets statistics. Based on 2002 data, public administration and defence's SW stock is around 1.1 billion SKK (i.e. Mio 26 EUR)

**Table D14** Level of ICT Investment in Public Administration

| No. | Procurement Organisation | Total Contract Value (incl. VAT) in '000 SKK | Subject of Procurement |
|---|---|---|---|
| 1. | Ministry of Finance | 1,325,703 | Information system |
| 2. | Ministry of Defence | 415,464 | Information system |
| 3. | Ministry of Interior | 393,494 | HW |
| 4. | Ministry of Justice | 232,487 | HW, SW licenses |
| 5. | Customs Office | 174,406 | Information system |
| 6. | Central Tax Authority | 152,503 | HW, SW, Services |
| 7. | Office for Geodesy, Cartography and Catastre | 69,343 | HW |

Source: TREND TOP in IT (2003),
Notes: The Biggest IT Procurement Contracts in PA in 2002, EUR = SKK 42

**Table D21** Trends in Innovation: Domestic Industrial Patents Applications

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|
| Agriculture | 4 | 5 | 7 | 3 | 6 | 3 | 4 | 9 |
| Foodstuffs and Tobacco | 5 | 9 | 5 | 8 | 4 | 11 | 10 | 7 |
| Personal and domestic articles | 3 | 3 | 2 | 7 | 7 | 6 | 3 | 3 |
| Health and Amusements | 9 | 13 | 8 | 14 | 9 | 7 | 17 | 18 |
| Medical, dental and hygienic preparations | 10 | 4 | 5 | 7 | 1 | 6 | 6 | 3 |
| Separating and mixing | 5 | 7 | 9 | 7 | 5 | 7 | 5 | 2 |
| Shaping metal | 4 | 8 | 3 | 7 | 3 | 4 | 1 | - |
| Material processing | 14 | 8 | 10 | 6 | 14 | 2 | 3 | 7 |
| Printing | - | 1 | 3 | 2 | 0 | - | 1 | 1 |
| Transportation | 11 | 17 | 17 | 16 | 17 | 28 | 29 | 34 |
| Transportation and storage of materials | 13 | 7 | 5 | 6 | 5 | - | - | - |
| Inorganic chemistry | 21 | 24 | 6 | 11 | 16 | 9 | 15 | 23 |
| Organic chemistry | 10 | 14 | 10 | 11 | 9 | 11 | 4 | 10 |
| Macromolecular compounds | 2 | 3 | 4 | 7 | 5 | 5 | 4 | 3 |
| Dyes, animal and vegetable oils | 9 | 5 | 6 | 1 | 6 | 2 | 6 | 7 |
| Biochemistry, sugar industry, leather | 5 | 5 | 10 | 10 | 4 | 4 | 4 | 5 |
| Metallurgy | 2 | 6 | 2 | 3 | 1 | 1 | 2 | 2 |
| Textiles | - | 3 | 2 | 0 | 2 | - | - | 2 |
| Paper | - | 1 | - | 2 | 0 | - | - | - |
| Construction | 26 | 35 | 13 | 19 | 16 | 22 | 24 | 22 |
| Drilling and Mining | 0 | 1 | 1 | 0 | 1 | - | - | - |
| Engines and pumps | 26 | 12 | 19 | 17 | 15 | 11 | 37 | 20 |
| Engineering in general | 15 | 9 | 11 | 10 | 5 | 16 | 13 | 4 |
| Lighting and heating | 9 | 10 | 4 | 7 | 8 | 8 | 9 | 19 |
| Weapons and ammunition | 1 | 5 | 6 | 12 | 17 | 4 | 3 | 7 |
| Measuring, optics and photography | 11 | 21 | 4 | 9 | 13 | 15 | 11 | 7 |
| Horology, regulation, computers | 5 | 5 | 3 | 4 | 5 | 10 | 10 | 9 |
| Musical instruments, information storage | 1 | 1 | 7 | 1 | 1 | 3 | 1 | 2 |
| Nuclear engineering | 1 | 1 | 1 | 2 | 0 | - | - | - |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Electrical technology | 8 | 16 | 12 | 12 | 12 | 12 | 9 | 15 |
| Electronic circuitry, communication technology | 6 | 10 | - | 3 | 6 | 7 | 10 | 5 |
| Other | 12 | - | - | - | - | - | - | - |
| TOTAL | 620 | 269 | 195 | 224 | 213 | 214 | 241 | 246 |

Note: Domestic patents filed with the Office for the Protection of Industrial Property
Source: Statistical Office of the Slovak Republic, Statistical Yearbooks 2002, 1999, 1997

**Table D22** R&D Expenditures

| | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total expenditure in Mio SKK | 6,241 | 5,662 | 4,473 | 5,374 | 5,905 | 7,744 | 6,154 | 5,552 | 6,086 | 6,467 | 6,333 |

Source: Statistical Office of the Slovak Republic, Statistical Yearbooks 1997-2003

**Table D23** Private and Government Contribution to R&D

| | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total expenditure in Mio SKK | 6,241 | 5,662 | 4,473 | 5,374 | 5,905 | 7,744 | 6,154 | 5,552 | 6,086 | 6,467 | 6,333 |
| *By Sector:* | | | | | | | | | | | |
| Private sector | na | na | na | na | na | 5,854 | 4,050 | 3,473 | 4,005 | 4,354 | 4,074 |
| Government | na | na | na | na | na | 1,370 | 1,524 | 1,528 | 1,502 | 1,532 | 1,682 |
| Universities | na | na | na | na | na | 520 | 580 | 551 | 579 | 581 | 576 |
| *By Field of Science:* | | | | | | | | | | | |
| Natural sciences | na | na | na | na | na | 873 | 1,021 | 896 | 1,600 | 1,669 | 1,720 |
| Engineering and Technology | na | na | na | na | na | 5,257 | 3,382 | 2,971 | 2,864 | 3,064 | 3,087 |
| Medical science | na | na | na | na | na | 400 | 569 | 606 | 492 | 593 | 623 |
| Agricultural sciences | na | na | na | na | na | 892 | 842 | 617 | 718 | 701 | 498 |
| Social sciences | na | na | na | na | na | 275 | 303 | 406 | 354 | 403 | 372 |
| Humanities | na | na | na | na | na | 47 | 37 | 57 | 57 | 37 | 33 |

Source: Statistical Office of the Slovak Republic, Statistical Yearbooks 1997-2003

