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

REPORT ON LITHUANIA

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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 Lithuanian Free Market Institute, and aims to study the factors and impacts of the Information Society in Lithuania. 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 Lithuania'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/

The contract was awarded by: Institute for Prospective Technological Studies (IPTS) of the Directorate General Joint Research Centre, European Commission
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COUNTRY PROFILE

General Information about Lithuania

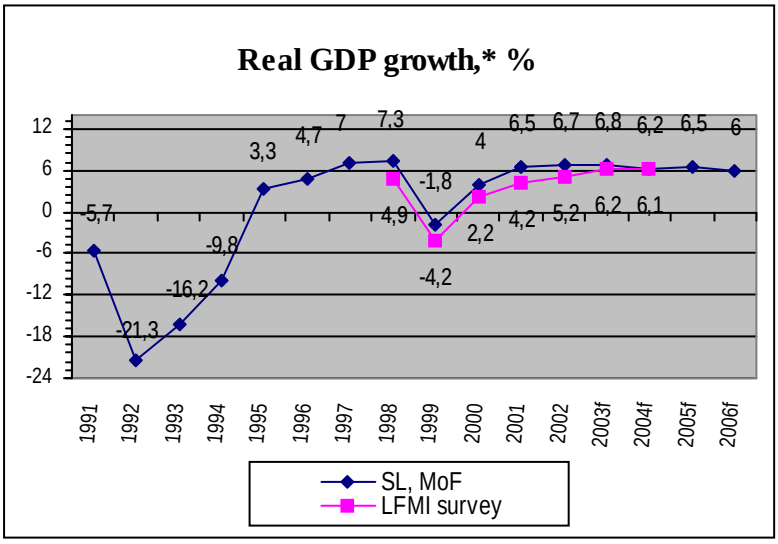
Capital -	Vilnius
Surface area -	65 200 sq. km
Population -	3 483 972
Lithuanians -	83.4%
Catholics -	79%
National currency -	litas (1 LTL= EUR 3.45)

A. NATIONAL AND REGIONAL ECONOMY

A.1. Transition and Growth

Lithuania has made a successful transition to a market economy. With the exception of a temporary recession in 1999 as a result of the Russian crisis, GDP growth has been positive and averaged 4 to 6 percent per year. GDP growth rates and GDP in PPP standards are presented in the diagrams below. The economy has shown a particularly remarkable performance in recent years. The high rate of growth has been accompanied by relatively modest fiscal deficits, low inflation and a stable currency. The rise of services and manufacture has been the main source of economic growth. An expansion of exports has played a major role in boosting manufacture.

Graph A1.



**at constant prices with 2000 as base year*
References: Statistics Lithuania, "Statistical Yearbook of Lithuania" 2002, p. 651; Statistics Lithuania, http://www.std.lt/web/main.php?parent=367; Ministry of Finance, http://www.finmin.lt/finmin/index.jsp; Lithuanian Free Market Institute, 2003, p. 8; Lithuanian Free Market Institute, http://www.lrinka.lt/Projektai/Tyrimas12.phtml, 2003 (about the survey see Annex A. Data inconsistency).

Growing capital investment was a major factor of Lithuania's economic growth, while the development of aggregate employment was negative. As the World Bank reports, capital investment has stabilized since the Russian crisis and total factor productivity has been the most important source of growth since 1999 *(World Bank, October 2002)*. Given Lithuania's negative demographic trends, productivity growth is expected to remain the main driving force behind Lithuania's economic development in the years to come.

There are significant differences in terms of regional contribution to GDP. The Vilnius, Kaunas and Klaipeda districts, concentrating around the three largest Lithuanian cities, contribute the largest shares of GDP, 34 percent, 19 percent and 12 percent respectively in 2000 (see the map below).

Table A1.

	GDP by districts in 2002, %	GDP per capita by districts in 2002, EUR
Total	**100**	**14 668 400**
Alytus	4.1	3 236 527
Kaunas	19.1	4 016 751
Klaipeda	12.1	4 594 712
Marijampole	3.6	2 803 063
Panavezys	7.4	3 641 092
Siauliai	7.8	3 092 039
Taurage	2.2	2 427 395
Telsiai	4.3	3 525 502
Utena	4.3	3 438 809
Vilnius	35.1	6 068 487

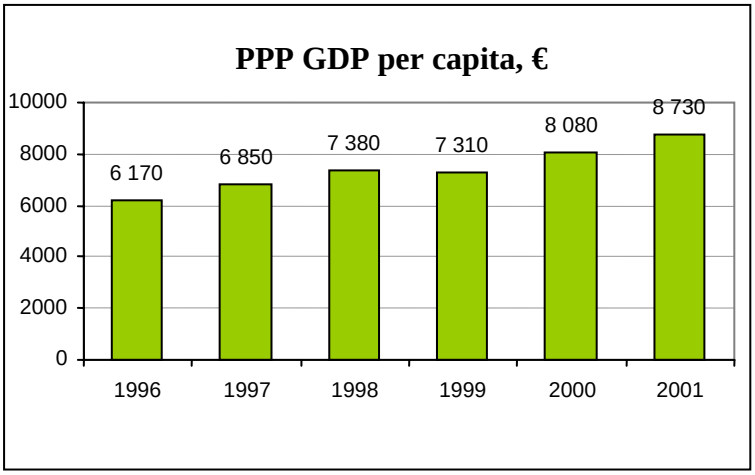
Reference: Statistics Lithuania,
http://www.std.lt/web/main.php?parent=367&module=680&id=733&PHPSESSID=0c32f703521d1b841145154a77511144

Differences in the proportion of GDP among the remaining seven districts are not wide. In 2002 GDP per capita ranged from 57 percent of the country's average in the Taurage district to 144 percent in the Vilnius district. Only two districts - the Vilnius and Klaipeda districts - exceed the country's average.

Graph A2.: **Regions (by administrative units, districts)**

EUROSTAT data show that Lithuania's GDP per capita constitutes 36 percent of the EU average (based on 2000 data). According to preliminary estimates, it will reach 40 percent in 2003. It is projected that Lithuania will have achieved more than 50 percent of the future EU average by 2015.

Graph A3.



Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania" 2002, p. 667.

Accession to the European Union is expected to be one of the major factors that will affect the development of the Lithuanian economy in the coming years. The European Committee under the Government of Lithuania has made an analysis of financial, economic and social implications of Lithuania's integration into the European Union. The survey findings show that as a result of accession in the EU investments into the Lithuanian economy will amount to about EUR 6.661 billion from 2002 until 2009, whereof allocations from EU Structural and Cohesion Funds will amount to EUR 2.607 billion and state investments will make EUR 1.303 billion. The remaining part of investments will be financed with private funds. Integration costs will total EUR 4.634 billion, of which EUR 2.607 billion will be covered by the state. The state will have to pay around EUR 1.245 billion to the EU budget; the closure of the Ignalina Nuclear Power Plan might cost EUR 0.521 billion; public administration costs will come up to around EUR 0.434 billion *(European Committee, 2002)*. The Lithuanian General Programming Document foresees that 40.1 percent of structural funds will be used for the development of socio-economic infrastructure, 25.8 percent will go for industry, 18.6 percent for the development of human resources and 15.6 percent for rural development and fishery.

While it is generally believed that joining the EU will improve the competition position of CEE countries in the world economy, a new study from the U.S.-based Cato Institute states that, while they will benefit from reduced barriers to trade and investment and, by 2010, free movement of labour, EU membership will make the accession countries less competitive. The study argues that "the EU forces poor member countries to adopt rules and regulations inappropriate to their level of economic development. […] Complying with the EU's regulation on labour, agriculture and the environment will raise production costs, while future harmonisation of taxes looms as an additional threat to the new members' comparative advantages" *(Cato Institute, 2003)*.

By expert estimates, the shadow economy has stood at about 20 percent of Lithuania's GDP in recent years, down from 27 percent in 1997 *(Lithuanian Free Market Institute, 2003, p. 12)*. Strong incentives to avoid regulations and taxes are among the main reasons for informal activities. Increased excise on cigarettes and fuel following legal harmonization with the EU law as well as a high level of protectionism of the domestic sugar industry have widened price differences in Lithuania and the neighbouring countries and so strengthened incentives for informal undertakings. The shadow economy has also been sustained by deteriorating

conditions for individual business activity and a growing tax burden on sole proprietors. Due to heavy labour taxation (the social security contribution is 34 percent and the personal income tax is 33 percent), unofficial wage payments, or the so-called "envelope" salaries, remain wide-spread. Unofficial wages explain the fact why official salaries are growing much slower than household consumption. According to a survey of the Lithuanian Entrepreneurs Confederation, the tax burden imposed on enterprises has been growing since 1995. Labour taxes constitute the biggest proportion of this tax burden *("Verslo Žinios" 2003.07.14).*

A.2. Structural changes

Over the past decade the biggest structural changes have occurred in agriculture and services. Services constitute the bulk of Lithuania's GDP. The share of services had increased steadily, reaching 68.7 percent in 2002. Services now employ 61 percent of the working population. The share of industry in GDP has varied inconsiderably and stood at 24.2 percent in 2002. Agriculture had contracted quite markedly, from 27 percent of GDP in 1990 to 7.1 percent in 2002. While agriculture constitutes a small share of GDP, it accounted for a large share of employment, 17.8 percent in 2002. Since 1995 employment in agriculture has declined roughly at the same rate as agricultural output. This means that labour productivity in agriculture has remained largely unchanged, making agriculture lag behind other sectors of the economy.

The agricultural sector in Lithuania contains only fragments of a market economy. Prices of basic agricultural products are guaranteed (direct regulation of milk procurement prices was abolished in 2001, but recently indirect regulation was reintroduced). Acquisition of agricultural land is restricted (a transitional period has been negotiated for the sale of agricultural land to foreigners). Changing the designation of land is cumbersome. Production is subsidised. Tariff and non-tariff measures are applied to restrict import of agricultural products. Because of these restrictions and subsidies, farmers do not act as market agents and are not supported by the market (e.g., land is not accepted as collateral for legal entities, so farmers cannot receive bank loans on a normal basis). Competition is distorted, resources are allocated inefficiently and the share of value added in agriculture is negligible. Common Agricultural Policy reinforces the inefficient national policy. It also boosts farmers' expectations and incites demands for higher subsidies. Strikes have become a popular way to obtain extra subsidies or market protection. All this further reduces incentives for agricultural restructuring and modernization, with a negative impact on productivity and income.

Table A2.
Supply side of growth: changes in share of GDP in major sectors of production, %

Sectors	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Total	100	100	100	100	100	100	100	100	100	100	100	100	100
Agriculture*	27.1	16.7	14.3	14.2	10.7	11.8	12.8	11.6	10.0	8.5	8.0	7.2	7.1
Industry**	20.9	45.3	38.8	34.2	27.0	26.7	24.9	24.2	23.7	23.3	24.3	25.4	24.2
Services	52.0	38.0	46.9	51.6	62.3	61.5	62.3	64.2	66.3	68.2	67.7	67.4	68.7

**agriculture, hunting, forestry and fishing*
*** manufacturing, mining and quarrying, electricity, gas and water supply*
Reference: Statistics Lithuania, 3/1999, 3/2003, pp. 112-113.

Small and medium-sized enterprises have contributed the most to the growth of services and agriculture. In 1998 they represented 60 percent of total value added and nearly 80 percent of total value added in the non-financial sector.

A.3. Factors of growth

On the expenditure side, exports have been a major factor of Lithuania's economic growth. After a short setback caused by the Russian crisis, Lithuania's exports have made a strong recovery, growing at almost 20 percent per year. Imports have increased at a higher rate. Strong consumption and investment activity have supported double-digit growth in imports. In recent years import of investment goods has increased the most, strengthening the basis for production and export. In 2001 the share of exports in GDP was 50 percent, while that of imports was 56 percent.

Private consumption and investment have also increased steadily, so their relative shares in GDP have remained largely unchanged. Public consumption has decreased moderately. Aggregate consumption has remained relatively flat as a share of GDP, standing at about 84-88 percent, with approximately three-quarters of this being private consumption. Gross domestic investment has declined slightly, from 25 percent of GDP in 1995 to 22 percent in 2001. Gross capital formation slumped even more, to 19 percent of GDP.

Table A3.: **Demand side of growth, % y-o-y***

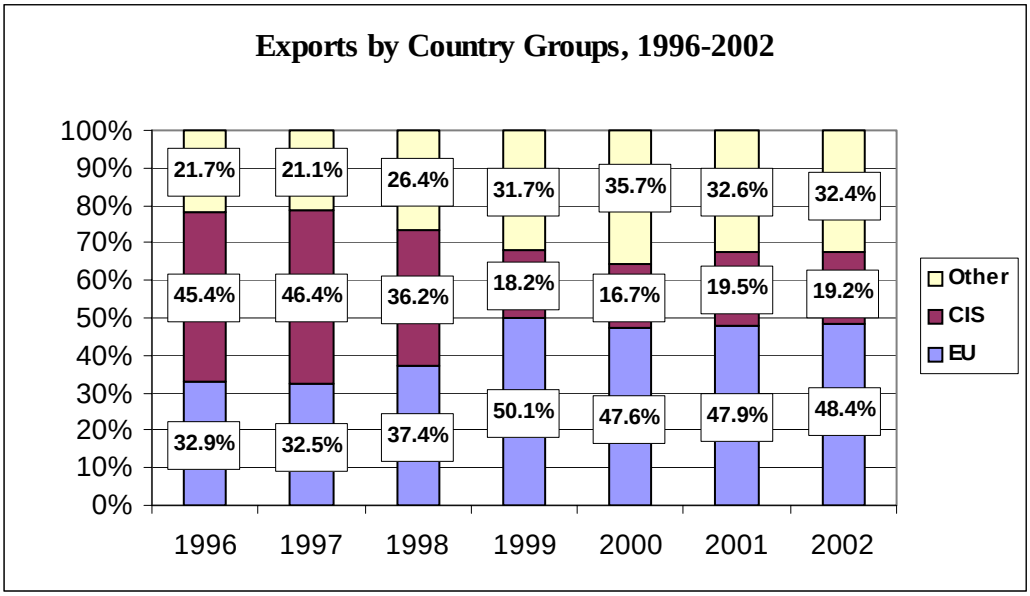
	1996	1997	1998	1999	2000	2001	2002
Final consumption expenditure	5.4	5.6	5.1	0.1	5.9	3.0	6.7
Gross domestic investment	12.6	34.8	19.8	-2.1	-11.8	17.0	10.7
Export	13.9	18.7	4.6	-16.8	9.8	21.2	19.4
Import (minus)	23.3	25.0	6.2	-12.4	4.7	17.7	16.1

** recalculated with 2000 as base year*
Reference: Statistics Lithuania, http://www.std.lt/web/main.php?parent=367&module=680&id=483

During the past few years Lithuania has largely reoriented its export destination. The share of Lithuanian exports to the EU has grown markedly, from 33 percent of total exports in 1996 to 48.4 percent in 2002. Exports to the CIS fell from 45.4 percent in 1996 to 19.2 percent in 2002. The composition of imports has not changed much. The EU has consistently accounted for 40 to 45 percent of total imports, while imports from the CIS have also remained substantial (25 percent) due to a large share of imported raw materials. Lithuania's major imports from the CIS are energy resources: oil, gas, timber, ferrous and non-ferrous metals. Lithuania's major imports from the EU are machinery and equipment, textile articles, different means of transport, products of chemical industry, plastics and rubber, mineral products, base metals and articles of base metals.

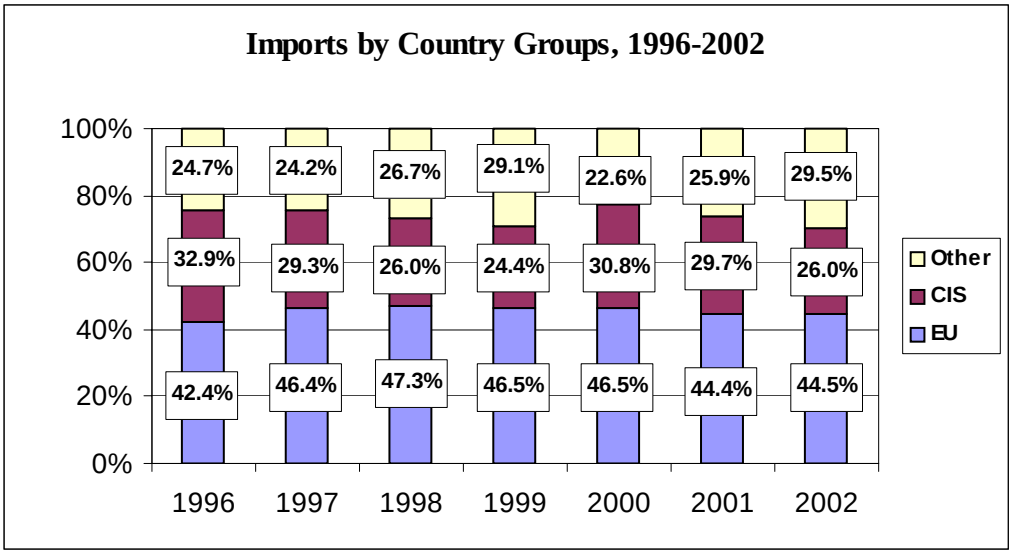
The reorientation of exports has required and led to significant restructuring which in turn has helped to enhance productivity and competitiveness of Lithuanian firms. In fact, exporting has been a major factor of productivity growth in manufacturing. Manufactured goods have had a growing importance in the country's total exports. Lithuanian exports to the EU comprise textile articles, machinery and equipment, products of chemical industry, wood and articles of wood, miscellaneous manufactured articles, transport means, mineral products. Textiles, furniture and other labour-intensive sectors have boosted their exports and as a result employment and sales. Export has thus proven to be critical for productivity growth.

Graph A4.



Reference: Law Firm Lideika, Petrauskas, Valiunas ir partneriai, Lithuanian Development Agency, Lithuanian Free Market Instiute, Vilnius Municipality, 2003, p. 32.

Graph A5.



Reference: Law Firm Lideika, Petrauskas, Valiunas ir partneriai, Lithuanian Development Agency, Lithuanian Free Market Instiute, Vilnius Municipality, 2003, p. 32.

The increasing trade volume with the European Union has largely been a result of the Free Trade Agreement between Lithuania and the European Union, which came into force on 1 January, 1995. With the exception of textiles and some agricultural products, Lithuanian exports are exempt from duties. A total of 70 percent of Lithuania's foreign trade and 85 percent of export are conducted under the conditions of free trade.

A.4. Labour force - Employment

A low intensity of labour use and high unemployment has been serious weaknesses of Lithuania's macroeconomic performance. Despite economic reforms and strong economic growth, employment has remained largely stagnant. The employment rate has declined by 6

percentage points from 1995 to 2000. The labour force participation rate has declined even more and was 58.9 percent in 2001. Unemployment is a serious problem. According to labour force surveys, unemployment stood at 17 percent at the beginning of 2002. Unemployment is largely of long duration as over 50 percent of the unemployed have been jobless for more than a year. The year 2002 marked a watershed in the Lithuanian labour market. As labour force surveys showed, the level of unemployment, affected by robust economic growth, dropped to 13 percent at the end of 2002 and continues to fall. The Lithuanian Labour Exchange reports lower indicators, 10.9 percent at the end of 2002 and 9.7 percent on September 1, 2003 *(Lithuanian Labour Exchange, www.ldb.lt)*. The gap between the data of the Labour Exchange and the labour force survey is indicative of a high level of hidden unemployment.

Table A4.

	1995	1996	1997	1998	1999	2000	2001
Labour force participation rate, %	66.9	65.4	61.5	61.7	61.9	60.4	58.9
Employment rate, %	65.2	64.6	65.2	65.0	63.2	61.0	60.1
Unemployment rate, %	17.1	16.4	14.1	13.3	14.1	15.4	17

Reference: World Bank, October, 2002, p. 18.

There are no wide differences in the rate of employment by regions. The only prominent exception is the Utena district, which was in the lead with a 79-percent rate of employment in 2002, as compared to the country's average of 59.6 percent. It was followed by the Taurage district with 64 percent, while the Alytus district with 53 percent was the only one to stand out on the lower side. The employment rates for other districts were around the country's average.

Differences in the unemployment level are more obvious. It can be mentioned that the Alytus district, characterised by the lowest employment rate, has also the highest unemployment (16.2 percent, as compared to the country's average of 13.8 percent in 2002). Only three districts - the Taurage, Marijampole and Klaipeda districts - stood out with a markedly lower unemployment rate relative to the country's average, 8.6, 10.5 and 12.3 percent respectively. In other districts differences are quite negligible. In most of the other districts the level of unemployment is higher than the country's average. It is interesting to note that labour force survey data differ quite considerably from the data on officially registered unemployment from the Labour Exchange. For example, labour exchange data show the Vilnius and Kaunas regions as having the lowest levels of unemployment, whereas labour force surveys indicate that their levels of unemployment exceed the country's average *(Statistics Lithuania, 2/2003, p. 40)*. These discrepancies can largely be explained by methodological differences (see Annex A).

Employment by age groups varies and has significantly changed over time. The highest rates of employment are among individuals aged from 25 to 49. In recent years the rate of employment decreased in all age groups, except for the age group 55-59. The biggest decrease was recorded in employment among 15-19 years olds and among 20-24 years olds. In 1997, a total of 14 percent of 14-19 year olds were employed. In 2001 the proportion was 4.6 percent. For 20-24 years olds the respective figures were 55.4 percent and 42.6 percent *(Statistics Lithuania, 2000, pp. 110-111, "Statistical Yearbook of Lithuania" 2002, p. 105)*. According to the labour force survey, approximately 868 000 young people (aged 15-29) were part of the labour force in 1997. Of these, 401 000 were employed. By 2000 the young labour force had dropped to 811 000 and the number of employed young people fell to 357 000. About a third of bachelor's students and approximately 80 percent of master's students worked and studied

at the same time (they belonged to the category of the employed) *(United Nations Development Programme, 2001, pp. 43-44)*. The rates of employment in the age groups from

25 until 54 are quite similar. The aggregate rate of employment in these groups contracted from 77.7 percent in 1997 to 73.9 percent in 2001, thus to a smaller degree than the rates of employment of the youth groups.

Unemployment by age groups has varied and changed as well. The unemployed aged 25-60 accounted for more than three-fourth of the total unemployed and their proportion increased over recent years. It rose from 74.5 percent in 1997 to 80.8 percent in 2001. Also, the proportion of the unemployed aged 60 and over went up from almost non-existent to 1.5 percent in 2001. At the same time the share of the unemployed aged 15-24 in the total number of the unemployed fell from 25.5 percent in 1997 to 17.7 percent in 2001 *(Statistics Lithuania, 1997, p. 119; Statistics Lithuania, 2000, p. 109; Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, p. 104)*. The proportion of the unemployed aged 15-29 decreased from 38 percent of the total unemployed in 1997 to 33 percent in 2000 *(United Nations Development Programme, 2001, p. 42).*

Analysis of the level of unemployment in different age groups shows that unemployment is the highest among individuals aged 15-24. The level of unemployment among young people has always been higher than the national average. According to the labour force survey, the actual youth unemployment is twice as high as the registered rate. From 1995 to 2000, the level of unemployment for both age groups 15-19 and 19-24 was more than 1.5 to 2 times the national average. The level of youth (15-24) unemployment had steadily increased in recent years, reaching 31 percent in 2001. The year 2002 was a watershed in the general level of unemployment as the trend reversed downwards. Likewise, youth unemployment dropped markedly to 23 percent in 2002. The highest level of unemployment was recorded in age group 15-19. It rose from 34.9 percent in 1997 to 45.9 percent in 2001. The level of unemployment for age group 20-24 was lower, but it grew from 21.8 percent in 1997 to 27.8 percent in 2001. The lowest level of unemployment was observed in age group 25-29, and the increase was not as sizeable, from 14 percent to 16 percent respectively. The level of unemployment in the age group 25-54 was about the country's average. It grew from 13 percent in 1997 to 16.5 percent in 2001. Again, the year 2002 marked a decline to 13.2 percent. The lowest level of unemployment is among individuals aged 55 and over. However, it is important to note that it has grown considerably in recent years, especially among 60-64 years olds (from 0.2 percent in 1997 to 8.7 percent in 2001 *(Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, p. 104, Statistics Lithuania, 2/2003, pp. 38-39).*

Economic growth not accompanied by employment growth can be explained by rising productivity associated with intense restructuring. Labour productivity has grown quite considerably, by an average of 6.3 percent per year since 1996. This means that the economy has risen largely due to a more efficient utilisation of labour resources rather than through an increased use of labour inputs. This is typical of most transition economies in Central and Eastern Europe. Another reason for the jobless growth is the process of cutting redundant jobs inherited from the previous system. Employment in the phase of entering the transition far exceeded the level justified by production requirements. Growing domestic and international competitions plus an influx of new and more capital-intensive technologies required shedding unproductive jobs. As a result, job losses have exceeded job gains, causing a net fall in employment. Job turnover has been high, indicating extensive restructuring and reallocation of labour. Although the job creation rate is high, it has a limited effect on unemployment,

because it has largely consisted of job-to-job transitions and new labour market entrants. It should be noted that a low degree of labour mobility has prevented unemployed skilled people who are in the wrong location to find jobs elsewhere. This has contributed to the expansion of long-term unemployment. Temporary employment and part-time employment are relatively rare.

Table A5.: **Dynamics of productivity (1995=100)**

1996	1997	1998	1999	2000	2001	Average annual rate of growth, %
104	111	117	113	122	136	6.3

Reference: World Bank, October, 2002, p. 18.

Strong economic growth is expected to sustain the trend of falling unemployment. Both local and foreign sources envisage a further decline in unemployment in 2003. The only exception is the Ministry of Finance which anticipates a slight increase in unemployment. Labour market forecasts prepared by the Lithuanian Labour Exchange on the basis of employers' surveys show that about 70 percent of Lithuanian companies are planning to hire more employees in 2003. Business surveys also indicate a growing demand for high quality labour.

A growing supply of permanent jobs is one of the positive trends on the labour market as it has contributed largely to reducing the share of long-term unemployment. It is also important that the number of young people registered with labour exchanges and long-term unemployment decreased by more than one third in 2002. A decline in unemployment is also related to a reduction in the labour force and a growing number of Lithuanian citizens working abroad. It is estimated that over 200 000 people are currently working overseas. The fact that fewer young people are registering with the Labour Exchange can be explained by a growing demand for young specialists and expanding job opportunities in Western countries.

There are numerous factors that continue to exert pressure on the labour market. Structural reforms are one of them, although in the long run they will facilitate job creation. A large number of unqualified persons and a lack of motivations are also serious concerns. Despite a high level of unemployment, many sectors, especially construction, sewing, electronics, automobile and furniture industries and confectionaries, increasingly complain of difficulties in finding skilled workers. This suggests that the existing unemployment does not mean a lack of vacancies. Rather, there is not enough skilled labour to fill these vacancies. Firm-level surveys conducted by the World Bank show that a lack of skilled workforce is among the main obstacles to firm operation and expansion in Lithuania (*World Bank, October 2002, p. 104).* A research "Evaluation of the State of Human Resources in Lithuania" (*Lith.* "Zmogiskuju istekliu bukles Lietuvoje ivertinimas") conducted by the Centre for Social Analysis and Consulting in 2003 also indicates that inadequate qualifications of labour force are a serious problem of the Lithuanian labour market *("Kauno diena" 11 September, 2003).* Improvements in the educational and vocational training system are therefore needed. On the policy side, tax policy should be revised and labour market regulation should be loosened to provide more flexibility in hiring workers and finding jobs. It should be noted that the mandatory minimum wage limits employment opportunities for low-skilled workers. Unemployment is the most entrenched among unskilled and low-skilled individuals, while the mandatory minimum wage is high relative to the country's average wage (about 50 percent). (Also see Part G).

A new labour code, effective as of the beginning of 2003, has instituted a number of changes

in employment regulation that are expected to have a varying effect on the labour market (see Box A1).

Box A1.: A new labour code
On the positive side, a new labour code, enforced from the beginning of 2003, abolished a detailed listing of legitimate causes of the termination of labour contracts on the initiative of the employer, although it still requires that labour contracts be terminated only for serious reasons. Labour contracts can now be ended for economic and technological reasons or because of enterprise restructuring. This will reduce the risks of recruitment and is likely to stimulate job creation. The list of legitimate labour contracts was expanded to provide more flexibility in finding employment. Alongside these changes many controversial provisions of the old labour code and other laws remain and some new restrictions were adopted. According to the new labour code, employees will be able to conclude fixed-term labour contracts only if provided by collective agreements or for jobs "of non-permanent character." The latter concept is not defined, so it is very difficult to receive this status. Part-time work is allowed only in certain cases; additional obstacles exist for the termination of labour contracts for certain social groups; high standards for working places are required. This will reduce flexible forms of employment that could prove beneficial for employers and employees alike. Another provision states that upon the termination of a fixed-term contract the employer has to pay a lay-off benefit in the amount of two average salaries, a provision that contradicts the essence of fixed-term contracts.
Reference: Lithuanian Free Market Institute, 2003, p. 65.

A.5. Changes in the taxation schemes

As enterprise surveys conducted by the World Bank indicate, taxation is the top concern for business in Lithuania. It is viewed as the leading constraint to the operation and expansion of business activity (*World Bank, October 2002, p. 104).* The tax system has been overhauled in recent years. Some changes have created conditions for the tax burden to decrease, while others have made it grow. Calculations based on GNP and budget revenues show that the tax burden comprises about 33.3 percent of GNP in 2003 *(Lithuanian Free Market Institute, 2003, p. 66)*. The corporate income tax was reduced from 24 to 15 percent starting from 2002, but the effects of this tax cut were outweighed by the abolition of a zero-tax rate on reinvested profits, which had been valid from 1997 until 2002. Under a new law on personal income tax, effective as of the beginning of 2003, two tax rates - 33 and 15 percent - replaced the former eight tax rates. This simplified tax rules and allowed a reduction in administrative costs. However, most of the former tax rates changed upwards. Given a reduction in the rate of the corporate income tax, a personal income tax cut would be welcome.

Despite small business being declared a priority, recent changes in tax legislation have markedly worsened business conditions for small businesses (see Box A2).

Box A2.: Recent changes in the tax regime of sole proprietorship
Starting from 2002 sole proprietors are required to pay social security contributions for the supplemental component of the old-age pension. Previously only a fixed contribution for the base pension had been required. Sole proprietors are subject to a 15-percent profit tax, but starting from 2003 they also have to pay a 15-percent income tax on that part of income which they use for personal expenses. According to the Centre of Registers, in 2002 a total of 4 477 sole proprietors closed down; 7 194 filed for liquidation; and 330 were registered as limited liability companies. Sole proprietors are also discriminated in the social security system as they have no right to receive social allowances regardless of the amount of income their business generates.
Reference: Lithuanian Free Market Institute, 2003, pp. 54-55.

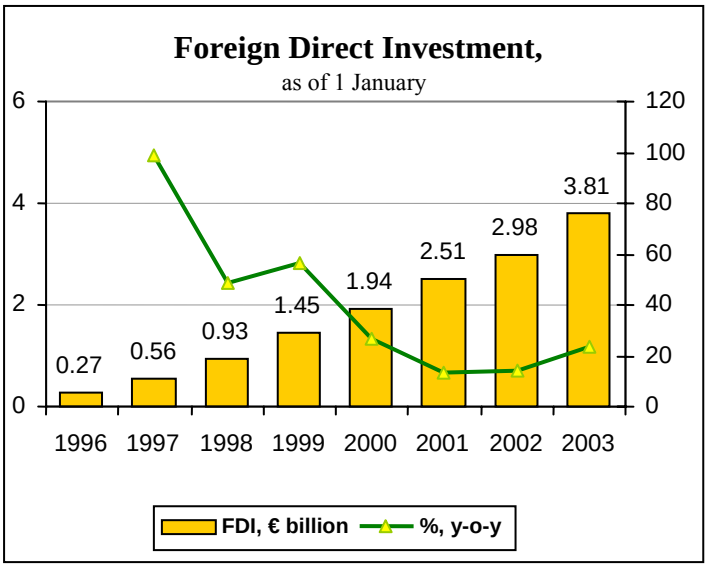
Increases in excise on fuel and tobacco in line with EU requirements are further augmenting the tax burden. It is important to note that the number of excise was reduced from eleven to three as of 1 July, 2002 in compliance with EU requirements. Excise is now charged on ethyl alcohol and alcoholic beverages, tobacco and fuels. One of the most defective taxes at present is the road tax: a 0.5 percent road tax is charged on companies' income from sales and all other types of income, including interest, income from property rent and currency exchange, subsidies, etc. This tax has been under constant attacks from experts and the business community. Reduced tax rates of the valued added tax (the regular tax rate is 18 percent) charged on certain goods, such as newspapers and journals, heating and fresh meat and poultry, need abolishing to provide for uniform taxation.

The tax-exempt minimum income was increased from LT 214 (EUR 62) to LT 290 (EUR 84) over the past year, and this increase is expected to counteract the growth of the tax burden. An increase in the tax-exempt minimum income expands tax progressiveness as the tax burden is redistributed in favour of low-income individuals. However, this measure does not give desired results because of a widespread practice of settling earnings after tax and unreported payments for work (unofficial wages).

A.6. Foreign direct investment

In total Lithuania has received less FDI than most of the other accession countries, mainly due to a slower restructuring and the country's small market. Unlike in other accession countries, in Lithuania significant FDI flows did not occur until late 1990s. FDI started to pick up in 1998, largely due to the launch of privatisation of large economic entities. The year 2002 saw the biggest inflow of FDI over the past few years. FDI rose by 23.7 percent and totalled EUR 3 817 771 000, or EUR 1 103 per capita at the end of 2002. Overall most of FDI has gone to manufacturing, financial intermediation, trade, post and communications. On 1 January, 2003 manufacturing accounted for 29.3 percent of total FDI stock, financial intermediation for 20.1 percent, trade for 17.3 percent, and communication services for 13.9 percent. Within manufacturing, beverages and tobacco have absorbed the largest share of total FDI (12 percent), followed by textiles and leather products (4 percent), and refined petroleum and chemicals (4 percent).