# E. INFORMATION SOCIETY TECHNOLOGIES (IST) PENETRATION

**Table E1.1** IST in Telecommunications

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| Main telephone line penetration (%) | 16.87 | 18.75 | 20.85 | 23.22 | 25.88 | 28.54 | 30.66 | 31.43 | 28.93 | 26.08 |
| digitalisation of network (%). | 5.17 | 12.15 | 25.68 | 37.57 | 50.65 | 62.05 | 66.81 | 70.41 | 74.28 | 78.23 |
| mobile density (%) | 0.06 | 0.11 | 0.23 | 0.53 | 3.65 | 8.77 | 12.3 | 20.6 | 39.7 | 54.4 |
| Internet density (%) | 0.1 | 0.4 | 0.9 | 3 | 5.8 | 9.3 | 11.1 | 12 | 12.5 | 16 |
| CATV density (%) | 13.9 | 16.5 | 19.44 | 25.74 | 30.83 | 34 | 36.6 | 40.6 | 35.2 | 41.6 |
| Households with own Satellite antennas (%) | 14 | 14.5 | 14.8 | 15 | 15.1 | 15.1 | 15.48 | 15.5 | 16 | 16 |
| Households with common TV antennas (%) | 80 | 77 | 75 | 73 | 68 | 65 | 62 | 55 | 60 | na |
| Pagers density (%) | 0.012 | 0.02 | 0.031 | 0.045 | 0.04 | 0.042 | 0.033 | 0.031 | 0.025 | na |

Source: Ministry of Transport, Posts and Telecommunications: Annual Reports (1994-2003)

**Table E1.2** IST in Transport

| | |
|---|---|
| Time schedules for public railways | www.zsr.sk |
| Time schedules for inter-city bus transport | www.cp.sk |
| Time schedules for public city transport | www.imhd.sk |
| Time schedules for airlines | www.slovak-airports.net |
| Time schedules for public ship transport | www.lod.sk |

**Table E1.3** IST in Financial Services

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|
| Credit and debit cards (thousands) | 772.7 | 1,002.3 | 1,358.1 | 1,543.0 | 1,719.5 | 1,974.6 | 2,459.1 |
| Banking self-service terminals | 782 | 873 | 965 | 1,011 | 1,084 | 1,182 | 1,366 |
| Number of transactions (EUR Million) | 26.80 | 39.0 | 48.9 | 52.9 | 49.5 | 52.1 | 58.9 |
| Amount of transactions (EUR Billion) | 0.69 | 1.05 | 1.45 | 1.56 | 1.94 | 2.21 | 2.86 |
| POS terminals | 389 | 1,092 | 3,001 | 4,623 | 6,322 | 9,602 | 12,265 |
| Number of transactions (Million) | 0.143 | 0.439 | 1.20 | 2.30 | 5.60 | 10.60 | 16.00 |
| Amount of transactions (EUR Million): | 4.82 | 13.18 | 37.88 | 70.26 | 159.66 | 270.15 | 412.18 |
| Internet banking | available since 1999, now offered by most banks | | | | | | |
| Mobile banking | available since 2001 | | | | | | |

Source: ZBK - Slovak Association of Banking Cards (2003)

*E1.4: IST in Postal Services*

Special postal services (special category of letters and parcels) can be monitored on-line (project Track & Trace) and a variety of other information is provided in the web pages of the Slovak Post (www.slposta.sk). A private run postal code database (www.posta.sk) has been publicly available since 1998.

The Slovak Post company started the project on implementation of new technology for majority of postal traffic systems in 1998. Total investments for development projects during period 2000 – 2004 are expected at SKK 1.6 billion. The plan is to establish public internet access points in main existing postal offices.

*E2: IST in Manufacturing*

The level of IST use in manufacturing varies greatly with ownership (foreign vs. domestic) and area of manufacturing. Many manufacturers deploy both internal and external information systems for logistics and customer contact.

The eEurope+ enterprise survey presented in the 2004 Progress Report showed that 85% of Slovak enterprises had internet access and 60% had a webpage, ahead of accession countries' averages of 73% and 39% respectively.

Slovak businesses according to an ICT survey of manufacturing SMEs commissioned by the National Agency for the Support of Small and Medium Sized Enterprise (NADSME) in March 2002, the following ICT penetration and application figures are worth mentioning here. Regarding *penetration*, of the Slovak manufacturing SMEs:

- 42.9% had PCs without a network connection (95.6% reported the use of at least one PC in their operations);
- 45.9% had PCs with LAN connection;
- 59.4% had PCs with Internet connection;

Regarding the areas of *application*, in the SMEs surveyed ICTs were used by:

- 91.7% to run their business information system (e.g. financial management),
- 34.1% to control part of the manufacturing process;
- 18.2% to control the whole manufacturing process;
- 42.4% for e-commerce purposes;
- 50% for e-mail.

*E3.1: IST in Public Administration*

www.obcan.sk – new "one stop shop" portal on public administration resources for citizens
www.government.gov.sk, www.rokovania.sk – government portal, tracks proposals discussed by the government, various government initiatives, decisions. English version is available
www.nrsr.sk – Slovak Parliament allow the tracking of the passage of laws
www.orsr.sk - Business Register of the Slovak Republic, provides information on registered business entities

www.zbierka.sk - Legal Journal of the Slovak Republic published all new legislation
zrsr.vs.sk - Tradesman Register of the Slovak Republic
www.statistics.sk – Statistical Office of the Slovak Republic – limited statistical data
www.infostat.sk – statistical publications of the Statistical Office of the Slovak Republic
Limited introduction of electronic filing of certain customs and tax declarations for businesses
All ministries have a web presence.
www.notar.sk – operated by the Chamber of Public Notaries focuses on providing information on different registers (on legal entities, notary activities, voluntary auctions, survey of legal restrictions for chattel ownership). It is now a fully implemented project. The investment was about SKK 25 million.
www.orsr.sk – Business Register of the Slovak Republic
zrsr.vs.sk – Small Tradesmen Register of the Slovak Republic
www.colnasprava.sk – detailed information on e-customs procedure
The Freedom of Information Act from 2000 mandates all state offices to accept inquiries also by e-mail and recognises the Internet as means of mass distribution of information from the state administration.

### *E3.2.: IST in Health Services*

Key IST application is the Health Information System maintained by the contributory organisation Institute of Healthcare Information and Statistics. The system. running as an unsophisticated database collects data from healthcare providers on a large number of indicators. The system is not online. The Ministry of Health maintains the Central Registry of Insured Persons collecting information on all individuals with health insurance. Some pilot projects (ad hoc in association with different IT companies) were prepared for electronic consultations for surgeons and hospital management. Sophisticated database systems tracking clients are in use by health insurers.