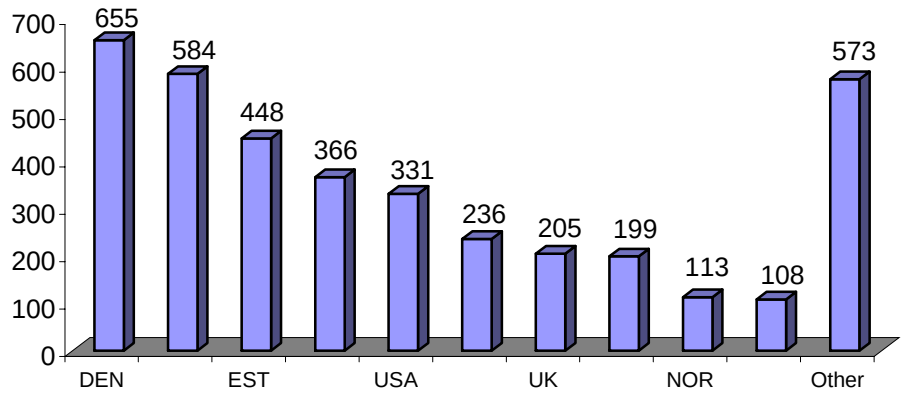
Graph A6.



Reference: Statistics Lithuania, http://www.std.lt/web/main.php?parent=364

In 2001 foreign investment made into the manufacture of textiles amounted to EUR 125 million. In 2001, compared with 1998, foreign investments in this sector grew by 151 percent. Electrical machinery and optical instruments as well as wood products also received significant foreign investments. A total of 62 out of 760 enterprises in the wood and wood products branch had attracted FDI. By the end of 2001 the amount of FDI in this sector settled at EUR 38.1 million. Unlike the wood branch, the Lithuanian furniture branch attracted relatively few foreign direct investments, although they are constantly increasing. By the end of 2001 the amount of FDI in the furniture branch totalled EUR 7.5 million. FDI in the paper branch amounted to EUR 32.7 million in 2001. FDIs in the plastic and rubber industry grew by 53 percent at the beginning of 2002 compared to 1998 and amounted to EUR 31.3 million. At present 17 percent of companies in the industry has attracted FDIs. At the beginning of 2002 FDI in the chemical industry in Lithuania declined by 17 percent as compared with 1998 and totalled EUR 26.7 million. Of the 67 enterprises producing chemical products, 20 have attracted foreign capital. The manufacture of pharmaceutical products and chemical ingredients are considered to be the most attractive for investments. The amount of FDI in Lithuania's metalworking, machinery and appliances sectors accounted for 4 percent of all FDI in the first quarter of 2002.

Graph A7.: **Major Countries Investors, as of 1 January, 2003 (EUR million)**



Reference: Law Firm Lideika, Petrauskas, Valiūnas ir partneriai, Lithuanian Development Agency, Lithuanian Free Market Institute, Vilnius Municipality, 2003, p. 27.

As the World Bank reports, FDI recipients defined as firms with at least 10 percent share of foreign capital have been increasingly involved in exporting activities *(World Bank, March 2003)*. In 2000 they accounted for 56.5 percent of Lithuanian exports, up from 41.6 percent in 1996. They also made up 52 percent of total imports in 2000, an increase from 40 percent in 1996. In 15 out of 47 two-digit NACE sectors, enterprises with foreign capital were the source of more than half of total exports. In computers and electrical machinery, such firms were responsible for 86 percent of foreign sales. They accounted for almost three-quarters of exports in radio, TV and communications equipment and over 60 percent in machinery and transport equipment. In labour-intensive sectors, such as textiles and food and beverages, firms with foreign capital were also the source of 60 percent of exports. FDI recipients also account for large shares of imports in radio, TV and communications equipment, transport equipment, computers and machinery.

A.7. Monetary policy

As the composition of Lithuania's trade shifted towards the European Union, the euro was substituted for the US dollar as the anchor currency of the Lithuanian *litas* under a currency board system. The currency board has been effective in Lithuania since April 1994. The *litas* was re-pegged to the euro at a fixed exchange rate of LTL 3.4528 to EUR 1 on 2 February, 2002 according to the EUR/USD exchange rate announced by the European Central Bank on 1 February, 2002. After the re-peg the *litas* floats in relation to the US dollar in accordance with the EUR/USD exchange rate on international markets. This has reduced currency risk for Lithuanian exporters to the euro area, putting them on a similar footing with their competitors.

A strict monetary policy pursued under a currency board system has been a major factor of Lithuania's successful economic transition. Under a currency board regime the money supply has been limited to the total of foreign reserves available and the national currency has been freely convertible into the reserve currency at a permanently fixed exchange rate, secured by a 100 percent reserve backing. The currency board brought transparency and credibility into the Lithuanian monetary system. It put inflation under control, making it plummet from a three-

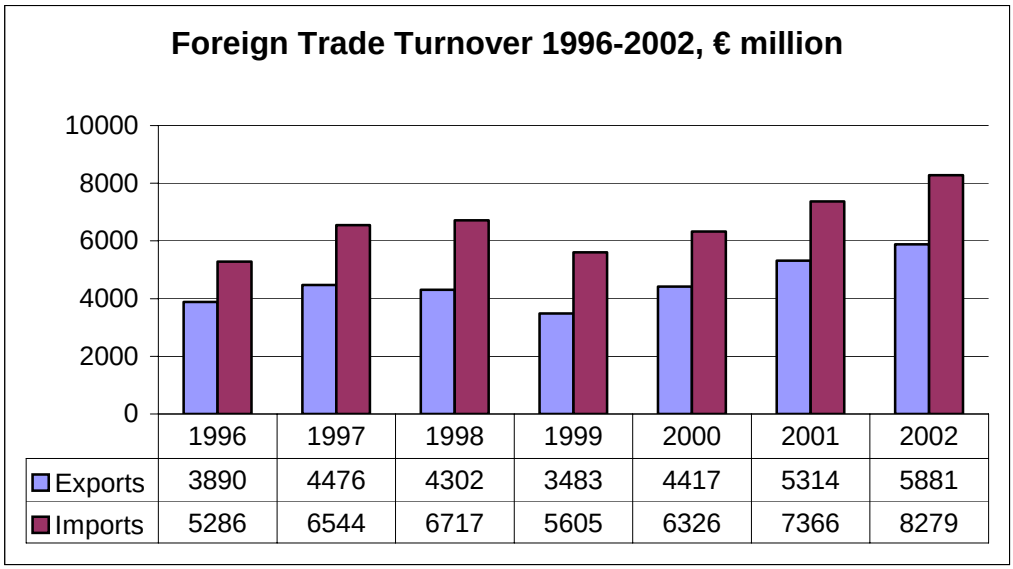
digit figure to 0.3 percent in 1999, and brought down interest rates on loans from 80 to 45 percent in the first six months following the adoption of a currency board (about 6 percent today).

Lithuania plans to preserve the currency board regime until accession to the European Monetary Union (EMU), envisaged for 2007. Lithuania already meets all membership criteria. The planned budget deficit for 2003 is 2.4 percent of GDP, while the EMU requirement is 3 per cent. State debt, which is required not to exceed 60 per cent of GDP, stood at 26.4 percent at the end of 2002. At present Lithuania also meets the criteria regarding inflation and interest rates on government bonds, while a fixed exchange rate with the euro under a currency board system will make it possible to meet the exchange rate requirement.

A.8. Foreign trade

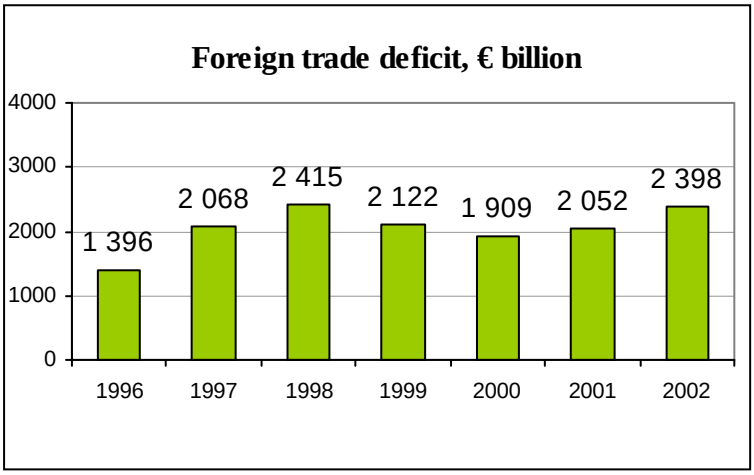
Lithuania's foreign trade has shown a steady growth over the past years, with the exception of a downward trend in the period following the Russian crisis. The growth peaked in 2001 when export rose by 20.3 percent and import went up by 16.4 percent. Despite a higher rate of export growth, the volume of import continued to exceed that of export, causing a negative trade balance of 14.2 percent of GDP. Despite the economic decline in the euro area, Lithuania maintained a fairly high rate of export growth in 2002, showing that structural export-related problems were subsiding (an upsurge of electricity export), the economy was being speedily modernized and earlier investments were giving results. Export rose by 10.7 percent, despite a 10 percent drop in the export of oil products, while import grew by 12.4 percent. The trade deficit stood at 16.3 percent of GDP.

Graph A8.



Reference: Law Firm Lideika, Petrauskas, Valiūnas ir partneriai, Lithuanian Development Agency, Lithuanian Free Market Institute, Vilnius Municipality, 2003, p. 30.

Graph A9.



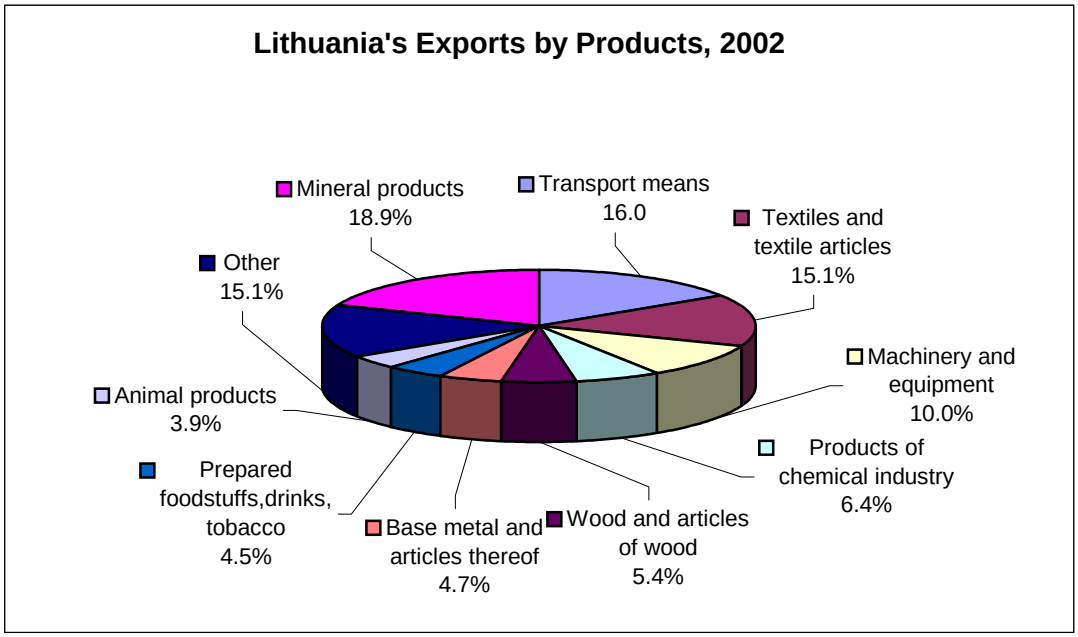
Reference: Statistics Lithuania, http://www.std.lt/web/main.php?parent=323

The composition of Lithuania's imports and exports by commodity groups has not changed in recent years. On the export side the biggest commodity groups are mineral products and textiles, followed by machinery and equipment, chemical products, and wood and wood articles. Export is still dominated by relatively low-skilled labour-intensive export sectors. In the past several years the biggest increase was recorded in the export of mineral products, whose share in the total export structure rose from 15.5 percent in 1996 to 18.9 percent in 2002. The share of exported chemical products fell the most, from 11 percent in 1996 to 6.4 percent in 2002. The share of exported machinery and equipment dropped from 11.8 percent to 10 percent respectively.

Mineral products also constitute the largest share in the import structure. Machinery and equipment, vehicles, chemical products and textiles follow. The share of vehicles in Lithuanian import increased the most, from 9.9 percent in 1996 to 16.2 percent in 2002; while the biggest decrease was in the share of food products, drinks and tobacco, from 5.9 percent

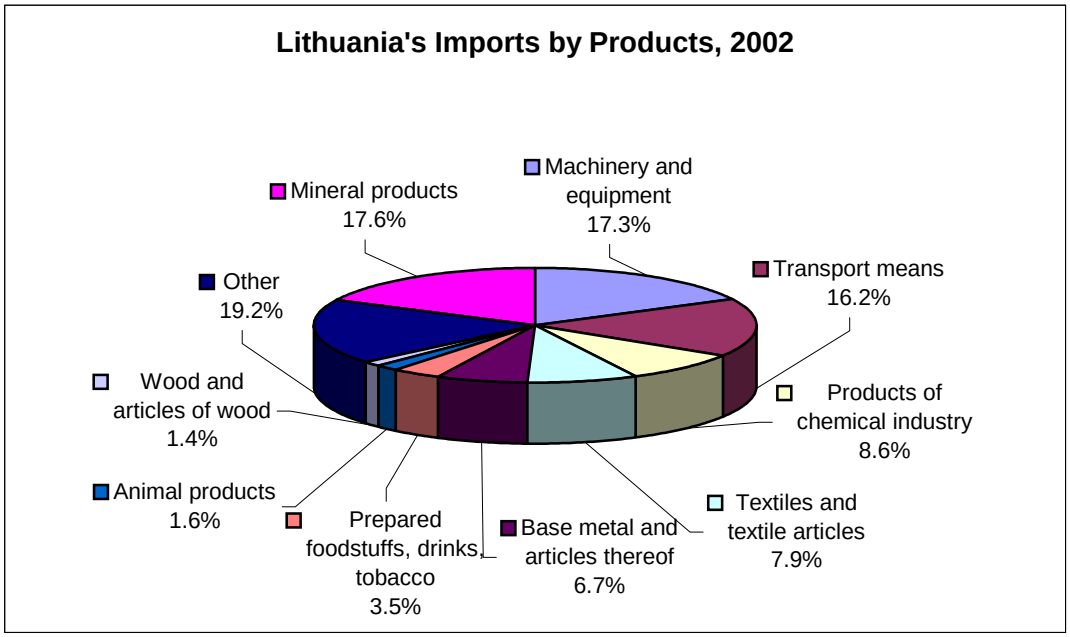
in 1996 to 3.5 percent in 2002.

Graph A10.



Reference: Law Firm Lideika, Petrauskas, Valiūnas ir partneriai, Lithuanian Development Agency, Lithuanian Free Market Institute, Vilnius Municipality, 2003, p. 33.

Graph A11.



Reference: Law Firm Lideika, Petrauskas, Valiūnas ir partneriai, Lithuanian Development Agency, Lithuanian Free Market Institute, Vilnius Municipality, 2003, p. 27.

A.9. Evolution of trade flows in IT sectors

Both import and export of ICT products have grown in recent years. But the rate of ICT import growth and the volume of ICT imports have far exceeded those of export. This has resulted in a widening trade deficit.

Table A6.

	Trade in ICT products, value EUR million			
	1998	1999	2000	2001
Total imports	18.8	15.5	18.5	25.2
Total exports	8.1	7.3	11.4	11.6
Trade deficit	-10.7	-8.1	-7.1	-12.3

Reference: International Trade Centre UNCTAD/WTO, October, 2002,
www.infobalt.lt/docs/WTO___profailas_apie_ITT_LIETUVA_2_dalis.doc

Although today export of IT products and services comprises a small share of Lithuania's total export, it is believed that the country has a potential to become a large software developer focused on markets of Western EU and Former Soviet Union (FSU). Highly qualified, multilingual and relatively low-cost IT specialists, combined with a growing expertise of IT companies in the development of sophisticated software products and IS, serve as a strong basis to increase significantly the volume of IT exports.

The emergence of the Lithuanian and neighbouring IT markets in the early 90s was driven primarily by a rapidly growing need for hardware products, the majority of which were imported from the West. Large and empty markets in the former Soviet Union countries opened up opportunities for Lithuanian IT companies to re-export Western information technologies and telecommunications equipment. Accumulated experience and established business contacts facilitated Lithuanian companies in entering IT Services markets in FSU. The Russian crisis slowed down the eastward export and forced Lithuanian IT companies to look for new niches in the developed western European markets. They started gradual reorientation to the western markets from small and simple software development projects.

Table A7.: **Lithuania: Global Export of ICT products, value EUR million**

Product category	1998*	1999*	2000*	2001*
Electronic components	72.1	72.1	124.4	136.1
Electronic data processing	10.7	8.4	14.1	21.2
Office equipment	0.2	0.9	1.1	2.2
Telecommunication	11.6	7.5	13.5	7.8
Other components	21.4	19.7	24.9	23.4
Scientific equipment	11.6	10.3	99.5	0.3
Total	129.1	117.1	182.8	207.5

Reference: Ibid.

Table A8.: **Lithuania: Global import of ICT products, value EUR million**

Product category	1998	1999	2000	2001
Electronic components	45.4	107.7	48.7	61.4
Electronic data processing	79.2	80.5	99.5	130.5
Office equipment	10.7	6.6	0.3	7.8
Telecommunication	88.1	54.3	73.5	101.5
Other components	47.6	35.6	40.0	66.9
Scientific equipment	29.4	29.0	27.0	35.7
Total	301.0	247.2	296.3	403.9

Reference: Ibid.