### *E3.3: IST in Educational Services*

www.sanet.sk – website of the Slovak academic network (ISP for academic institutions and universities)
www.infovek.sk - website of the project Infovek. ECDL project in preparation
All universities have a web presence, some secondary and primary schools do as well.

**Table E3.4** IST in Households

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| households with PC (%) | na | na | na | na | na | na | na | na | 9.20 | na |
| households with internet access (%) | na | na | na | na | na | na | na | 3 | 3 | 4 |
| households with telephone lines (%) | 37.8 | 42.2 | 49.2 | 57.0 | 61.0 | 61.14 | 63.39 | 75.43 | 69.48 | 61.8 |

Source: Statistical Office: Statistical Yearbook (2002), CEEC monitoring reports (PWC/ IBM, 2002-2003), Ministry of Transport, Posts and Telecommunications (Annual Reports 1994-2003)

# F. INSTITUTIONAL CAPACITIES AND REGULATORY BACKGROUND

*F1.1: Deregulation of Major Markets Affecting the IST Industries*

ICT industry + IT sector: fully liberalised market (since 1990), Telecom sector: data services market liberalised (since 1992), mobile market partially liberalised (since 1996 - 2 operators, but frequency capacities for 3), alternative infrastructure liberalised (since 1998), voice telephony liberalised (since 2003)

**Table F1.2** Institutional Implementation Capacities

| IMPLEMENTING AGENCY | RESPONSIBILITY | TECHNICAL CAPACITIES | ASSESSMENT |
|---|---|---|---|
| Ministry of Economy | ICT sector policy maker | one specific department with approx. 6 staff | adequate level (no observable problems in relation to the effectiveness of work within relevant responsibilities) |
| Ministry of Transport, Posts and Telecommunications (MDPT) | ICT sector policy maker | telecom policy department with 8 staff; information society policy dept. with 6 staff (transfer from Ministry of Education in May 2003) | inadequate level (insufficient number of staff in relation to relevant responsibilities) |
| Antimonopoly Office | competition policy | Some 160 staff in total | adequate level (no observable problems in relation to the effectiveness of work within relevant responsibilities) |
| Telecommunication Office | technical and price regulation of telecom sector | cca 150 staff, but only 7 in the regulatory department, | adequate level in terms of total staffing, but inadequate due to insufficient language skills and specialised knowledge (e.g. telecom lawyers and economists and internal competence division (press reports of problems related to the effectiveness of work within relevant responsibilities) |
| Board for Broadcasting and Re-transmission | content regulation of TV and radio broadcasting (incl. CATV) | some 28 staff (total) | adequate level (no observable problems in relation to the effectiveness of work within relevant responsibilities) |
| National Security Office | digital signatures certification | some 10 staff (in the department responsible | adequate level (no observable problems in |

| | | | |
|---|---|---|---|
| | | for digital signatures) | relation to the effectiveness of work within relevant responsibilities) |
| 8 regional governments | Regional development (incl. info-communication infrastructure) | total staff of about 50 (for regional development only) | adequate level (no observable problems in relation to the effectiveness of work within relevant responsibilities) |
| Local governments (total number approx.2 950) | Local development (incl. info-communication infrastructure) | Total approx.8 000 staff (for local development only) | adequate level (no observable problems in relation to the effectiveness of work within relevant responsibilities) |

Source: own elaboration

*F1.3: Privatisation Policies*

ICT industry + IT sector: the former state entities privatised during 1991-1994, Telecom sector: former monopoly operator (Slovak Telecom) privatised by sale of 51% shares to strategic partner (Deutsche Telekom) in 2000, at present not clear when and how the rest of shares will be privatised, paradoxically, in 2002 a new telecom operator TRANSTEL was established with potential significant influence of the government through its shareholdings in energy and gas companies (TRANSTEL was established as an infrastructure and service operator using the telecom infrastructure of all energy and gas companies, which are majority government owned – during privatisation a maximum of 49 % of shares has been sold to strategic investors).

*F2.1: IST-based Public Information and Services*

Main legal framework - Act No. 211/2000 Coll. on Free Access to Information provides for citizens' access to all information (except for confidential information, classified information) available to central and local administration bodies. Each public administration office has obligation to inform citizens under request. In response to the 2000 law, state administration offices have set up units to handle inquiries from citizens. However, the quality of service provided varies by institution.

# G. EDUCATIONAL SECTOR AND LABOUR FORCE SUPPLY

**Table G11.1** Number of Students in Secondary and Tertiary Education

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001/ 2002 | 2002/ 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| Secondary | 339,935 | 351,743 | 360,484 | 362,704 | 349,007 | 333,175 | 297,719 | 2895,60 | 299,785 | 313,902 |
| Grammar Schools | 68,102 | 72,232 | 76,700 | 80,023 | 80,925 | 82,038 | 78,360 | 80,615 | 86,239 | 91,661 |
| Specialised Secondary Schools | 113,816 | 1195,95 | 123,332 | 126,443 | 122,091 | 116,495 | 103,975 | 88,776 | 91,820 | 83,353 |
| Technical | na | na | na | na | na | na | na | 35,591 | 37,445 | 34,117 |
| Commercial | na | na | na | na | na | na | na | 33,399 | 34,599 | 31,890 |
| Agricultural | na | na | na | na | na | na | na | 7,214 | 7,616 | 6,686 |
| Forestry | na | na | na | na | na | na | na | 817 | 831 | 857 |
| Librarians | na | na | na | na | na | na | na | 374 | 374 | 406 |
| Pedagogical | na | na | na | na | na | na | na | 2,848 | 2,855 | 2,698 |
| Conservatories | na | na | na | na | na | na | na | 1,579 | 1,623 | 1,649 |
| Vocational schools for girls | na | na | na | na | na | na | na | 6,954 | 6,477 | 5,050 |
| Secondary Schools of Ministry of Health | na | na | na | na | na | na | na | 9,586 | 9,384 | 8,785 |
| other ministries | na | na | na | na | na | na | na | na | 496 | 1,079 |
| Joint Secondary Schools | na | na | na | na | na | na | na | na | na | 34,590 |
| Vocational Secondary Schools | 153,340 | 155,136 | 155,936 | 152,009 | 141,908 | 130,312 | 111,224 | 106,240 | 106,775 | 89,137 |
| Special Schools | 4,677 | 4,780 | 4,516 | 4,229 | 4,083 | 4,330 | 4,160 | 4,343 | 5,071 | 5,297 |
| Grammar | na | na | na | na | na | na | na | 77 | 78 | 73 |
| Specialised Secondary Schools | na | na | na | na | na | na | na | 273 | 271 | 335 |
| Vocational Secondary Schools | na | na | na | na | na | na | na | 550 | 704 | 693 |
| Vocational Schools | na | na | na | na | na | na | na | 3,443 | 3,804 | 3,918 |
| Practice Schools | na | na | na | na | na | na | na | na | 214 | 278 |
| Tertiary | 69,600 | 78,379 | 86,942 | 95,875 | 105,839 | 115,784 | 124,357 | 136,348 | 144,548 | 149,038 |
| TOTAL | 409,535 | 430,122 | 447,426 | 458,579 | 454,846 | 448,959 | 422,076 | 425,908 | 444,333 | 462,940 |
| per 1000 persons | 76.91 | 80.44 | 83.42 | 85.34 | 84.49 | 83.28 | 78.23 | 78.86 | 82.59 | na |

Source: Institute of Information and Forecasting in Education: Statistical Yearbook on Education 1993-2002 and own calculations using demographic data from the Statistical Office Census

**Table G11.2** Number of Students in Life-Long Learning by Area of Training

| | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| Natural Sciences | 19,988 | 12,550 | 13,882 | 12,410 | 25,164 |
| 1000 persons | 3.71 | 2.33 | 2.57 | 2.31 | na |
| Technical Sciences | 66,274 | 55,245 | 54,264 | 50,777 | 62,048 |
| 1000 persons | 12.29 | 10.25 | 10.07 | 9.42 | na |
| Agricultural and Forestry Sciences | 7,156 | 7,026 | 8,340 | 7,803 | 6,920 |
| 1000 persons | 1.33 | 1.30 | 1.55 | 1.45 | na |
| Medical and Pharmaceutical Sciences | 10,906 | 9,207 | 8,014 | 12,139 | 17,332 |
| 1000 persons | 2.02 | 1.71 | 1.49 | 2.25 | na |
| Social Sciences | 129,142 | 132,369 | 167,004 | 206,667 | 216,170 |
| 1000 persons | 23.96 | 24.55 | 30.98 | 38.34 | na |
| Sciences about culture and art | 1,589 | 1,949 | 6,159 | 6,666 | 12,897 |
| 1000 persons | 0.29 | 0.36 | 1.14 | 1.24 | na |
| Military and Security Sciences | 5,848 | 4,463 | 8,305 | 3,822 | 12,539 |
| 1000 persons | 1.08 | 0.83 | 1.54 | 0.71 | na |
| Assorted | 43,890 | 47,306 | 15,876 | 35,013 | 37,184 |
| 1000 persons | 8.14 | 8.78 | 2.94 | 6.49 | na |
| TOTAL | 284,793 | 270,115 | 281,844 | 335,297 | 390,254 |
| 1000 persons | 52.83 | 50.06 | 52.19 | 62.33 | na |

Source: Institute of Information and Forecasting in Education: Statistical Yearbook on Education 1998-2002 and own calculations using demographic data from the Statistical Office Census

**Table G11.3** Number of Graduated from Secondary and Tertiary Education

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001/ 2002 | 2002/ 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| Secondary | na | na | na | na | na | na | na | na | na | na |
| Grammar Schools | 13,763 | 15,292 | 15,051 | 16,255 | 16,051 | 15,945 | 15,636 | 16,202 | 14,504 | 13,991 |
| Specialised Secondary Schools | 23,059 | 25,529 | 27,907 | 30,154 | 31,104 | 32,008 | 32,594 | 33,330 | 29,028 | 26,639 |
| Joint Secondary Schools | na | na | na | na | na | na | na | na | na | 8,355 |
| Vocational Secondary Schools | 62,273 | 47,480 | 47,869 | 51,625 | 50,431 | 48,825 | 45,918 | 40,755 | 36,497 | 22,525 |
| Special Schools | 1,165 | 1,252 | 1,251 | 1,303 | 1,245 | 1,071 | 1,111 | 1,056 | 1,276 | 1,295 |
| Vocational Schools | na | na | na | na | na | na | na | na | na | na |
| Practice Schools | na | na | na | na | na | na | na | na | na | na |
| Tertiary | 10,360 | 8,626 | 11,167 | 11,444 | 14,725 | 15,403 | 18,694 | 20,326 | 23,890 | 25,343 |
| TOTAL | 110,620 | 98,179 | 103,245 | 110,781 | 113,556 | 113,252 | 113,953 | 111,669 | 105,195 | 98,148 |
| per 1000 persons | 20.78 | 18.36 | 19.25 | 20.62 | 21.09 | 21.01 | 21.12 | 20.68 | 19.55 | na |

Source: Institute of Information and Forecasting in Education: Statistical Yearbook on Education 1993-2002 and own calculations using demographic data from the Statistical Office Census

**Table G11.4** Number of College and University Applications

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| Number of college and university applicants | 81,114 | 73,810 | 93,410 | 89,996 | 116,706 | 123,719 | 115,052 | 116,021 | 97,843 | 92,477 |
| per 1000 persons | 15.23 | 13.80 | 17.42 | 16.75 | 21.68 | 22.95 | 21.32 | 21.48 | 18.19 | na |

Source: Institute of Information and Forecasting in Education: Statistical Yearbook on Education 1993-2002 and own calculations using demographic data from the Statistical Office Census

*G12: Reforms in Secondary and Tertiary Education*

Key material outlining the government's view of the present situation and necessary reforms in education is the document Millenium (Millenium - National Programme of Training and Education in the Slovak Republic for the Coming 15 to 20 years) prepared by a group of experts and approved by the government in 1998. Millenium calls for sweeping changes at all levels of education, stressing the need for deep curricular change and change in the approach to students.

It introduces quantitative aims for expanding secondary and tertiary education, improving the quality of teaching, status of marginalised groups in the education system.

Recent reforms have been aimed towards strengthening the financial independence of schools and at least starting to reduce their complete dependence on state financing. Extensive plans also exist to introducing national measurement systems to measure the value added by schools.

*Key reforms in secondary education*

Decentralisation – the key reform taking place in secondary education has been the transfer of secondary schools from the authority of the central government (mainly the Ministry of Education but also other line ministries in specialised and vocational training) to the recently created self-governing regions. The transfer of authority took place in 2002. The regions have so far made few changes, but are expected to act more efficiently than the state in shaping the existing network of schools.

Curricula changes – throughout the 1990s there has been gradual change in the curricula of secondary schools. The decade has seen the introduction of more foreign language teaching and minor pressure towards less memorisation. Further changes are planned once the Ministry of Education establishes the so-called Curricular Commissions, which are to re-evaluate the current curricula at all levels.