In order to compete in the international market most of the largest software developers were certified to the ISO quality standard in recent years. Certification of specialists according to

standards of international software vendors has been set as one of the top priorities of Lithuanian IT companies. As Eastern markets recover, Lithuanian computer assemblers and communication equipment manufacturers are expected to significantly increase their sales to FSU. Cost-effective and multilingual specialists combined with a well-developed telecommunications infrastructure provides good opportunity for development of call centres and telemarketing business in Lithuania as well as the export of these services.

A.10. Data consistency

Macroeconomic data across different sources have largely indicated the same trends over the past years, although there have been significant differences in figures *per se*. Expert estimates from private sources and market participants (see Annex A. Data inconsistency) tend to be more moderate in estimating economic indicators than the official statistics. The biggest differences are observed in the estimates of GDP growth, price changes, unemployment, earnings and income levels. Market participants have invariably provided lower estimates of GDP growth than the official statistics. Inflation estimates have differed markedly, as expert estimates have consistently reported higher price increases than the official statistics. Unemployment estimates have also differed quite markedly across sources. Labour force surveys have shown the highest rates of unemployment, while the Labour Exchange has recorded the lowest levels. The estimates of market participants have come in between. It is also important to note that there are noticeable discrepancies and inconsistencies in (un)employment statistics by regions from the labour force surveys and the Labour Exchange. Wide discrepancies are observed in data regarding household income and earnings. Official statistics, based on quarterly household budget surveys conducted by the Department of Statistics, have been approximately twice lower than the estimates provided by private agents.

A.11. Conclusions

Lithuania has achieved a strong and steady economic growth, accompanied by relatively modest fiscal deficits, low inflation and a stable currency. Strong export and investment growth have been major factors of growth. Productivity grew rapidly. Wages remained fairly stagnant for some years, but they have started to pick up. Rising wage growth and commercial lending have promoted private consumption and investments. Inflation continues to be very low, largely due to intense competition and an appreciating *litas*. A falling employment rate and high unemployment, especially among the low-skilled, have been serious concerns. These trends have been largely affected by ongoing restructuring, but a steady economic growth, combined with a shrinking labour force, has begun to push down the level of unemployment and may reverse adverse employment trends.

A rising domestic market and continued export and investment growth are expected to sustain robust economic development. Positive export trends are reflected in an accelerating pace of growth in almost all commodity groups. Exports will continue to expand, as terms of trade improve, companies continue to strengthen their trading links in the EU and export markets recover. Productivity and efficiency growth in manufacturing will contribute to export expansion. Investments have temporarily slowed down after an upsurge in 2001, determined largely by intentions to avoid a tax on reinvested profits renewed from 2002, but improving credit conditions, co-financing of investment projects from the EU and the need to maintain competitiveness at a high level is likely to sustain positive investment growth prospects and increase the share of investments in GDP. A gradual fall of unemployment, an increase in labour demand and strong productivity growth will stimulate wage growth and real incomes. This, coupled with growing lending opportunities, is expected to sustain private consumption.

Rising domestic consumption is expected to drive up the level of prices, but growing competition and productivity will partly offset these trends. Prices will also be affected by further increases in excise along EU requirements and changes in value added tax breaks. While an increase in labour demand and growing productivity are expected to favour further wage growth, a continuously high rate of unemployment and weak employment growth may counteract these trends.

A strict monetary policy pursued under a currency board agreement has been essential to the country's successful economic transition. Lithuania plans to preserve a currency board regime until accession to the European Monetary Union (EMU), envisaged for 2007. Lithuania already meets all membership criteria. The present favourable macroeconomic situation provides a good opportunity to reduce the budget deficit or even to balance the budget, as proclaimed by the government. A budget deficit and a growing state debt could be justified only by comprehensive structural reforms, but these have been delayed so far. Failure to adhere to the adopted principle of programme budgeting precludes an efficient allocation of budget resources and obstructs the reform of public administration.

Continued privatisation and restructuring as well as EU membership are seen as additional sources of Lithuania's long-term economic growth. It is estimated that accession into the EU will add approximately 1.14 percentage point to the rate of Lithuania's GDP growth per year from 2002 until 2009. Lithuania's economic growth would be stimulated not so much by direct financial injections from the European Union, but by changes in the business environment - a free movement of goods, services, capital and labour as the most. Above all, the country's long-term development will depend on progress in accelerating today's lacklustre reforms of agriculture, the social security system, healthcare and public administration.

A.12. SWOT analysis

Strengths	**Weaknesses**
• Strong foundations of a market economy; • Macroeconomic stability • Strong GDP growth; • Strong productivity growth; • Robust export growth; • Low inflation; • Relatively low fiscal deficit; • Skilled labour; • Relatively low labour costs; • Stable currency; • Relatively favourable investment climate and infrastructure; • Favourable geographical location between Eastern and Western markets.	• High unemployment, especially among the low-skilled; • Falling employment rate; • Weak domestic market; • Delayed structural reforms, exerting pressure on the whole economy; • Low-skilled labour-intensive export sectors; • Over-regulated labour market; • Skill shortages; • Low FDI levels; • Remaining business regulations; • Share of agricultural employment and impact of agricultural lobbying; • A fairly large informal economy.
Opportunities	**Threats**
• Export expansion; • Integration-related inflow of fund; • Growing investment; • Improved business conditions; • Continued modernisation; • Increase in productivity; • Growing labour demand; • Rising employment; • Falling unemployment; • Growth of domestic market; • Continued privatisation; • Growing competition.	• Prolonged recession of Western markets; • EU accession-related fiscal pressures; • Expansion of government borrowing; • Growth of labour costs; • Tax hikes; • Delays in implementing structural reforms; • Expansion of regulations and bureaucracy.

The factors underlined in the above SWOT are estimated by the authors to be the most relevant to IST-related developments in the country.

B. NATIONAL AND REGIONAL IS POLICIES

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

The institutional setting for IS policies in Lithuania has been changed several times during the twelve years of the Independent state (see "The history"). It remains complicated and contains dispersed and overlapping functions. A list of the IS related institutions and their declared functions is presented in Annex B1. The actual role and activities of these institutions are enumerated below under "The Institutional setting behind the policies."

B.2. The History

- In 1992 the Ministry of Communications and Informatics was founded.
- In 1998 the Ministry of Communications and Informatics was closed and public administration functions pertaining to communications were transferred to the Ministry of Communication, while those pertaining to information were delegated to the Ministry of Public Administration Reforms and Local Authorities.
- At the end of 2000 the Ministry of Public Administration Reforms and Local Authorities was closed. The functions of public administration pertaining to information were transferred to the Ministry of the Interior.
- In February 2001 an Information Society Development Commission (ISD Commission) under the Government of Lithuania was set up.
- In May 2001 a Communications Regulatory Authority (CRA) started to function. (It was set up in 2000 after reorganization of the National Radio Frequencies Agency).
- In August 2001 the Information Society Development Committee (ISD Committee) under the Government of the Republic of Lithuania launched its activities.
- At the end of 2002 proposals to establish a separate ministry for Information Society issues were discussed, but the ruling coalition declined them. The same proposal was raised again in a World Bank report called "Lithuania. Aiming for Knowledge Economy" in the spring of 2003.
- At the beginning of 2003 a Science and Technology Commission started to function.

B.3. IS policies

Most of the present strategic IS documents were adopted in 2001 and 2002, although a broad information society development project "National communication and informatics programme" (unofficially called "Lithuania 2000") was initiated back in 1992. Major goals of the programme were to facilitate integration into the EU, to increase efficiency of public administration, to increase the quality of public services, to create favourable conditions for a market economy, and to create a national system of information services. The Ministry of Communications and Informatics, which was later abolished, headed the programme. A state-owned enterprise "Infostruktura" was established to implement it. For numerous reasons, including too high a level of centralization and poor financing and managerial skills of public administration, only fragmented results were achieved and the programme was terminated together with the closure of the ministry.

The actual major strategic documents for IS development in Lithuania are a conceptual framework for Information Society Development and an action plan of the Government's 2001-2004 Programme. They lay down most of the same goals of "Lithuania 2000," but the goals are better structured and responsible institutions are listed.

The conceptual framework for Information Society Development in Lithuanian together with a strategic plan of Information Society Development (2001) and its detailed plan for 2002 are a positive example of consistent policy planning, starting with defining goals and priorities and finishing with concrete steps, funding and responsible institutions. Despite a number of highly questionable provisions, the documents shall be evaluated positively, primarily because they are consistent and include implementation monitoring. In addition to that, the most controversial provisions of the plan, such as a project for integration of state communication and data transmission networks (see Box B1. in Annex B2.) or the establishment of a governmental eSignature certification centre, were abandoned during the implementation phase.

Similar provisions are laid down in the Action Plan of the Government's 2001-2004 Programme, in the chapter on Information and Knowledge Society Development.

However, a large number of actual documents and a lack of a clear hierarchy thereof are serious weaknesses of IS policy. Some strategic documents (e.g., A Conceptual Framework for eBusiness, approved in 2001) have not found their place in the whole policy framework and thus remain ineffective.

Innovation and R&D policies have been addressed separately from IS issues so far, and this is an obvious weakness of both. These policies are the responsibility of the Ministry of Economy and are addressed as part of industrial policy (which hardly exists despite export being set as a priority). Innovation and R&D policies have just started to be developed, so it is too early to evaluate them.

The parliament also exerts influence on IS policies. During the 2000 parliamentary elections all major political parties developed rather fragmented and superficial attitudes towards the IS issue, although no party ranked it among the priority issues for their campaign. This did not happen either during the recent presidential elections in late 2002. Information society issues were touched upon but were not explored or prioritized. In 2001 and 2002 there were two politicians who chose this issue to be their trademark. These are Ex-Prime Minister and the present leader of the Conservative Party Andrius Kubilius, who withdrew his candidacy for presidency in favour of President Valdas Adamkus, and Mayor of Vilnius and presently the leader of the Liberal-Centre Party Arturas Zuokas. Mr. Kubilius is advocating a knowledge economy-oriented state policy, promoting clusters, technology parks, selection of separate economic sectors to achieve a break-through in growth and to increase competitiveness of the country. During his tenure as a mayor, Mr. Zuokas has pursued municipal policy favouring the aforesaid activities and a strategic goal to make Vilnius "a city of knowledge."

B.4. Driving motivations of IS policies

As stated in the Government's Action Report for 2002, its target is to increase transparency of decision-making, the quality and efficiency of public services as well as information provision to the public, business and public institutions through ICT use.

Promotion of ICT-based production and services is another goal stated in the Report. To achieve this goal, the Ministry of Economy and municipalities of the largest cities are providing financial contribution to the creation of technology parks and business incubators.

Major motivations for IS policies are twofold. Political motivations come first. Information society as a rather new and sound slogan draws a vision of a modern Lithuania and an open, moving and forward-looking society, in contrast to an old-fashion, post-Soviet province still solving the problems of the past (land and savings restitution, agricultural problems, etc.). Though both *Lithuanias e*xist, the choice of the future direction is demonstrated.

Second, the development of IS is seen as the basis for increasing the country's competitiveness and its ability to co-exist as an equal partner in the EU and in the entire global market. While the competitiveness of Lithuanian firms is a core issue in this case, the policy is mainly focused on the country's competitiveness. Attention politicians pay to the country's ratings and positions in different indexes and benchmarking lines is un-proportionally big compared with the efforts that are being taken to create a competitive legal and economic environment for business and society at large.

Major disagreements in IS policy are threefold. First of all, they are related to a relatively low importance assigned to IS issues in comparison to other state problems (such as agriculture or increases of state social security pensions). It resembles the fact that part of the population still finds itself living in an agricultural/industrial society and wants to go on that way, while the rest sees and measures the economic reality in terms of knowledge society and considers its issues as rising and therefore of priority. The second type of disagreements comes from a different approach to the capabilities and consequences of state regulations of the market. State institutions tend to administrate, predefine, restrict, control and penalize. This approach is usually shared by the academia, adding a prefix "scientific" (scientifically grounded predefinition, restriction and etc.) Market participants and some analysts treat this type of policy as inefficient and unfavourable for business and consumers in general. The third type of disagreements is among different public institutions regarding distributions of authority, functions and funds. In the first case differences in opinion usually compete at the political level. In the second case they compete in society (mainly in the media), and in the third case they compete at all levels of public administration and legislature.

Lithuanian IST policy is far from being sophisticated, because there are usually two types of proposals for problem solving. One of them is to create a new responsible institution or a work group and the other is to request more funds from the budget. So it is a natural consequence that IST policy does not respond adequately to market changes. As ill-targeted policy actions disturb the market and squander public resources (e.g., the establishment of a new inefficient public institution having the right to impose regulations on enterprises or individuals), in many cases a weak implementation of such actions is more preferable.

B.5. Objectives and results of the IS policy

Four priorities were set out in the Conceptual Framework for Information Society Development in Lithuania:

1) Competence of the population in ICT use,
2) Public administration,
3) eBusiness

4) The Lithuanian culture and language in an electronic environment.

An Action Plan was worked out according to these priorities. The 2002 budget allocations for the above mentioned were the following:

Table B1..: **Budget allocations for IS in 2002, EUR million**

Competence of the population in ICT use	8.5
Public administration	0.8
eBusiness	14
Lithuanian culture and language in an electronic environment	0.2
Total	23.5

Reference: Committee for Information Society Development, presentation in Parliament, September 2003

In February 2003 the Committee for Information Society Development presented a 2002 Report on the plan's implementation (see Annex B2.). According to the Report, the majority of the items foreseen in the plan either had been implemented or were being implemented. As mentioned above, the most controversial provisions of the plan were skipped due to a lack of resources. It should also be mentioned that many targets of the plan (such as promoting or advocating something) are difficult to evaluate.

eGovernment, although not included into the plan as a separate item, is in high demand. In the middle of 2002, after several years of debates, the government approved a conceptual framework for the development of eGovernment. The framework foresees a decentralized, demand-driven approach. However, the present public administration does not support this approach. Therefore, continuous attempts to make eGovernment another pre-defined and top-down enforced project are unavoidable. The eGovernment concept can be implemented only together with the introduction of a new type of public administration. For the time being different institutions are implementing separate eGovernment services.

According to Taylor Nielsen Sofres, 8 percent of the Lithuanian population used eGovernment services in 2002.

Box B1. ISDC Survey "Status of eGovernment services and its perspectives" 2003

eGovernment services according to eEurope+ indicators, 2002.05		
Service	Type	Level
Personal income tax	Declaration	2
	Notification of assessment	0
Job search	Excluding employment procedures	4
Social benefits	Disability	1
	Children allowance	1
	Benefits of the Sickness fund	1
	Student scholarships	1
Personal documents	Passport	1
	Drivers license	1
Car registration		1
Application for building permission		1 (0), depending on municipality
Declaration to the police	Reports on incident	0
Public libraries	View of catalogues, search, ordering	4
Certificates (request and delivery)	Birth	1
	Marriage	1
Enrolment in University	Applications	2
Announcement of address change	Declaration of the living place	1 (0)
Health related services	Information on services, registration	0
Social contributions	For employees	2 (1), manual delivery is also obligatory
Corporation tax	Declaration	2
	Information	2
VAT	Declaration	2
	Information	2
Company registration		2
Submission of statistics		3
Customs declarations		2 (0), manual delivery is also obligatory
Environment-related permits	Permissions and reports	1
Public procurement	Information and reports	2

The levels: 1 - information on the Internet site; 2 - partial automatization (such as provision of the forms at the Internet site); 3- partial interaction (for ex., e-questions); 4 - interaction: both request and delivery of the service are carried out in electronically.

Reference: Government of the Republic of Lithuania, http://www.lrv.lt/main.php?cat=22&gr=5&d=2001

As the above estimates show, the plan to achieve at least 3-level services in 2005 as provided in the conceptual framework for the Development of eGovernment is not realistic.

Administrative capacities are being strengthened for the management of the Structural Funds inflows: a National Payment Agency was established under the Phare program, its staff was trained and methodological support was provided; The key ministries - the Ministry of Economic, the Ministry of Communication, the Ministry of Social Security and Labour, the Ministry of Health Care and the Ministry of Education - established necessary agencies to deal with the projects. The Ministry of Finance is the coordinating institution *(Ministry of Economy, www.ekm.lt 2003).*

According to ISD Committee, fifty-two information society development projects are planned for 2003. Public funding is estimated to total EUR 42.6 million, with EU assistance planned at EUR 13.8 million.

B.6. The Institutional setting behind the policies

The Communications Regulation Authority (CRA) implements and shapes (of late) telecommunication policy. Before CRA was established as an independent regulator, telecommunication policy had been formed mainly by the Ministry of Communication. The CRA is a new public institution established in 2000 and one of the most modern ones. The leading staff is young, well-educated and with good knowledge of EU legislation. A lack of competence and experience as a competition regulator are major weaknesses of this institution. Expertise is clearly lacking in economics, finances and business. The institutions could also be more circumspect towards market processes. Over-extensive and over-detailed regulations carried out by CRA can damage the telecommunication sector.

The Ministry of the Interior is responsible for eGovernment and security of information technologies. In the field of eGovernment the work has just started. A conceptual framework for eGovernment, which was mainly shaped by members of parliament and NGOs, was approved in 2002. Institutional capacities of the ministry in this field are clearly insufficient.

The Ministry of Education is engaged in computerization of educational establishments, first of all secondary schools, and eEducation programmes. It draws student enrolment plans for tertiary institutions. The ministry has already experience in working with municipalities and private public partnerships, especially in the field of computerization of schools. It is also possible to mobilize more resources than the ministry's alone.

The Ministry of Economy deals with IS issues from the perspective of industrial policy. Its activities are mainly related to SME support programmes, business incubators, technology parks and similar subsidy-type engagements. The ministry's administrative capacities in IS policy are weak, both in terms of staff and experience. The Ministry of Economy is also in charge of the work of the so-called Sunset Commission, an interagency, public-private initiative to identify and reduce regulatory obstacles to business development. Although a separate group to deal with ICT was established within the commission, the results proved to be negligible.

The Science and Technology Commission has just started its work and does not give reason to expect any substantial changes in the field of science and innovation policy.

The Information Society Development Committee coordinates implementation of general IST policy documents, collects information on IS in Lithuania and the European Union, evaluates budgets for ICT projects in line ministries, deals with integration of state registers, the use of the Lithuanian language in IT, the use of open code SW and regulation of Internet content. It temporarily serves as a supervisory institution and prepares by-laws for qualified eSignature certification centres, sets e-qualification standards for public officials, etc.

The Information Society Development Commission serves as a bridge for IST issues and decisions to be passed to the Government. This is a rather successful set-up, as IST issues are often too specific to be addressed directly at cabinet sittings. Outside experts are also more frequently invited to meetings of the Commission.

The Information Society Council comprises public representatives, including academia and business people, politicians and public activists. Its task is to represent public opinion on IST issues at the highest, presidential level. Its influence is bound to depend on President-Government relations and the president's general influence.

B.7. Specific important actors

For the Information society in Lithuania specific important actors are mainly NGOs (see Annex B3.). They had actively supported the idea of Information society even before official policies "discovered" this issue. NGOs play an important role in IS education activities, organisation of public debates, in bringing up new ideas and projects, analysis of separate issues and the execution of IS projects.

B.8. Conclusions

- IS national policy is rather new and, despite an impressive number of documents, not properly integrated into general public policy. The best evidence is the fact that major general legal acts, such laws on labour regulations, taxation, accounting etc., do not take into consideration the specifics of IST (such as the possibility to use eSignature instead of a manual one and the stamp, the possibility to employ part-time, flexible employees or persons working at home; taxation of IST products and alike).
- Innovation and R&D policies are just appearing and are not integrated into IS policies in turn.
- A lack of a stable institutional framework is one of the factors that has made IS policy fragmented, therefore the establishment of a separate ministry for IS affairs is often proposed. However, there is no reason to expect it will work better than the existing ministries. IN addition to that, as the narrow institutional approach prevails, a separate ministry could even complicate integration of IST dimension into the general economic policy.
- The eGovernment dimension of the present IS policy is underdeveloped. A public administration reform that would set a framework for the communication of public institutions with the public on a service-provider-client basis is an essential precondition for the implementation of eGovernment. Consequently, IS policy would be improved significantly if a proper public administration reform were carried out.
- eGovernment services are clearly lagging behind private eDevelopments. An outdated public administration system and narrow institutional interests tolerated at the governmental level are the main reasons for this.
- Information society in Lithuania is progressing rather fast. The private sector, with its ideas, initiatives and certain pressure on politicians, is the driving force behind this development.

B.9. SWOT analysis - IS

Strengths	**Weaknesses**
• Presence of all major strategic policy documents for IS; • An active private and NGO sector; • Well-educated new public servants in newly established and better financed institutions; • Competitive pressure in the EU and world markets.	• Abundance of strategic IS documents and a lack of hierarchy thereof; • An unstable and fragmented institutional framework for IS policy; • A low rank of IS policy in comparison with traditional policies on the governmental agenda; • Prevailing superficial and simplified understanding of IS policy issues among politicians and academia; • An out-dated system of public administration and narrow institutional interests; • Weak traditions of state institutions' cooperation with the private sector as a partner.
Opportunities	**Threats**
• Learning from world experience: as IS issues (such as eSignature, regulation of telecommunications, ID cards, etc.) began to be dealt with rather late in comparison with EU countries, the approaches and methods that did not work can be avoided; • Using the know-how of investors and EU support.	• Delayed public administration reform and other structural reforms; formal reforms or improper goals; • Direct transmission of EU legislation without regard to local problems; these priorities and traditions can give the opposite results (e.g., the threat to misuse, or actual misuse of, regulatory powers by so-called independent regulators); • Recognising IS as a fashionable issue, to initiate or support projects at the governmental or parliamentary level that are economically unjustified but PR or narrow interest-driven (such as establishing a new ministry, setting up state-owned or subsidised qualified certification centre for eSignatures or "creating" a competitor for fixed line operator with public money).

C. INDUSTRIAL DEVELOPMENT AND COMPETITIVENESS, AND ITS GEOGRAPHY

C.1. Structure of production

Structural reforms and enterprise reorganisation have had profound effects on the country's industrial development. Those sectors of the economy which required relatively small investments were the fastest to restructure. Relatively low labour costs allowed them to maintain competitiveness, attract foreign investors and find new markets. The apparel, textile, food, wood and chemical industries are the examples. Modernisation of the food industry, Lithuania's largest manufacturing sector, proceeded quite rapidly, but as production capacities exceeded local market needs and export possibilities were limited by high customs duties, import quotas and quality requirements, deteriorating sales became a concern. Such industries as electrical engineering and electronic industries required more time and investments to install new technologies.

Table C1..: **Structure of sales of industrial production by sectors, %***

	1993	1994	1995	1996	1997	1998	1999	2000
Total industrial sales	100	100	100	100	100	100	100	100
Mining and quarrying	0.6	0.6	1.1	1.3	1.4	1.4	1.5	1.9
Food products and beverages	29.6	32.6	23.2	31.0	29.4	27.7	26.8	23
Tobacco products	0.5	0.8	1.4	3.0	1.6	1.5	1.8	1.4
Textiles	8.3	7.6	7.6	7.0	6.7	7.1	6.4	5.9
Wearing apparel	3.0	2.3	5.0	5.8	7.0	8.1	10.5	9.5
Leather and leather products	1.6	1.3	1.4	1.6	1.8	1.3	1.2	1.1
Wood and wood products	2.6	2.9	4.7	3.4	4.6	5.4	5.7	5.4
Pulp, paper and paper products	0.9	1.4	1.7	1.4	1.5	1.2	1.4	1.2
Publishing, printing and reproduction of recorded media	0.5	0.2	1.5	2.1	2.3	2.5	3.6	3.1
Refined petroleum products	25.5	24.8	13.8	16.0	17.7	16.2	12.2	19.3
Chemicals and chemical products	3.9	4.8	7.8	7.7	6.2	6.4	6.3	5.7
Rubber and plastic products	0.3	0.6	0.6	1.0	1.3	1.7	3.0	2.4
Other non-metallic mineral products	4.0	4.2	4.1	3.5	3.3	4.1	3.4	2.9
Basic metals	0.4	0.4	0.4	0.4	0.3	0.4	0.5	0.5
Fabricated metal products	1.1	1.4	1.7	1.3	1.5	1.8	1.9	2.5
Machinery and equipment	5.3	4.0	4.4	3.2	2.9	2.5	2.3	2.1
Office machinery and computers	0.1	0.2	0.1	0.1	0.0	0.1	0.2	0.2
Electrical equipment and apparatus	1.4	0.9	1.3	2.0	2.3	2.0	2.2	2.0
Radio, television and communication equipment and apparatus	5.0	3.7	3.4	3.0	2.6	2.5	3.0	3.5
Medical, precision and optical instruments	0.9	0.6	0.6	0.6	0.8	1.0	1.1	0.9
Motor-vehicles, trailers and semi-trailers	0.4	0.2	0.2	0.2	0.2	0.1	0.1	0.1
Other transport equipment	1.4	2.2	1.8	1.7	1.7	2.1	1.9	1.9
Furniture	2.5	2.1	2.3	2.4	2.6	2.7	2.8	2.9
Recycling of metal waste and scrap	0.2	0.2	0.9	0.3	0.3	0.2	0.2	0.6

**1993 and 1994 data on structure of industrial production by activity and 1995-2000 data on structure of sales of industrial production by activit. Reference: Statistics Lithuania, 1998, pp. 264-265; Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, pp. 421-422.*

The composition of Lithuanian industry has not changed much over recent years. Industrial production has been dominated by food products and beverages, refined petroleum products, wearing apparel, textiles and chemicals. Manufacture has grown steadily, with the exception of a temporary recession in 1999 in the wake of the Russian crisis. Since 1996 an upsurge has been recorded in the manufacture of rubber and plastic products, radio, TV and communication equipment and apparatus, wood and wood products, chemicals, furniture and wearing apparel. Export-oriented sectors have given a strong boost to manufacture as the rates of export growth have accelerated, with textile, furniture, wood, metal and chemical sectors being in the lead among the exporters. The general trend in the country's industries is the orientation towards ISO standards. According to the Lithuanian Standards Board, by December 2002 a total of 270 Lithuanian companies obtained ISO 9000 quality control certificates and 27 companies acquired certificated of environmental management standards ISO 14001.

Table C2.: **Structure of industrial production, current prices, EUR million**

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Mining and quarrying	21.0	25.7	17.1	30.8	34.1	35.4	41.9	75.4	88.6	83.1
Manufacture	2 238	2 553	915.5	1 124	1 474	1 626	1 635	2 158	2 446	2 562
Electricity, gas and water supply	529.7	597.6	238.6	282.0	331.6	364.9	388.7	416.6	498.2	552.2

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, pp. 416-417.

Industrial production is concentrated around Lithuania's largest cities which are evenly distributed throughout the whole country, so in regional terms industrial production is also evenly distributed. Agriculture is also fairly evenly distributed in regional terms, but there are differences in productivity, the highest being in Marijampole and Siauliai districts and around Pasvalys and Kedainiai. Still, there exist certain differences in terms of regional contribution to GDP and regional employment and unemployment. Districts concentrating around cities with more extensive manufacturing industries, such as Vilnius, Kaunas, Klaipeda, Utena and Panevezys, contribute larger shares to gross domestic product than other regions (see section A1) and have higher employment rates than the country's average. According to the data on officially registered unemployment from the Labour Exchange, these districts also have lower rates of unemployment; although labour force surveys do not confirm this correlation (see section A4).

C.2. Industry profiles

Certain changes have occurred in the shares of different sectors in gross domestic product. Food production continues to comprise the largest portion of GDP, although it declined from 32.2 percent in 1995 to 23 percent in 2000. The food industry suffered heavily from the Russian crisis, but it has started to recover in recent years as export volumes have increased. Exports of dairy products (see Box C1.) are among the most dynamic in the Lithuanian agricultural sector. In 2000 dairy products constituted 30 percent of agricultural and food exports. The main export markets are the EU, USA, Baltic States and CIS. Growing compliance with EU quality standards enhances the growth prospects of food industry (see Box C2.) but increased competition may put significant pressure on food producers.

Oil refining recovered in 1996 and maintained high volumes for three years until the Russian

crisis. Manufacture of refined petroleum products rose from 13.8 percent of total industrial production in 1995 to 19.3 percent in 2000. The Lithuanian oil industry exerts a profound impact on the national economy. The primary source of this impact should be attributed to "Mazeikiu nafta," the only oil refinery in the Baltic region, providing for 15-20 percent of tax revenues to the state budget. The company processes crude oil from Russia and small amounts that are extracted in Lithuania, though imports via "Butinge" terminal is also possible and was sometimes used in previous years.

From 1997 a constant growth tendency can be observed in the Lithuanian textile and apparel industry, which is recognized as one of the most developed industries with long-standing traditions and is one of the major local exporters successfully competing in EU markets. A total of 550 enterprises are operating in the Lithuanian textile and apparel industry. The share of the apparel industry went up from 5 percent of GDP in 1995 to 9.5 percent in 2000. Manufacture of textiles outstripped production of chemicals and chemical products in 1997 and remains in the fourth position, although its share slumped from 7.6 percent in 1995 to 5.9 percent in 2000. The Lithuanian textile and apparel industry is the leader in national exports. In 2001 the value of exported production comprised approximately 19.5 percent of all Lithuanian exports. The total export volume of the textile and apparel industry makes up 87.4 percent of total output of the textile and apparel industry. Approximately 83 percent of all textiles and apparel is exported to the EU *(Lithuanian Development Agency, Lideika, Petrauskas, Valiūnas ir Partneriai, 2003, pp. 203-207).* The leaders in the country's textile and apparel industry have either implemented or are in the process of implementing ISO quality standards such as ISO 9000, ISO 14000 and others. In the near future the Lithuanian Textile Institute will issue "European certificates for textile fabrics." In 2002 the last accreditation procedures were completed in the Lithuanian Textile Institute for the accreditation that will be valid in all European countries. Exporters will be able to receive this more quickly and cheaply than their peers in other countries.

Box C1.: Dairy industry in Lithuania

Dairy is an agricultural activity in which Lithuania enjoys a definite comparative advantage in terms of the price of dairy industry's basic raw material. Despite its modest yields per cow, Lithuania, whose milk production costs are under USD 0.15/kg, is one of the world's least cost producers. However, a recent sizeable fall in the prices of milk purchase, caused largely by declining markets, have led to significant disagreements between milk producers and processing enterprises and subsequently to indirect interventions on the part of the government. The development potential of the milk processing sector is estimated to be high. This is related to growing export opportunities, given than about 20 milk processing enterprises have EU quality certificates. Significant concentration of the milk processing sector, which has taken place in recent years, may also enhance the growth potential. The number of dairy processors contracted from 38 in 2000 to 24 at the end of 2001. After a rather difficult primary privatization, bankruptcy of many dairies and the secondary tumultuous redistribution of shares, three distinct leaders have emerged in the dairy market: "Pieno zvaigzdes," "Rokiskio suris" and "Zemaitijos pienas." They controlled 80 percent of the milk bulk purchase market in 2001 and 87 percent in July 2002. The relative market share of "Rokiskio suris"grew from 33 to 38 percent in the aforesaid period and that of "Zemaitijos pienas" rose from 18 to 22 percent.

Reference: Statistics Lithuania, 2/ 2002; World Bank, October , 2002, pp. 68-70.

The share of chemical production fell from 7.8 percent of the country's GDP in 1995 to 5.7 percent in 2000. As a consequence of industrial restructuring and the Russian crisis the sales

volume of chemical products fluctuated between 1997 and 2002. In 2002 the sales volume increased by 6 percent over 1997, meanwhile the volume of production sold by Lithuania's extraction and processing industry during this period rose by 33 percent *(Lithuanian Development Agency, Lideika, Petrauskas, Valiunas ir Partneriai, 2003, pp. 225-230)*. In 2002 there were 67 enterprises operating in Lithuania's chemical industry. The main branches include the production of enzymes and organic and non-organic chemicals, fertilizers, pharmaceutical products and household chemical and cosmetics. A total of 55 percent of the total output of the chemical industry is sold on the domestic market. Exports of Lithuania's chemical industry's production comprised 6.4 percent of the country's total exports in 2001. Of the chemical products, 65 percent were exported to EU countries, 18 percent to CIS countries and 12 percent to the countries of the Baltic region. In 2002, 14 enterprises in the chemical industry had ISO quality control certificates and one enterprise, "Achema," had ISO 14001 environmental protection standard. The chemical enterprises in Lithuania are also gradually preparing to introduce the "Responsible Care" standard. Accession into the EU is now forcing pharmacists to inculcate the requirements of "good manufacturing practice," which will become mandatory for Lithuania's pharmaceutical enterprises in 2004.

Box C2.: Food producers: adjusting to EU quality standards

According to the State Food and Veterinary Service, there were 38 companies in the Lithuanian agro-business which met the EU quality standards at the beginning of 2002. Out of them, 19 were dairy product producers, 10 from the fish product sector, 5 meat processors and 4 slaughter houses. The number of companies from these sectors which will meet EU norms by 2004 is estimated to be around 314 out of total 675. Based on the action plans provided by agro-business firms, it is estimated that 152 meat processors and 136 slaughter houses will meet EU standards by that time.

Reference: World Bank, October, 2002.