Vocational education – in order to expand the portion of secondary school graduates who complete the state-leaving exam required to attend university, the Ministry of Education gradually intends to merge vocational schools with the so-called specialised schools (industrial specialisation's, commerce, nursing, hospitality).

Unified state leaving exam – the government has introduced a unified state leaving exam to be launched in 2004. Following several years of piloting for the exam, the number and composition of exam subjects has been settled, allowing five subjects at two differentiated levels of difficulty. Until now the state leaving examinations were managed by the individual schools and did not allow for the comparison of results across schools.

Financing – as of next year, secondary schools are to move to per student financing normatives, which are to reflect only a limited number of factors and thus create pressure on schools with declining populations to close down or merge with other schools.

*Key reforms in tertiary education*

Expansion of number of universities – Slovakia is the country with the highest number of universities per capita. This leads to the dilution of already limited resources for higher education. Largely for political reasons, the successive governments have created six additional universities since 1994, bringing the total number to 24.

Part-time study – inability to collect fees from students despite excess demand for full-time studies has led to a massive expansion of part-time studies to the point when many part-time students are fresh secondary school graduates, paying fees to universities through semi-legal means (e.g., university foundations). Universities have also opened branch offices throughout the country, mainly for part-time study. The quality of part-time education varies greatly, as some part-time programmes only have very limited number of contact hours.

Financing – the new law on universities approved in 2001 and amended twice since then has introduced funding for universities on the basis of a formula reflecting the average staff/student rations in various areas of study. Universities do not face a formal limit on the number of students they can accept and have fully funded by the state. The portion of university funding distributed for science and research is currently low, but the government intends to expand it. The government has also declared it intends to introduce higher education fees for all students to help alleviate the problem of insufficient financing of universities.

Accreditation – the accreditation committee is a body staffed mainly by Slovak academics. There have been accreditation issues mainly with the newly established universities, which were not always able to meet the committee's demands but the committee's recommendations can and have in the past been overridden by the ministry's executive decisions. In the next

Fields of study – recent reforms have focused on reducing the number of separate fields of study in use from over a thousand, introducing a catalogue of about 350 fields harmonised with EU standards. As a part of the process, universities will undergo re-accreditation in the next two years.

Degree system – the specific Slovak degree system heavily tilted in favour of five-year and longer masters' level programme have been mandatorily replaced with a standard three degree system of BA, MA and PhD. Only 6,354 BA-level degrees were awarded in 2001 (with most students continuing to MA-level) and 16,100 MA-level degrees.

*G13: Evolution and Trends in Secondary and Tertiary Education*

Demographic change – The number of children of primary schools age has fallen by almost a fifth since the beginning of the 1990s, from 720,326 in 1990 to 602,360 in 2002. In parallel, the number of schools has slowly risen, especially through the opening of parochial and private schools, effectively reducing funding per student due to overhead costs. In the upcoming years the decline will be felt in secondary and tertiary education.

Rising share of age cohort in higher education – Universities have undergone a massive expansion of capacity, bringing the number of students to 149,038 in 2002 from 69,600 in 1993. This corresponds to an increase in the share of secondary school-leavers to 46.00% from 20.72%.

Share of grammar school students – the number of students ending with the state-leaving exams has expanded from 68,102 in 1993 to 91,661 in 2002. The Milenium calls for this share to rise from current the 17-18% to 25-30% by 2015.

Situation of doctoral students – the working conditions for doctoral students have been extremely poor, far below levels in surrounding countries. Full-time doctoral education is thus a luxury and many doctoral students must have a job even if they formally participate in a full-time degree. Doctoral students are formally required to work full working hours, i.e. 8.5 hours daily and receive a stipend of 7,220 crowns before taxes, corresponding to just over a half of the average wage.

*G31: Tertiary Sector and Research Performance in IST Subjects*

Research funding for universities comes from competitive grant financing within several sub-programmes of the budgetary chapter of higher education. For the school-year 2002/2003, the following were the allocations for research:

**Table G31.1** 2003 Budgetary Subprogramme "University Science&Technology"

| Item | Total | Current Spending | Capital Spending |
|---|---|---|---|
| Subprogramme Total | 638,652 | 538,652 | 100 |
| Item i. Operation and development of research and development infrastructure | 413,652 | 373,652 | 40 |
| Item ii. Tasks of basic research in universities initiated by researchers | 130 | 90 | 40 |
| Item iii. Applied research in universities for practical use | 54 | 40 | 14 |
| Item iv. International scientific and technological cooperation of universities | 20 | 20 | na |
| Item v. Tasks of research and development in universities for the development of the education systems in specific areas, initiated by researchers | 21 | 15 | 6 |

Source: Ministry of Education

Note: 1/ in Mio SKK, 2/ Comparative data for previous years are not available due to the introduction of programme budgeting.

**Table G31.2** Research and Development Expenditure Spent by Universities

| | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|
| Total expenditure in SKK million | 7,744 | 6,154 | 5,552 | 6,086 | 6,467 |
| Private sector | 5,854 | 4,050 | 3,473 | 4,005 | 4,354 |
| Government | 1,370 | 1,524 | 1,528 | 1,502 | 1,532 |
| Universities | 520 | 580 | 551 | 579 | 581 |

Source: Statistical office of the Slovak Republic, Statistical yearbooks 2002, 1997.

**Table G41.1** Number of Students in ICT-related Education

| Subject | Students Bc level | Students MA level | Students PhD level |
|---|---|---|---|
| applied informatics and industrial automation | 574 | 124 | na |
| applied informatics | 216 | na | 15 |
| applied informatics and information systems | 31 | na | na |
| automation | 665 | 185 | na |
| economic informatics | 107 | 914 | na |
| information and management systems | 11 | na | na |
| informatics | 1,359 | 845 | na |
| informatisation of business and public administration activities | 593 | na | na |
| management technology and automation | 4 | 159 | na |
| computer technology and informatics | 112 | 815 | na |
| automation and management in engineering | na | 71 | na |
| information and security systems | na | 345 | na |
| equipment, information and automation technology | na | 83 | na |
| equipment, regulatory and automation technology | na | 174 | na |
| management, specialising in the management of information systems | na | 36 | na |
| automation and management | na | na | 45 |
| numeric analysis and scientific and technological computations | na | na | 4 |
| computer means and systems | na | na | 6 |
| programme and information systems | na | na | 16 |
| theoretical informatics | na | na | 2 |
| Total | 3,672 | 1,807 | 73 |

Source: own calculations based on data from the Slovak Ministry of Education

*G42: Institutional Resources in ICT-related Education*

Financing is allocated to universities on the basis of coefficients determined according to how demanding individual study fields are in terms of numbers of students per teacher and numbers of non-teaching staff per teacher. A small portion of university budget comes from allocations for other programmes such as the support of scientific research, which are distributed through grants.