The dominating role in the woodworking industry, which comprises over 1 000 companies, belongs to the wood and wood products accounting for 58 percent of total production of this industry. The furniture branch accounts for 28 percent, while the paper branch for 14 percent. The woodworking industry accounts for 10 percent of all Lithuanian exports. Since 1999, wood and furniture industry branches were steadily growing and in 2002 the growth of these branches was estimated to be the fastest in the manufacturing industry on the whole. The wood and wood products branch grew twice as fast as the country's total industry in the period 2000-2001. This increase was largely due to the growing number of employees engaged in this industry. Meanwhile labour productivity in this branch is growing rapidly only in lumber milling, plywood and panels production. In 2000 labour productivity in these sectors was more than twice as high as that in 1996. The growth rate of the furniture branch was around 25 percent for the period 1999-2002. Although Lithuanian furniture production sizes are growing rapidly, in the European context the Lithuanian furniture branch exceeds only its Latvian counterpart. Production by German and Italian furniture branches is more than 100 times bigger. Labour productivity in this branch is not high. Between 1998 and 2001 it increased by less than 10 percent. The Lithuanian furniture branch is export-oriented. In 2001 exports were almost three-quarters of all furniture sales (with almost a quarter of exported furniture and its components are exported to Germany, which is also the main export country for Lithuanian wood and wood products). The paper branch developed unsteadily in recent years. Paper branch exports constitute 53-62 percent of all the branch production, with paper and cardboard comprising the main share of export *(Lithuanian Development Agency, Lideika, Petrauskas, Valiunas ir Partneriai, 2003, pp. 216-218).*

In the former Soviet Union, Lithuania was a leader in the electronics industry, particularly regarding the production and development of television sets, television equipment computers, semiconductors and radio measurement equipment. Lithuanian companies were also among the major suppliers of electronic products to the Soviet military industry and space programmes. During the period of transition, the electronics industry was restructured and is now successfully competing in Western markets. Since 1996 a particular upswing has been observed in the electronics industry, caused largely by growing investments and a rapid export growth. The Lithuanian electronics industry is distributed among three branches of (1) electric equipment and appliances, (2) radio, television and communications equipment and appliances and (3) medical, precision and optical equipment. In 2002 the Lithuanian electronics industry covered 162 companies, of which 24 attracted foreign capital in 2001. Production from the three largest companies - "Vilniaus Vingis," "Ekranas" and "Siauliu Tauro Televizoriai" - account for over 80 percent of the total electronics sector production level (see Box C4).

An intensive growth during the period from 1997 to 2002 was observed in the branch of radio, television and communications equipment and appliances. This branch has survived thanks to its exclusive feature to preserve existing potential and to re-orient itself towards the production of television technologies. In 2000 the total sales in this branch increased by 34 percent and in 2001 by 10 percent. The estimated growth of this branch in 2002 was 20 percent.

Medical, precision and optical instruments are the fastest growing branch in the electronics industry in Lithuania. The total sales of this branch have more than doubled within the last four years and amounted to EUR 93 million in 2001. Main leaders in this sub sector are companies producing medical hardware and developing and manufacturing precision measuring means. Products of the Lithuanian electronics industry are much specialised and most of the production is exported. In 2002, 30 percent of the production was sold in the domestic markets and 70 percent was exported. Of that exported, 44 percent went to the EU and 26 percent to the CIS countries, Latvia and Estonia. In 2001 the export of electronic products accounted for 4 percent of Lithuania's total exports *(Lithuanian Development Agency, Lideika, Petrauskas, Valiūnas ir Partneriai, 2003, pp. 187-193).*

The growth of plastic and rubber production has been equally impressive. Its share in total industrial production has tripled in the 1996-2001 period. The share of exported production has increased too. About two-thirds of plastic and rubber products are exported. In 2001 the value of exported plastic and rubber production comprised roughly 2 percent of total Lithuanian export. About 20 percent of all exported plastic and rubber industry goes to EU countries, 31 percent to CIS countries and 3 percent to CEFTA *(Lithuanian Development Agency, Lideika, Petrauskas, Valiunas ir Partneriai, 2003, pp. 219-224).* The current export growth is based on the increasing export to the Baltic countries, Russia and Ukraine. Lithuanian companies are regaining Eastern markets and this indicates further potential of this industry. Labour productivity in this industry is among the highest in Lithuania's manufacturing industry but still retains potential for further growth. Of 186 companies in this industry, 168 are engaged in the production of plastics and only 18 in the production of rubber products. The industry offers a wide range of finished and semi-finished industrial and household products, including plastic building materials, automotive components from plastic and rubber, plastic packaging, etc. The main guarantee of the quality of plastic and rubber products made in Lithuania is a strict mechanism of quality control and manufacturers' orientation to ISO standards. In total, 10 percent of Lithuanian plastic manufacturers are certified according to ISO 9000 requirements. The potential for further reasonable growth of

this industry is reflected in a growing use of plastic components in plastic branch, a growing demand for plastic packaging materials and a growing use of secondary raw materials in the plastic sector. In Lithuania the recycling and use of secondary plastic raw material in manufacturing almost quadrupled between 1994 and 2000. It is forecasted that the growth level in this industry will remain at the level of 15-20 percent.

Metalworking and the production of machinery and appliances have long-standing traditions in Lithuania. Currently about 600 enterprises operate in this sector, which, due to timely privatisation, has successfully adjusted to market conditions. The market share of this sector in Lithuania is comparatively small, so most of the products are sold on foreign markets. The sector accounts for 8 percent of Lithuania's entire export turnover. "Baltijos Laivu Statykla," specialising in the manufacture of metal constructions for the shipbuilding industry, is a leader in the area of metal constructions. It exports 95-97 percent of its total production. The production of machinery and appliances includes the manufacture of production equipment and heating and refrigeration equipment and the like for various branches of the industry and personal use. "Snaige" is the leader in this sector. It exports over 90 percent of its production to 30 countries. Exports to the EU comprised 48 percent, while those to the CIS accounted for 43 percent. Every year the enterprise invests an average of EUR 4.3 million in new technologies. It has introduced ISO 9000 and ISO 14001 *(Lithuanian Development Agency, Lideika, Petrauskas, Valiunas ir Partneriai, 2003, pp. 239-245)*.

Mining and quarrying has shown high rates of growth, mainly due to impressive growth of oil extraction in recent years, with about 400 000 tons of oil extracted per year, compared with 10-12 000 tons in 1990. The share of electricity, gas and water supply dropped from 5.4 percent in 1995 to 4.2 percent in 2002, mainly due to a more efficient use of energy resources in restructured industries. Structural changes in indigenous energy generation have taken place over recent years. The share of solid fuels and that of crude oil has been growing, while the specific weight of nuclear and hydropower has been contracting. The share of solid fuels rose from 12.1 percent in 1996 to 20.1 percent in 2000, while that of crude oil from 3.6 to 10.0 percent respectively. At the same time the share of hydropower and nuclear energy slumped from 84.3 percent to 69.9 percent. Gross internal costs of energy resources and energy losses have gradually declined over the recent years, showing that energy resources are being used more efficiently. Within the energy generation balance structure generation of liquid fuel and nuclear and hydropower prevail.

Between 1998 and 2002 the Ignalina nuclear power station supplied about 76-90 percent of all the electricity consumed in Lithuania, with the rest being produced by thermal electric and hydro-electric power stations. Lithuanian has pledged to decommission the first of Ignalina's two reactors by 1 January, 2005. The decision regarding the closure of the second bloc will be taken in 2004. Given that the Ignalina power station is the biggest electrical energy producer in Lithuania, its closure will affect the country's entire electricity market. The closure issue is closely related to the restructuring and modernisation of electrical energy production and creating conditions for new market entrants. Strategic objectives in the electricity sector include linking the Lithuanian power grid to the western systems, in particular by interconnecting the power grids of Lithuania and Poland as well as establishing a common electricity market of the Baltic States. Also, the closure of the nuclear power plant entails such politically sensitive issues as re-qualification of the company's personnel and implementation of the Ignalina nuclear power station's region's development projects.

Lithuania may be characterized as a net electricity exporter with a large reserve margin.

Currently Lithuania exports electricity to Russia and the Kaliningrad region as well as neighbouring Latvia and Estonia. Plans to export electricity to Poland and Ukraine are being considered. Lithuania is fully dependent on gas and oil pipelines from the Russian federation. The share of natural gas in the aggregate balances of the primary energy resources of Lithuania amounts to approximately 28 percent. The Lithuanian Gas remains the sole owner of the main grid and owns approximately 75 percent of the distribution grids. The gas supply grid is interconnected with the grids of neighbouring Latvia and the Kaliningrad region but is not linked with the grids of Western Europe (see also Part F. Privatisation and de-regulation of other services).

Incorporation into international production and marketing networks can be a successful strategy of growth for many local producers. This would facilitate significantly technology upgrading and acquisition of managerial know-how as well as provide direct access to larger markets, with significant effects on productivity growth. A comparison of CEE-10 in terms of their participation in the international division of labour shows that Lithuania is ranked 7th, with less than 10 percent of non-chemical manufacturing exports being network-related. It thus lags behind Estonia but ranks above Latvia (*World Bank, October 2002, pp. 43-44)*.

Box C3.: "Vilniaus Baldu Kombinatas"

The case of "Vilniaus Baldu Kombinatas" (VBK), the largest furniture producer in Lithuania, shows that establishing commercial ties with a multinational corporation may be a successful strategy for integrating into a global distribution network and boosting exports. VBK produces both home and office furniture. Since the Lithuanian furniture market is too small to support a company of the size of VBK, VBK relies on exports. About 93 percent of VBK production is exported to Sweden, Belgium, Great Britain, Canada, US and France. About 90 percent of output is sold to the Swedish company IKEA, which in 1999 named VBK its best supplier in the Baltics. This cooperation began in 1998. IKEA has provided support to VBK in terms of technology, production organization and personnel training. VBK is connected to the IKEA's computer system through which invoices and payment and delivery information are being processed. VBK is upgrading its computer system to be able to receive daily information on sales of its products in IKEA stores abroad. VBK is one of the top 25 IKEA suppliers out of 200.

Reference: World Bank, October, 2002, p. 42.

The overall importance of international networks in Lithuanian trade has been increasing. Their combined export share has risen from 8.6 percent in 1993 to almost 10 percent in 1997 and to 12.6 percent in 1999. Box C3. and Box C4. contain case studies of firms involved in such international production and distribution networks. Lithuania has been focusing on participating in the international furniture network. This sector accounted for 6.8 percent of non-chemical manufacturing exports in 1999. Lithuanian textile and apparel producers also cooperate successfully with international companies (such as Ikea, Nike, H&M, Zara, C&A and Laura Ashley). Participation in the international automobile network has been less impressive, even though insulated wires and cables produced within the network are among one of the most dynamic export sectors in the country.

Box C4.: "Vilniaus Vingis" and "Ekranas"

"Vilniaus Vingis" (VV) is an important manufacturer of electronic components in Central and Eastern Europe. The company's main products include deflection yokes for colour picture tubes and flyback transformers for TV sets and monitors. Yokes account for about 85 percent of total output. The company was established in 1959 as a state-owned enterprise producing radio components. Manufacturing of deflection yokes began in 1976. Ten years later the company acquired technology and equipment for manufacturing deflection yokes from the American concern RCA. In 1993 the company was privatized and three years later it became a supplier of Samsung, Germany. In 1998 the production of deflection yokes for 21'' screen colour picture tubes for Philips Components was begun. In 1999 mass production of mini neck deflection yokes for Philips and Chunghwa Picture Tubes commenced. In 2000 mass production of 29'' deflection yokes was started. Samsung purchases about 37 percent of yokes produced by VV. They become part of TV sets assembled by Samsung and Philips. Another 30 percent of yokes are sold to a Lithuanian company "Ekranas," where they become part of assembled TV sets sold abroad. "Ekranas" itself accounts for 4 percent of Lithuania's total exports to western Europe. Ten percent of VV's output is exported to Philips, Barcelona and 7 percent to Philips, England. Another 10 percent is shipped to Thomson Polkolor in Poland where it becomes part of TV tubes sold all over the world through Thomson's distribution network. VV is growing rapidly, with its sales increasing from LTL 28 million in 1994 to LTL 63 million in 1997 and LTL 135 million in 2001. To remain competitive, VV purchases foreign technology licenses as well as performs in house R&D. The company holds numerous quality certificates. It also places strong emphasis on training. From a development point of view, this is the area with the most prospects in the Lithuanian machine-building and instrument making sector.

Reference: World Bank, October, 2002, p. 45.

C.3. Services profiles

In the service sector transport and communication have shown the biggest growth in recent years. The share of this sector in GDP rose from 9.1 percent in 1995 to 13.7 percent in 2002. Construction rose considerably reaching a record high in 1998, when it stood at 8.6 percent of GDP. Although the share of construction has dropped since then, the construction sector continues to grow quite impressively and is said to be under revival (a 12.8-percent rise in 2002). This is mainly attributed to the expanding housing loan market and falling interest rates. It is predicted that the housing loan market, which constitutes 2.3 percent of the country's GDP, will grow by 35-40 percent in 2003. Also, increased competition in the construction sector has driven prices down, enhancing the affordability of construction services.

Wholesale and retail trade revived in 2000 after a decline in the previous few years and reached 18 percent growth in 2002. The Lithuanian retail sector has expanded significantly over the past few years. The growth has further accelerated in recent years, especially in 2002, with the growing economy and household income, positive future outlook and development of a consumer credit market. This growth has also been backed by a change in purchasing habits - newly established super/hypermarkets are becoming more popular. The majority of retail sales consist of food products, but the share of non-food consumer goods is increasing every year with economic development. The Lithuanian retail market is dominated by three major players - "VP Market," "IKI" and "ICA/Ahold" ("Rimi"), which together are estimated to control over 50 percent of the total market (see Box C5.).

Box C5.: The largest retail market players in Lithuania

"VP Market" is the largest retail market operator in Lithuania. It has successfully competed against both local and international competitors and emerged as pan-Baltic leader. It has entered Latvian and Estonian markets and is considering expansion to Poland, Russia and Ukraine. In the first half of 2002 "VP Market" started to operate the largest shopping and leisure centre in the Baltic, "Akropolis," which occupies over 53 000 square metres. "VP Market" operates 214 trade centres in total: 165 in Lithuania, 48 in Latvia and one in Estonia. The company plans to invest LTL 300 million in 2003, to open 20 new stores and to increase its sales by 13.5 percent in the Baltic countries. "VP Market" operates under five different formats. "IKI" is the next largest player, focusing on the high-end segment with their supermarkets and pursuing a domestic expansion strategy. "IKI Group" is owned by three brothers Ortiz who opened their first store in 1992 in Vilnius. The IKI retail chain consists of 106 stores under three different formats. In 2003 it plans to open 20 new stores. "IKI" chain ownership will be consolidated under a single operator, "Palink," in 2003. The Norwegian "ICA/Ahold," the only foreign player with a pan-Baltic presence, acquired the entire "Ekovalda" retail chain in the middle of 2002. The chain has about 40 stores in different formats. In 2003 all store formats will be readjusted to meet the standard ICA/Ahold store formats. They plan to open 11 new hypermarkets and supermarkets in 2003.

Reference: Lithuanian Development Agency, Lideika, Petrauskas, Valuūnas ir Partneriai, 2003, pp. 254-259.

Table C3.: **Changes in the weight of services in GDP, %**

Sectors	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Construction	10.0	5.5	4.1	5.1	7.2	7.6	7.1	7.8	8.6	7.8	6.0	6.1	6.5
Wholesale and retail trade	7.1	6.2	9.5	14.0	17.5	17.3	16.8	16.7	16.7	16.0	16.6	17.5	18.0
Hotels and restaurants	2.2	1.8	1.7	1.3	1.4	1.5	1.6	1.8	1.6	1.7	1.5	1.6	1.6
Transport and communications	7.9	8.4	9.9	9.8	10.1	9.1	9.6	9.9	9.8	10.6	12.5	12.5	13.7
Financial intermediation	5.6	3.5	8.5	7.3	5.0	2.4	2.5	2.0	2.2	2.3	2.2	2.3	2.3
Real estate, renting and business activity	6.8	4.1	5.5	4.2	6.8	7.2	7.4	7.5	7.4	8.4	8.5	8.3	8.1
Public administration and defence, compulsory social security	10.9	7.7	7.4	2.9	5.0	6.2	6.8	6.3	7.0	7.1	6.9	5.8	5.5
Education	27.1	0.0	0.0	2.8	4.2	4.7	4.8	5.4	6.2	7.0	6.5	6.4	6.2
Health and social work	0.0	0.0	0.1	1.8	2.6	2.7	2.9	3.9	3.9	4.1	3.6	3.4	3.4
Other community, social and personal service	4.2	3.3	3.6	2.4	2.6	2.9	2.8	2.9	2.9	3.3	3.2	3.3	3.2
Private households with employed persons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1

Reference: Statistics Lithuania, 3/1999, 2003/03, pp. 112-113.

With the start of the Russian crisis the prices of real estate in Lithuania soared by an average of 30 percent within several months, but in 1999 the total turnover of real estate declined by almost half, although prices continued to follow an upward trend. Commercial land and land lots for private housing maintained the largest transaction volumes. With the recovery of the national economy in 2000 the Lithuanian real estate and rent market stabilized and started to

show signs of growth. In 2000 it reached 8.5 percent of GDP. The activity of market participants increased in line with expanding volumes of loans and investment into real estate projects and the steeply growing construction of commercial premises. Compared to 1991 the prices of real estate boosted by almost 1 000 percent to reach EUR 500-1 000 per square metre in the largest cities of Lithuania. In 1996 no hyper/supermarkets were present in Lithuania. Today there are more than 350 stores that belong to different food, do-it-yourself or home appliances retail operators. Today the total area of A-class office buildings in Vilnius exceeds 30 000 square metres and is expected to triple by the end of 2004. The first modern 20 000 square metre warehouse was constructed in mid-2002. Lithuania's accession to the EU in 2004 is expected to significantly boost the prices for real estate in the country *(Lithuanian Development Agency, Lideika, Petrauskas, Valiunas ir Partneriai, 2003, pp. 269-270).*

The share of financial intermediation in GDP remained stable from 1995 until 2002, but the growth prospects are positive. In 2002 this sector rose by 10.6 percent, mainly due to outstanding results of commercial banking, the insurance market and the lease market. In 2002 the banking sector showed the best performance during the past 12 years. The insurance market grew mostly due to the introduction of mandatory third-party vehicle liability insurance in April 2002 and an upsurge in life insurance stimulated by tax-exemption of life insurance benefits under contracts signed until the end of 2002 (tax-deductions for insurance premiums remain in force). The lease market is among the most rapidly growing sectors (a 56-percent growth in 2002), reflecting strong economic growth, rising investments into production and growing domestic consumption. Financing of heavy transport and passenger cars, industrial and technological equipment and real estate has had the biggest impact on the development of the lease market. Moveable property accounts for 82 percent of the lease market, with real estate comprising the remaining part. The lease market is expected to maintain a 30 to 40-percent growth. Falling interest rates and intense competition among lease companies will continue to be significant factors.

C.4. Investment processes

After the Russian crisis industrial investment processes recovered much faster than the rest of the economy. The growth of investments by sectors has varied in recent years. The mining and quarrying industry invested considerably in the past years and now is looking for new oilfields. It is estimated that in Lithuania there are from 40 to 60 million tons of oil for extraction. After a decline in 2000, investments in agriculture have shown a sizeable increase, related largely due to numerous investment projects financed from EU assistance funds and growing banking crediting of the agricultural sector. The food industry, Lithuania's largest manufacturing sector, has stood out in terms of investments. In 2002, investments in the food industry accounted for 36 percent of total investments in manufacture, up from 30 percent in 2001. Labour productivity has increased steadily and the number of workers has diminished *(Lithuanian Development Agency, Lideika, Petrauskas, Valiunas ir Partneriai, 2003).* The food industry has been the most profitable of all manufacturing sectors in Lithuania for the past few years. The textile industry, the second largest manufacturing sector in Lithuania, has invested on a large scale, stimulated by exporting and intense competition. According to the data of the Lithuanian Apparel and Textile Industry Association, in 2000, compared with 1995, capital investments in the textile and apparel industry grew by 73 percent. An allocation of EUR 34.8 million capital investment was made into the textile and apparel industry from own financial resources. In 2000, compared with 1995, capital investments in the manufacturing of textiles increased by 44 percent, while those in the manufacture of wearing apparel grew by 168 percent. The biggest investment is now planned in the linen industry.

Table C4.: **Changes in investment, % y-on-y**

	1995	1996	1997	1998	1999	2000	2001	2002*
Total stock investment	14.3	17.9	14.6	20.5	-6.7	5.3	21.0	1.9

** Preliminary data*
Reference: Statistics Lithuania

Investments in transport and storage declined in the past few years but they started to grow in 2002. Investments in domestic trade have largely been driven by a remarkable expansion of supermarket chains, both through new construction projects and reconstruction. Only in Vilnius 180 000 square meters of shopping area was built in 2002. Communications have shown a remarkable investment growth in recent years and the trend is likely to persist. A sustainable investment growth has been observed in restaurants and hotels, while new projects are likely to sustain growth prospects in the near future. Investments in financial intermediation fell steadily in 1999 and 2001, but they started to recover slowly in 2002. This is associated with a change of ownership resulting from privatisation of former state-owned banks and increased competition in the banking sector which requires, in addition to attractive prices, new measures to attract clients, such as improving the quality of services and widening the assortment.

The majority of IT companies in Lithuania were started on the basis of local capital. For a number of years difficult access to capital was one of the main barriers to a faster development of young IT enterprises. This prevented companies from increasing the scale of their local operations and from investing into development of new products, thus making it more difficult to build international marketing channels. The first private offering of a Lithuanian IT company to international financial investor was executed in 1997 only. As the Association of Information Technology, Telecommunications and Office Equipment Companies in Lithuania "Infobalt" informs, in 1999 and 2000 investment funds and other financial institutions invested over USD 7 million into the Lithuanian IT market, including software development, services and PC assembling *(Infobalt 2001)*. Today the companies that received international funding are the strongest performers among all IT enterprises. These include "Alna," "Sonex grupe" and "Informacines Technologijos." Despite an economic slowdown, foreign investors remained active in 2000, targeting large, diversified companies or niche enterprises in specific, promising market segments. Number of financial investors active in Lithuania raised new funds in 2000, the majority of which is intended to be invested in high-tech enterprises. The process of merging IT firms has started, but the firms remain relatively small. Acquisitions and mergers of IT firms on the scale of the Baltic region would help to maintain competitiveness thereof in the Single market.

In 2003 "European Investment Monitor" by "Ernst & Young" has included Lithuania in the top twenty territories in terms of investment attractiveness. Lithuania has moved by nine positions to locate fifteenth. This is attributed to an improving investment climate, including a strong and credible banking sector offering favourable credit terms. Other factors include relatively low labour costs, a low profit tax, low inflation and expanding relationships with foreign companies. Accession into the EU is expected to augment investment flows in Lithuania.

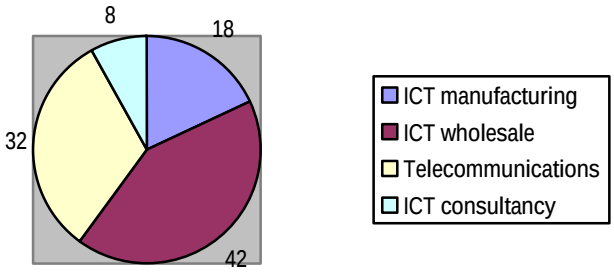
C.5. General overview of the Lithuanian information technology and communication market

The Lithuanian ICT market approximately amounted to EUR 1 229 billion in 2002. Communications were estimated to total EUR 629 million and comprised the biggest share of the ICT market. The IT market and the market for IT services, complex solution and communications equipment were estimated to amount to EUR 300 million each *(Infobalt 2003)*.

According to the study "Indicators for the Information Society in the Baltic" Regions *(RISO, Department of State Informations Systems, 2003),* telecommunications account for 56 percent of total value added of the Lithuanian ICT sector. ICT manufacturing ranks second with 21 percent, followed by wholesale with 12 percent and ICT consultancy with 11 percent. According the above mentioned study, in 2001 value added created by the Lithuanian ICT sector made up 12 percent of total value added in manufacturing, 27 percent of total value added in services, and 22 percent of total value added in the private sector. These are the highest figures among the surveyed countries of the Baltic Region (with the exception of Finish manufacturing, making 23 percent of total value added in manufacturing).

According to the aforesaid study "Indicators for the Information Society in the Baltic Regions," the structure of the Lithuanian ICT sector in terms of ***turnover*** is the following:

Graph C1.



Reference: *RISO, Department of State Informations Systems, 2003.*

In recent years the markets of ICT equipment, software products, carrier services and IT services have shown the biggest growth. The market for end user communications equipment grew the most, followed by mobile telephone services and datacom and network equipment.

Table C5.: **Lithuania: Market for ITT Products, EUR million at constant 2000 exchange rates**

	1999	2000	2001	2001/00
				%
Server systems	9	13	13	*0.4*
Workstations	1	1	1	*-16.8*
PCs	35	30	34	*11.1*
Add-ons	10	11	11	*6.0*
Computer hardware	**55**	**55**	**59**	***7.0***
Copiers	3	3	3	*1.2*
Other office equipment	9	10	11	*7.5*
Office equipment	**12**	**13**	**14**	***6.1***
Mobile telephone sets	12	20	32	*55.1*
Other end user communications equipment	21	22	23	*5.0*
End user communications equipment	**32**	**42**	**55**	***29.1***
LAN hardware	7	8	9	*7.1*
PBX, key systems and circuit switching equipment	46	49	48	*-1.8*
Cellular mobile radio infrastructure	48	71	82	*15.5*
Packet switching and routing equipment	12	14	16	*11.9*
Other datacom and network equipment	21	24	28	*14.6*
Datacom and network equipment	**134**	**137**	**183**	***9.6***
Total ICT equipment	**233**	**278**	**311**	***11.9***
System software	9	10	11	*15.6*
Application software	12	13	15	*13.1*
Software products	**20**	**23**	**26**	***14.2***
IT services	**35**	**40**	**44**	***10.2***
Telephone services	192	204	214	*5.0*
Mobile telephone services	118	159	187	*18.1*
Switched data and lease line services	6	8	10	*18.1*
CaTV services	9	12	14	*19.5*
Carrier services	**325**	**382**	**425**	***11.2***
Total ICT	**614**	**723**	**806**	***11.5***
Total IT	152	166	182	*9.7*
Total telecommunications	462	557	624	*12.0*

Reference: International Trade Centre UNCTAD/WTO, 2002;

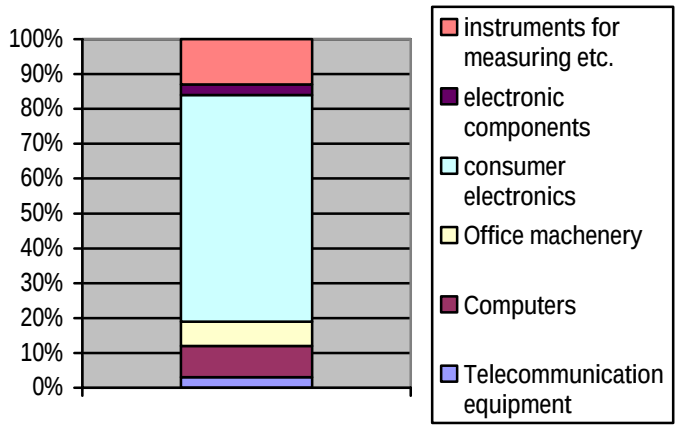
The ICT sector in Lithuania employs four and six percent of the total number of employees in manufacturing and services respectively. In ICT manufacturing more than 80 percent of the employed work in enterprises larger than 100 employees (such as "Vilniaus Vingis" and "Ekranas" (see Box C4.) or "Baltijos Automobiliu Technika"). In ICT services, only 44 percent of employees work in such enterprises. Small business is prevailing in ICT services

(RISO, Department of State Informations Systems, 2003).

ICT manufacturing

According to Statistics Lithuania, ICT manufacturing accounted for 8.7 percent of total industrial turnover in 2000 *(Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002)*. As the sector in general is growing, this difference is most likely of the estimation character. According to aggregation used by the Lithuanian statistics, radio, television and communications equipment is the largest sector of ICT manufacturing, followed by electrical machinery and apparatus. The study "Indicators for the Information Society in the Baltic Regions" *(RISO, Department of State Informations Systems, 2003)* presents the following structure of Lithuanian ICT manufacturing:

Graph C2.

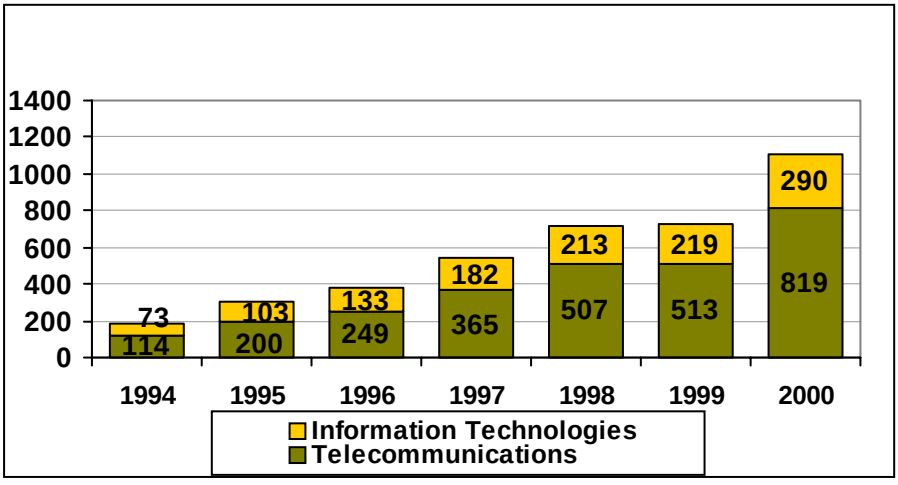


Reference: *RISO, Department of State Informations Systems, 2003.*

ICT services

As "Infobalt" states, in 2000 almost three quarters of the Lithuanian ICT service market were made up by the telecommunications sector, leaving 26 percent of the market to information technologies *(Infobalt 2001)*. ICT services are among the fastest-growing sectors of the Lithuanian ICT market. The Lithuanian ICT service market has grown almost five times during the last six years. In 2000 the aggregate turnover of Lithuanian ICT service companies exceeded EUR 1 billion. In 2002 the ICT service sector accounted for 7 percent of GDP.

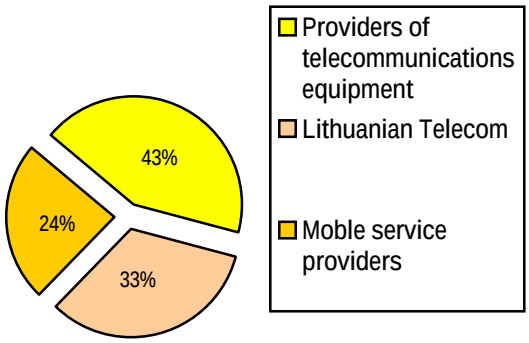
Graph C3.: **ICT service market in Lithuania in 1994-2000, EUR million**



Reference: Infobalt 2001

The telecommunications sector has grown almost six fold in the past several years. In 2000 the sector rose by 32 percent and reached EUR 812 million. In 2001 telecommunications accounted for 4.5 percent of GDP. Telecommunications are not only one of the fastest growing sectors of the economy in Lithuania but also a sector attracting most foreign investments. As the Lithuanian Agency of Economic Development reports, by the end of 1999 total investments in the telecommunications sector made up about EUR 600 million. In 2002 the revenue of four largest Lithuanian telecommunication market operators ("Lietuvos telekomas," "Omnitel," "Bite GSM" and "Tele2") reached a total of EUR 629 million, up from EUR 532 million in 2001 and EUR 448.6 million in 2000 *(Infobalt 2001, 2003)*.

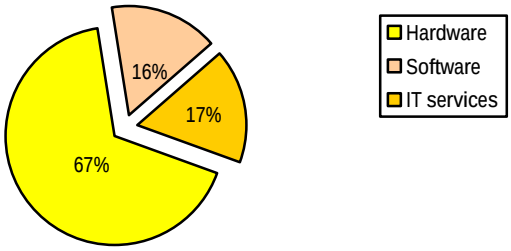
Graph C4.: **Telecommunications market structure in Lithuania, 2000**



Reference: Infobalt 2001

As "Infobalt" informs, Lithuania is now the fastest growing market of information technologies in the Baltics. The Lithuanian IT market has been developing faster than the overall economy by nearly three times. In 2002, the volume of sales among IT wholesalers grew by 27 percent, sales of personal computers increased by 43 percent. The general IT market share reached EUR 265 million. In the first half of 2002 the share of information technology in GDP reached 6 percent, up from 5 percent in 2000. It is forecasted that the indicator for the entire year could reach 6.5 to 7 percent. The growth rate shows that the input of the IT sector in the Lithuanian economy will exceed 10 percent of GDP in three years. In 2002 the Lithuanian IT sector has grown mostly due to the recovered domestic consumption. So last year IT companies increased their sales mostly in the domestic market, including for small and medium-sized businesses. Some computer hardware dealers offering production for home users raised their turnover by 70 to 100 percent. Revenues of 20 largest Lithuanian IT companies grew by 17 percent in 2002. Lithuanian sales comprised 120 000 new computers, or 60 percent more than in 2001 (75 000). The PC market was mostly boosted by home users and SME. The wholesale market of computer hardware grew by 27 percent to EUR 144.2 million. The growth in computers and the overall IT sector is partly influenced by Internet boom. (*Infobalt 2003*).

Graph C5.: **IT market structure in Lithuania, 2000**



Reference: Infobalt 2001

The software sector in Lithuania is showing a fast growth. The domestic market is already too small for its capacities, while the capacities of individual firms are too negligible for foreign markets. The markedly fast growth of this sector in the last years is related to large-scale investments into the country's economy and rapidly expanding IT and telecommunications services. According to "Infobalt", the software market in Lithuania made up EUR 40.6 million in 2000. However, due to piracy, more than EUR 22 million could have been lost (more about piracy see F). In spite of a large-scale piracy in FSU, export of software and related services is one of the main exports of the Lithuanian IT sector (see also Section A9).

Currently the Lithuanian IT sector employs more than 10 000 highly qualified specialists. Growing use of computers in households and the need for faster computerisation of state institutions implies a growing demand for IT products and services and hence a growing demand for IT specialists. Student enrolment in the field is growing, although the quality of training is a concern, while brain drain threatens to absorb qualified specialists (see part G for more about IT skills).

Export strategies

Experience and business contacts established on the former Soviet market facilitated Lithuanian companies in entering IT Services markets in FSU (see also section A9). As "Infobalt" reports, "Informacines Technologijos," a leading distributor of Oracle products and software developer, provided training services in Russia and Ukraine. "Penki kontinentai" distributed banking equipment and developed IS for a number of banks in FSU. "Elsis" and "Technograma" produced and exported electronic equipment in FSU. First attempts to export software development service to the West were made by "Alna" and "Penki kontinentai" in the middle of 1990s. Today "Alna," the largest Lithuanian IT company, pursues a software export strategy the most actively. In 2000 the company signed a USD5 million contract with Bentley Systems to design and test software applications. Several start-ups just several years ago successfully entered western markets with innovative solutions and web design services. Today these enterprises generate more than half of their revenue from export activities.