**Table G43.1** Number of Technical Science Graduates

| Area of studies | 1993 | | | 1995 | | | 1997 | | | 1999 | | | 2001 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | form of studies | | | | | | | | | | | | | | |
| | full-time | part-time | total | full-time | part-time | total | full-time | part-time | total | full-time | part-time | total | full-time | part-time | total |
| technological disciplines | 3,602 | 348 | 3,950 | 2,865 | 115 | 2,980 | 4,093 | 48 | 4,141 | 4,237 | 381 | 4,618 | 5,579 | 383 | 5,962 |
| TOTAL SR | 8,824 | 1,536 | 10,360 | 9,304 | 1,863 | 11,167 | 12,681 | 1,798 | 14,479 | 13,827 | 4,452 | 18,279 | 16,100 | 6,354 | 22,454 |

Source: Institute of Information and Forecasting in Education: Slovak Tertiary Education in Numbers and Figures, 2002

*G44: Employment of the Recently Trained ICT Graduates*

Very little data is available on the issue of employment of recently trained ICT graduates in Slovakia. ICT graduates, along with bank employees, architects, designers and lawyers belong among the employees with the highest hourly wages, according to research by the consultancy Trexima from 2002. ICT positions belong among those most heavily advertised on the internet job portal www.profesia.sk, the largest such portal on the Slovak market.

Some IT companies cooperate directly with technical universities as a part of recruitment efforts.

*G45: Mobility of the Recently Trained ICT Graduates*

No data is collected on the share of Slovak ICT graduates who accept jobs outside the country. According to anecdotal accounts, some portion of ICT graduates leave to work internationally. Press report quoting recruiters have said that still s sizeable portion of ICT graduates do not speak English well enough to be able to work abroad.

# H. NATIONAL AND REGIONAL DEMOGRAPHIC DATA AND PROSPECTIVE

**Table H1.1** Share of Pre-Productive, Productive and Post-Productive Population

| population by age groups (%): | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|
| 0-14 | 23.54 | 22.89 | 22.27 | 21.66 | 21.04 | 20.43 | 19.81 | 19.18 |
| 15-59 | 61.41 | 62.01 | 62.57 | 63.14 | 63.71 | 64.27 | 64.80 | 65.30 |
| 60+ | 15.05 | 15.11 | 15.16 | 15.20 | 15.25 | 15.30 | 15.39 | 15.52 |
| 80+ | 2.10 | 2.16 | 2.10 | 1.99 | 1.86 | 1.77 | 1.85 | 1.93 |
| mean age | 34.04 | 34.27 | 34.53 | 34.81 | 35.09 | 35.38 | 35.67 | 35.97 |

Source: INFOSTAT - Institute of Informatics and Statistics, Demographic Research Centre (2001)

**Table H1.2** Population by Age Groups

| population by age: | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|
| 0-4 | 378,295 | 366,616 | 350,069 | 332,131 | 316,838 | 301,513 | 291,639 | 285,576 |
| 5-9 | 421,858 | 411,448 | 401,231 | 394,369 | 386,592 | 378,337 | 366,407 | 349,770 |
| 10-14 | 455,879 | 447,924 | 443,988 | 438,397 | 430,248 | 421,991 | 411,329 | 401,080 |
| 15-19 | 473,380 | 476,491 | 474,244 | 468,888 | 462,738 | 455,831 | 447,769 | 443,826 |
| 20-24 | 400,836 | 419,816 | 437,169 | 453,484 | 465,307 | 472,523 | 475,460 | 473,094 |
| 25-29 | 374,114 | 368,977 | 368,101 | 372,042 | 383,729 | 400,785 | 419,214 | 436,168 |
| 30-34 | 392,650 | 393,797 | 391,247 | 386,978 | 382,248 | 373,990 | 368,484 | 367,378 |
| 35-39 | 427,484 | 420,707 | 413,133 | 404,691 | 395,185 | 391,336 | 392,180 | 389,613 |
| 40-44 | 404,972 | 416,815 | 423,192 | 426,215 | 426,150 | 423,493 | 416,406 | 408,968 |
| 45-49 | 311,264 | 325,320 | 348,995 | 371,566 | 386,428 | 397,868 | 409,295 | 415,563 |
| 50-54 | 260,878 | 266,576 | 266,974 | 272,045 | 285,863 | 302,051 | 315,608 | 338,424 |
| 55-59 | 231,708 | 232,623 | 235,712 | 240,541 | 244,962 | 248,559 | 253,981 | 254,570 |
| 60-64 | 234,356 | 230,621 | 226,290 | 220,899 | 216,018 | 214,775 | 215,710 | 218,947 |
| 65-69 | 209,253 | 208,798 | 209,918 | 210,018 | 210,824 | 208,390 | 205,300 | 201,881 |
| 70-74 | 174,662 | 179,022 | 181,378 | 179,638 | 177,306 | 174,666 | 174,885 | 176,285 |
| 75-79 | 72,650 | 74,850 | 83,384 | 99,971 | 116,736 | 132,065 | 135,335 | 137,300 |
| 80-84 | 72,677 | 73,535 | 68,923 | 61,734 | 53,813 | 45,937 | 48,492 | 54,563 |
| 85-89 | 30,102 | 32,036 | 33,032 | 33,817 | 35,494 | 35,827 | 36,700 | 34,219 |
| 90-94 | 8,272 | 8,894 | 9,174 | 9,560 | 9,504 | 10,581 | 11,212 | 11,588 |
| 95-99 | 1,165* | 1,341* | 1,636* | 1,756 | 1,554 | 2,457 | 2,721 | 3,009 |
| 100+ | na | na | na | 192 | 113 | 407 | 530 | 725 |

Source: INFOSTAT - Institute of Informatics and Statistics, Demographic Research Centre (2001)
Note: *age group 95+

**Table H21** Population Dynamics: Annual Increase and Growth

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|
| total (mid-year population) | 5,336,455 | 5,356,207 | 5,367,790 | 5,378,932 | 5,387,650 | 5,393,382 | 5,398,657 | 5,402,547 |
| total (population as of Dec 31) | 5,324,632 | 5,347,413 | 5,363,676 | 5,373,810 | 5,383,214 | 5,390,657 | 5,395,324 | 5,400,679 |
| natural increase | 20,549 | 14,984 | 8,741 | 8,887 | 6,987 | 4,426 | 3,821 | 2,427 |
| net migration | 1,751 | 4,768 | 2,842 | 2,255 | 1,731 | 1,306 | 1,454 | 1,463 |
| total increase | 12,483 | 10,898 | 6,772 | 6,420 | 5,147 | 4,045 | 3,841 | 2,955 |
| growth rate* | 1.006 | 1.004 | 1.002 | 1.002 | 1.002 | 1.001 | 1.001 | 1.001 |

Source: INFOSTAT - Institute of Informatics and Statistics, Demographic Research Centre (2001)
Notes: *previous year = 1.00; based on mid-year population figures,

**Table H22** Main Economic and Social Effects of Population Dynamics

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001[1] |
|---|---|---|---|---|---|---|---|---|---|
| economic effects: dependency ratio (%)* | 69.3 | 67.7 | 66.1 | 64.7 | 63.3 | 61.9 | 60.6 | 59.4 | 60.6 |
| social effects: ageing index** | 74.0 | 76.3 | 78.8 | 81.4 | 84.2 | 87.1 | 90.5 | 94.2 | 99.9 |
| pre-productive age*** | 1,256,032 | 1,225,988 | 1,195,288 | 1,164,897 | 1,133,678 | 1,101,841 | 1,069,375 | 1,036,426 | 1,015,493 |
| productive age**** | 3,151,578 | 3,194,595 | 3,230,768 | 3,266,079 | 3,299,618 | 3,332,060 | 3,361,114 | 3,389,829 | 3,349,231 |
| post-productive age***** | 928,845 | 935,624 | 941,734 | 947,956 | 954,082 | 959,481 | 968,169 | 976,293 | 1,014,731 |

Source: Slovak Statistical Office
Notes: 1/2001 Census data; 2/*ratio of pre-productive and post-productive population to productive population; **ratio of post-productive to pre-productive population; ***0-14 years old, ****15-59 (males) and 15-54 (females), *****60+ (males) and 55+ (females)

# I. CULTURAL AND SOCIOLOGICAL ASPECTS

**Table I11** Changes in Employment Structures

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|
| Industry total | 690 | 665.8 | 662.5 | 630.3 | 615.2 | 628.8 | 641.0 |
| Mining and quarrying | 33.5 | 42.7 | 35.6 | 29.9 | 24.8 | 22.2 | 21.4 |
| Manufacturing | 600.3 | 566.7 | 573.7 | 547.5 | 540.4 | 553.6 | 573.5 |
| Electricity, gas and water supply | 56.2 | 56.4 | 53.2 | 52.9 | 50.1 | 53.1 | 46.1 |
| Construction | 189.7 | 200.8 | 204.5 | 189.7 | 167.7 | 169.5 | 176.0 |
| Internal trade | 226.1 | 254.1 | 262.3 | 260.4 | 259.6 | 255.7 | 271.5 |
| Hotels and restaurants | 62.6 | 60.2 | 62.5 | 64.8 | 65.3 | 71.6 | 68.5 |
| Transports, storage, post and telecoms | 168.6 | 160.4 | 169.7 | 166 | 167.1 | 162.1 | 154.4 |
| Financial intermediation | 30.3 | 30.2 | 37.2 | 36.7 | 37.1 | 38.3 | 39.8 |
| Real estate, renting and business activities, R&D | 88.5 | 74.5 | 77.3 | 80 | 90.8 | 104.3 | 103.3 |
| Public administration and defence; social security | 157.2 | 160.3 | 153.9 | 150.4 | 158.3 | 157.8 | 149.7 |
| Education | 177.3 | 166.7 | 165.3 | 166.7 | 161.6 | 168.9 | 162.8 |
| Health and social work | 143.1 | 146.9 | 146.3 | 155 | 147.9 | 143.6 | 141.5 |
| Other community, social and personal service activities | 92.3 | 82.2 | 75.7 | 74.8 | 90.5 | 91.7 | 87.0 |

Source: Slovak Statistical Office
Notes: 1/Labour Force Survey data, 2/Figures in ‘000

**Table I21** Migration

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|
| INTERNATIONAL | | | | | | | | | |
| *immigration:* | | | | | | | | | |
| EU members | 362 | 294 | 304 | 272 | 223 | 199 | 218 | 170 | 243 |
| EU candidates | 7,406 | 3,371 | 1,692 | 1,320 | 1,075 | 965 | 1,048 | 1,408 | 1,116 |
| the Czech Republic | 7,232 | 3,144 | 1,497 | 993 | 867 | 777 | 856 | 1,268 | 990 |
| EFTA | 61 | 57 | 67 | 48 | 54 | 51 | 30 | 41 | 38 |
| Ukraine&Russia | 411 | 503 | 499 | 357 | 455 | 359 | 266 | 217 | 156 |
| continents: | | | | | | | | | |
| Africa | 30 | 48 | 28 | 31 | 29 | 25 | 37 | 33 | 21 |
| Asia | 193 | 149 | 82 | 112 | 133 | 133 | 163 | 70 | 118 |
| America | 227 | 192 | 203 | 173 | 141 | 137 | 127 | 192 | 202 |
| Australia&Pacifics | 49 | 63 | 35 | 45 | 36 | 46 | 18 | 16 | 22 |
| Europe | 8,453 | 4,467 | 2,707 | 2,115 | 1,964 | 1,709 | 1,716 | 1,963 | 1,659 |
| TOTAL | 9,106 | 4,922 | 3,055 | 2,477 | 2,303 | 2,052 | 2,072 | 2,274 | 2,023 |
| *emigration:* | | | | | | | | | |
| EU members | 31 | 25 | 47 | 70 | 226 | 245 | 247 | 348 | 397 |
| EU candidates | 7,295 | 109 | 130 | 103 | 230 | 287 | 230 | 335 | 422 |
| the Czech Republic | 7,276 | 95 | 108 | 89 | 212 | 251 | 208 | 310 | 398 |
| EFTA | 1 | 0 | 4 | 9 | 27 | 41 | 26 | 36 | 34 |
| Ukraine&Russia | 3 | 4 | 5 | 7 | 2 | 10 | 8 | 13 | 6 |
| continents: | | | | | | | | | |
| Africa | 0 | 0 | 1 | 3 | 6 | 3 | 3 | 6 | 3 |
| Asia | 2 | 1 | 3 | 3 | 8 | 18 | 10 | 8 | 12 |
| America | 18 | 13 | 10 | 13 | 51 | 104 | 74 | 75 | 110 |
| Australia&Pacifics | 8 | 3 | 9 | 10 | 30 | 21 | 14 | 17 | 17 |
| Europe | 7,327 | 137 | 190 | 192 | 477 | 600 | 517 | 705 | 869 |
| TOTAL | 7,355 | 154 | 213 | 222 | 572 | 746 | 618 | 811 | 1,011 |

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|
| INTRA-NATIONAL | | | | | | | | | |
| Total (‘000) | 85.0 | 82.6 | 68.3 | 80.2 | 82.5 | 84.8 | 79.0 | 76.9 | 79.9 |
| within districts | 59.6 | 58.7 | 55.8 | 50.0 | 43.5 | 37.6 | 35.7 | 35.2 | 36.8 |
| within regions | 22.2 | 21.9 | 23.5 | 50.0 | 33.4 | 27.5 | 25.1 | 24.3 | 25.0 |
| across regions | 18.2 | 19.4 | 20.7 | na | 23.1 | 19.7 | 18.2 | 17.3 | 18.1 |

Source: Slovak Statistical Office

Notes: Migration defined as change of permanent address; 1996 data not available due to administrative reform

**Table I31** Income Distribution

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|
| net monthly income per capita in the poorest 10% households (EUR) | na | na | na | 60 | 74 | 70 | 66 | 73 |
| net monthly income per capita in the richest 10% households (EUR) | na | na | na | 285 | 328 | 340 | 293 | 337 |
| ratio of the highest to the lowest decile (%) | na | na | na | 4.75 | 4.40 | 4.86 | 4.47 | 4.62 |
| Gini coefficient | 18.5 | na | na | 26.3 | na | na | na | na |

Source: Slovak Statistical Office

**Table I32** Cultural Production and Consumption

| | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|
| theatres: | 36 | 34 | 41 | 44 | 43 |
| number of performances | 4,796 | 5,091 | 5,925 | 5,638 | 5,781 |
| visitors ('000) | 1,221 | 1,256 | 1,416 | 1,347 | 1,322 |
| film production: | 94 | 81 | 73 | 83 | 77 |
| of which full length films | 3 | 1 | 3 | 3 | 2 |
| public libraries: | | | | | |
| total | 2,712 | 2,705 | 2,696 | 2,657 | 2,656 |
| local branches | 274 | 294 | 277 | 259 | 253 |
| stock ('000) | 19,334 | 19,300 | 19,223 | 19,090 | 18,954 |
| registered users ('000) | 756 | 749 | 726 | 697 | 679 |
| loans to users ('000) | 25,733 | 25,756 | 25,422 | 25,018 | 24,702 |
| loans per 1 registered user | 34.03 | 34.37 | 35.02 | 35.89 | 36.4 |
| university libraries: | | | | | |
| total | 559 | 569 | 582 | 578 | 568 |
| stock ('000) | 4,646 | 4,613 | 4,955 | 4,663 | 4,670 |
| registered users ('000) | 133 | 144 | 152 | 146 | 142 |
| loans to users ('000) | 2,503 | 2,498 | 2,651 | 2,594 | 2,707 |
| loans per 1 registered user | 18.85 | 17.37 | 17.49 | 17.8 | 19.02 |
| centralised scientific libraries: | | | | | |
| total | 12 | 12 | 12 | 12 | 12 |
| stock ('000) | 14,661 | 14,753 | 14,835 | 15,087 | 15,761 |
| registered users ('000) | 140 | 122 | 120 | 110 | 112 |
| loans to users ('000) | 3,886 | 3,914 | 3,890 | 3,472 | 3,481 |
| loans per 1 registered user | 27.73 | 32.12 | 32.28 | 31.47 | 31.04 |
| periodical press: | | | | | |
| titles of newspapers and magazines | 1,157 | 1,269 | 1,290 | 1,465 | 1,505 |
| of which: daily newspapers | 21 | 19 | 24 | 16 | 16 |
| circulation of newspapers and magazines ('000) | 674,270 | 555,389 | 508,816 | 487,208 | 463,870 |
| of which: daily newspapers | 389,746 | 274,723 | 229,356 | 205,117 | 183,599 |
| radio broadcasting: | | | | | |
| nation-wide broadcasting (hours) | 33,737 | 34,268 | 39,291 | 41,099 | 41,048 |
| local broadcasting (hours) | 318,013 | 381,150 | 448,558 | 723,487 | 175,580 |
| subscribers (households) | 817 | 795 | 1,195 | 1,151 | 1,124 |
| television broadcasting: | | | | | |
| nation-wide broadcasting (hours) | 16,239 | 16,252 | 10,533 | 10,773 | 10,767 |
| local broadcasting (hours) | 10,379 | 20,008 | 36,582 | 18,388 | 19,580 |
| subscribers (households) | 1,397 | 1,024 | 1,242 | 1,157 | 1,134 |
| museums: | 82 | 82 | 78 | 79 | 81 |
| (international) expositions | 370 | 372 | 380 | 401 | 414 |
| domestic exhibitions | 1,007 | 936 | 973 | 1,013 | 1,066 |
| visitors ('000) | 3,444 | 3,222 | 3,164 | 3,459 | 3,541 |
| galleries: | 19 | 23 | 22 | 21 | 21 |
| (international) expositions | 47 | 56 | 47 | 58 | 59 |
| domestic exhibitions | 424 | 404 | 354 | 289 | 311 |
| visitors ('000) | 378 | 522 | 424 | 364 | 369 |
| public observatories and planetariums: | 23 | 23 | 26 | 25 | 25 |
| visitors ('000) | 249 | 263 | 265 | 253 | 249 |

Source: Social Development Trends in the Slovak Republic (Slovak Statistical Office, 2003)

*I5: The Role of NGOs*

NGO sector has been generally very pro-active in Slovakia since early 1990s, and quite successful in influencing public policy process in recent years. In fact, in Slovakia most of the non-government IS initiative has come from the NGO sector. For instance, the fundamental Freedom of Information Act was initiated and to a large extent shaped by NGOs. In the IS policy domain, key NGO actors, including PPP, and IPV (see Table C35 for more detailed information), have been systematically voicing - through various websites, seminars and conferences - their visions and ideas on IS development in Slovakia, but their real influence on policy process has so far been rather limited, given mainly the lack of priority of IS issues on the part of the Slovak Government.

**Table I6** Access to Basic Technical Networks

| | 1997 | 1998 | 1999 | 2000 | 2001* |
|---|---|---|---|---|---|
| drainage | 53.7 | 54.5 | 54.7 | 54.7 | 60.3 |
| water system | 80.9 | 82.1 | 82.3 | 82.9 | 94.7 |
| gas | na | na | na | na | 74.8 |
| central heating | na | na | na | na | 76.3 |

Source: 2003 Yearbook of the Slovak Republic, *2001 Population and Housing Census