Lithuanian computer assemblers and communication equipment manufacturers are expected to significantly increase their sales to FSU. Today local computer assemblers sell PCs to Latvia, Estonia, Ukraine and Russia. "Lintec Baltica," a Lithuanian-German joint venture, exported about 40 percent of its products to Germany in 2000 and planned to sell computers to Sweden and Finland. The leading call centre provider "Nelte" exported over 50 percent of its services in 2000.

Table C6.

Largest IT exporters in Lithuania in 2000			
		Export, EUR million	**Export as % of total sales**
Alna	IT solutions, consulting	3.1	12
Elsis	IT systems	2.6	18
Strauja	IT solutions and services	0.5	15
Kordab Vilnius	IT solutions and services	0.4	65
Hnit-Baltic GeoinfoServisas	GIS GPS navigation equipment	0.4	25
Kemek Elektronika		0.2	10
Sintagma	IT solutions and services	0.1	3
Fima	Data networks	0.1	1
Baltic Amadeus	IT solutions and services	0.1	1
DBiT	Computer systems and products	0.1	10
Compidea	IT solutions and services	0.1	5
Baltic Optical Disc	CD-Audio, CD-ROM, CD-Extra, Photo-CD, Video-CD manufacture		47

Reference: Infobalt 2001

ICT growth trends

The trend is towards continued growth of the ICT service market in the coming years. A rapidly growing GDP has influenced the growth of home and small business users section, therefore sales of computer hardware in this segment is developing dynamically. An unfilled domestic market and especially a low-level utilization of modern technologies in state institutions are the main factors of growth. The development of household computerisation and fast computerisation of state institutions are opening up wide opportunities for market participants. Other factors of ICT service growth are rapidly growing investments into the Lithuanian finance, energy and telecommunications sectors, a growing interest of foreign companies in Lithuanian specialists and expanding export of IT solutions (see below about export strategies). As “Infobalt” notes, the yet unfilled Lithuanian market and qualified specialists are factors that have lately attracted considerable interest of foreign investors. The bulk of investments has gone into telecommunications and the IT sector. The general trend reveals that the investors are mostly attracted by software development and export as the internal market has only recently begun to develop traditions of using legitimate software.

C.6. International co-operation and competition. Regional cross country agreements

Lithuania is member of common Baltic institutions: the Baltic Council of Ministers (including Information Society Committee established under the Council), Baltic Assembly, Baltic Summit and the working groups within a framework of the Baltic Free Trade agreement. Those institutions facilitate the co-operation between the governments, parliaments and Presidents of Estonia, Latvia, and Lithuanian. Baltic Free Trade agreement foresees more liberal trade regime then the respective countries have with the EU as import barriers (both tariff and non-tariff) are abolished for the agricultural goods as well.

Lithuania participates in implementing the Northern eDimension action plan. Lithuania participates in the eEurope+ initiative, aimed at helping to accelerate reform and modernisation of the economies in the EU candidate countries, encourage capacity and institution building, improve overall competitiveness and enhance social cohesion. Participation in this programme is intended to help implement effectively the Information Society by means of joint actions that address the specific situation of the candidate countries. The provisions of the eEurope+ action plan are reflected in the Information Society Development strategic plan and the action plan for the implementation of the 2001-2004 Programme of the Government of Lithuanian.

Lithuanian also participates as a full and equal member of EU information society programmes, including IST, eContent, eSafe and other PHARE programmes that are not directly related to information society development.

.C.7. Major actors in ICT industry

Manufacturing sector

The electrical and optical equipment industry is another growth industry. “Ekranas” - one of the sector’s leaders, hiring over 4 000 employees, specializes in manufacturing of colour picture tubes and exports more than 90 percent of total production. The company holds 18.5 percent of the small TV tube market and 12.5 percent of medium-sized TV tube market in Europe. “Ekranas” sales amounted to EUR 121.9 million in 2002 and profits before tax were EUR 6.4 million. In the first quarter of 2003 “Ekranas” suffered a loss of EUR 1.7 million but lessened it to EUR 0.4 million by the end of the first half of 2003 and at the time its sales revenues reached EUR 54 million. In 2003 the company plans to invest about EUR 24 million and to produce 3.9 million TV tubes. 57% of “Ekranas” stock capital belongs to foreign investors (“Farimex S. A.” - 15.9%, “CPT Investment Ltd.” - 14.3%, “Profilo Sanayi Ve Ticaret A. S.” - 12.9%, “Henley trading Ltd.” - 8%, “Redoak Investment Holding” - 5.9%) *(Ekranas, Jusu tarpininkas)* (see also Box C4. for additional information on “Ekranas”).

A producer of TV sets “Siauliu tauro televizoriai” (STT) is a subsidiary of “Ekranas”, which holds 77.5 percent of shares.” In 2002 the company’s sales soared by 83 percent and amounted to EUR 32 million. In 2002, over 80 percent of STT production were exported to Western Europe countries, while by the midst of 2003 about 30 percent of its production STT sold on Russian market, 3 percent stayed in Lithuania and the rest went to the West European markets. In 2003 STT plans to invest about EUR 0.5 million and expects to double its turnover and receive EUR 1 million of after-tax profit *(Jusu tarpininkas)*.

“Vilniaus Vingis” is one of the biggest manufacturers of electronic components in Europe. The company holds the first place in sales of deflection yokes in Europe. Every fourth TV set made in Europe is assembled in complete with the company's made deflection yoke. The main

customers are advanced manufacturers of picture tubes: "LG Philips Displays" (Spain, UK), "Samsung" (Germany, Hungary) and "Ekranas" (Lithuania). In 2002 "Vilniaus Vingis" investments into new technologies and new products amounted to EUR 3.9 million. In spite of the 2001 worldwide recession, the company's sales increased by 11.2 percent and reached EUR 44 million in 2002. The sales revenue by the end of June 2003 was over EUR 20 million and it is expected to reach EUR 46 million by the end of the year. *(Vilniaus Vingis, Jusu tarpininkas)* (see also Box C4. for additional information on "Vilniaus Vingis").

"SY Wiring Technologies" is a subsidiary of Siemens - Yazaki Technologies and produces wiring for automobile manufacturer Renault. Based in Klaipeda, the company employs over 3 000 people - this number grew by 1 000 in 2002 alone. Its turnover mounted by 20 percent in 2002, reaching EUR 80 million. In 2003 the company plans to make turnover of EUR 115 million and expand its personnel to 4 000 people. *(Vilniaus bankas, www.vbfin.lt/pdf/sektoriu_analize2002.pdf).*

Table C7.: **Major producers of electronic equipment**

	Turnover, million euro		Personnel (end of 2002)	Ownership (% of shares)
	2002	I half of 2003		
Ekranas	121	54	3 801	Foreign investors - 57 %, company's management - 35.2%
Siauliu tauro televizoriai	32	27	NA	Ekranas - 77.5%, State property fund of Lithuania - 23.34%.
Vilniaus Vingis	44	20	2 113	Vinvesta (Lithuania) - 37.8%,
SY Wiring Technologies	80	NA	3 000	Siemens - Yazaki Technologies - 100%

Reference: Ekranas; Jusu tarpininkas; National Stock Exchange of Lithuania www.nse.lt/nvpb/eie.php?id=5485; Zvybas E.; Vilniaus bankas, 2003; Vilniaus bankas, www.vbfin.lt/pdf/sektoriu_analize2002.pdf.

C8. ICT services

The IT sector is one of the leading growth industries in Lithuania. The largest companies - "Alna," "Sonex grupė," "Blue bridge," "Penki kontinentai" and others - supply software and integrated IT solutions to industry, trade, energy production and telecommunications in the Baltics and in the CIS. Projects of Lithuanian companies are valued by such corporations as "Microsoft," "Compaq," "Hewlett-Packard" and "Cisco systems."

Table C8.: **Major IT enterprises**

	Turnover, million euro				Personnel (IV qtr. 2002)	Ownership
	1999	2000	2001	2002		
Sonex grupė	13.1	18.9	30.7	41.9	400	33% EBRD, 67% - Lithuanian shareholders
Alna group	13.7	25.4	24.0	33.8	250	EBRD, Lithuanian shareholders
Baltic Amadeus	NA	6.8	7.5	8.5	108	Lithuanian shareholders
Blue Bridge	10.3	9.6	13.6	17.0	52	NA
Penki kontinentai	4.6	7.5	13.6	22.2		NA
Informacinės technologijos	2.3	4.1	5.8	6.7	112	69% company's personnel, 22% foreign investors

Reference: Knowledge Economy Forum; Sonex; Alna; Baltic Amadeus; Blue Bridge; Penki kontinentai; Informacines technologijos.

Recently the IT market has received considerable attention from foreign investors. The European Bank of Reconstruction and Development invested in "Alna" and "Sonex grupė" The Baltic Investment Fund and EQVITEC Technology Fund became shareholders of "Informacinės technologijos." *(Knowledge Economy Forum; Alna).*

Four major players in the telecommunications market are "Lietuvos Telekomas" (Lithuanian Telecom), the owner of a fixed-telephony network, and three providers of mobile communication services: "Omnitel", "Bite GSM" and "Tele2".

Table C9.: **Major telecommunication enterprises**

	Turnover, million euro				Personnel (end of 2002)	Ownership (% of shares)
	2000	2001	2002	I half of 2003		
Lietuvos Telekomas	281	295	280	118	4 531	Amber Teleholding A/S (Sweden) - 62.94 %, Lithuanian state - 9.48 %.
Omnitel	93	138	202	107	574	TeliaSonera AB (Sweden) - 55%, Motorola Inc. (USA) - 35%
Bitė GSM	45	65	101	56	441	TDC (Denmark) - 100%
Tele2	-	17	43	NA	52	NetCom (Sweden) - 100%

Reference: Lietuvos telekomas; Omnitel; Bite GSM; Tele2.

In August 2003 "TeliaSonera" made an agreement with "Motorola Inc." on acquiring thirty five percent of "Omnitel" shares from the latter company. This contract is to be approved by the Competition Council of Republic of Lithuania by the end of 2003 *(Omnitel)*.

Since 2003 the legal environment for telecommunication activities has been changed - the new Law on Telecommunications came into force. As a result, companies expressed their willingness to enter a fixed telecommunication market and started negotiations with the incumbent operator "Lietuvos Telekomas". In March 2003, the first alternative fixed communication service provider "Eurocom" started to operate. According to "Eurocom", within three months of operation, they attracted 3 600 subscribers. *(Baltic News Service, 3 June, 2003)*

In the last years of "Lietuvos Telekomas"' monopoly, competition with mobile operators increased significantly and "Lietuvos Telekomas" started loosing clients (the number reaches 200,000, according to the magazine *"NK Verslas"* estimates). Various evaluations show that "Omnitel" holds about 50 percent of the mobile communications market, "Bitė GSM" and "Tele2" both have around 25 percent of the market each *(Bite GSM; Tele 2;Ebiz.lt)*. The number of mobile service providers continues to increase with emergence of virtual operators: In September 2003 "Bite GSM" had agreements with four potential service providers on use of its network for their services and estimated, that by the end of 2003 the new operators will hold 1-2 percent of market share, and by the end of 2004 - 3-4 percent of the market. "Eurocom" started to operate on the first of July and in September 2003 had about 11,400 of subscribers. Nevertheless, one of the newcomers - "Rcom" withdrew from the market in two months since beginning of activities. *("Verslo zinios" .4 September, 2003;.6 October, 2003)*

C.9. Future of ICT industry in Lithuania

Year 2002 was very successful for producers of electronic equipment. They plan to raise their turnover at least by 50 percent in 2003. A fast development is due to the expansion to European and other markets and the trend might persist for several years. Some risks for the sector's stability might be inferred from the fact that Lithuanian enterprises export mostly to single markets, so diversification of sales could prevent detrimental effects.

Various new trends can be observed in the Lithuanian ICT market. Many enterprises are investing in security and business management systems and are buying consultations. Several dozens of companies invested in CRM systems in 2002. In order to be ready to compete in the EU market, the companies are trying to keep up in terms of technologies and know-how. The IT sector's share of GDP will grow substantially in few upcoming years. IDC experts forecast 11.8 percent increase of IT market annually until 2006.

The sales of information technologies grew by 27 percent in 2002. Total sales by top five wholesale computer companies amounted to EUR 145 million. The dynamics of the sector was mainly caused by household clients. The choice of users is also changing. For example, the sales of digital cameras, portable PCs and LCDs (liquid crystal displays) increased by several hundred percent in 2002. The growth of computer sales in 2003 is estimated to be about 23 percent. A more modest growth is foreseen due to falling prices and investments of the biggest clients - telecommunication companies. The up growth of hardware market should also influence the expansion of IT services market.

Internet use was a weak point in Lithuania for some time. In 2002 the situation improved markedly as the number of users doubled. Surveys show that the bulk of new users come from public infrastructure, including schools, Internet cafés and public access internet points (the latter is associated with the initiative "Window to the future," see B3). The level of internet penetration rate in September 2003 has reached 24.4 percent. Due to several factors future increase of internet users is foreseen. First of all, computer sales for households are increasing rapidly, cable internet is offered widely in the biggest cities and competition in telecommunications market is intensifying. The Internet market is expected to reach EUR 58 million.

"Lietuvos Telekomas" is expected to recover after 2002 difficulties such as the end of the monopoly, the loss of clients for mobile operators and a rather negative image in society. The company has started to apply discounts for end-users and this enhances prospects that retail prices will go down. The main shareholder of "Lietuvos Telekomas" - "TeliaSonera" - has prepared a new strategy for the Baltic States with major targets to improve its public image and to focus more on income from the Internet and data transmission services.

Mobile operators project that 57 percent of the population will be users of mobile services by 2004 (at the end of 2002 the penetration has stood at 45 percent). The competition is based on prices, supply of new services and public campaigns. The competition between three mobile operators is rather fierce. The smallest mobile operator "Tele2" has announced its plans to enter the fixed telecommunication market. Due to new legislation several virtual operators and suppliers of telecommunication services are entering Lithuanian market which will affect the prices of services and shift the market shares of the incumbent players.

Just like in 2002, the major income generator will be SMS services: from information and

parking payments to lotteries and a virtual casino. Today one subscriber of mobile telecommunication services sends on average 35 messages per month. It is forecasted that SMS services will make 20 to 25 percent of the income for mobile operators in the coming two or three years. In 2003 the growth of the mobile market is forecast to increase by EUR 145 million and to total EUR 0.5 billion. The results of the sector will strongly depend on regulations and court decisions regarding the SMP status (see part F1.1) *(LFMI estimates, Naujoji Komunikacija, January, 2003, pp. 22-24, "Verslo zinios" 15 September, 2003;, Vilniaus bankas, www.vbfin.lt/pdf/sektoriu_analize2002.pdf).*

C.10. Conclusions

Sectors providing goods and services for export will remain the main driving force of Lithuanian economic development. Mining and quarrying industry is expected to pick up in the coming years as oil extraction increases. Oil refinery is likely to grow following new investment and modernisation plans. The prospects of the steadily growing textile and apparel industry may be threatened as increasing competition from cheap producers in developing countries and the growth of local labour costs make it more difficult to preserve a competitive edge. A welcome strategy for apparel companies would thus be to reposition themselves into a higher value added segment of the industry, to supplying foreign retailers with time-sensitive fashion products. A rising domestic market and recovering export markets are expected to sustain the growth of the food industry, especially as integration and increased compliance with EU quality requirements expand export opportunities of Lithuanian producers. It is predicted that wholesale and retail trade, construction, transport, storage and communications will constitute a growing share of GDP. Likewise, a sizeable growth is projected for financial intermediation. It is envisaged that the initial effect of the Structural Funds will boost the construction sector, with a lesser impact on industry and education. New employment positions will enhance the demand for intermediate products, which will produce secondary effects on such service sectors as trade, transportation and storage and communication.

Optimistic expectations regarding the country's economic development, falling interest rates and improving terms of crediting, the need to maintain competitiveness at a high level and integration-related investment projects will sustain positive investment growth prospects. Considerable investments are envisaged in all industries, including oil refining, food, textile and apparel, wood and furniture and chemical industries. The EU Structural Funds are expected to have a marked influence on the growth of the investments. According to the Ministry of Finance, the major effect of the EU financial assistance on investments is envisaged in 2005, when real gross capital formation is expected to grow up to 10 percent. By the end of 2006 a share of gross capital formation is predicted to amount to 23 percent of GDP *(Ministry of Finance, http://www.finmin.lt/finmin/index.jsp)*. Considerably low interest rates on loans and a vast expansion of the lease market have created favourable conditions for investment funding from borrowed funds. The loan portfolio has increased sizeably in recent years and in near future the credit volumes are likely to grow at a steady pace and thus helping to tackle short-term and long-term financial problems of enterprises. Intensifying investments processes have also been reflected in a remarkable growth of lease of investment goods and construction volumes.

The Lithuanian ICT sector has shown a remarkable growth in the past several years and the trend is towards continued growth in the coming years. This can be explained by an unfilled domestic market and especially a low-level utilization of modern technologies in public

institutions (e.g. health care establishments), rapidly growing investments into the Lithuanian finance, energy and telecommunications sectors, increasing interest of foreign companies in Lithuanian ICT specialists and expanding export of IT solutions. The yet unfilled Lithuanian market, qualified specialists and a possibility to invest into Lithuanian ICT companies at favourable conditions are the factors that have lately attracted considerable interest of foreign investors. Telecommunications are one of the fastest growing sectors of the economy in Lithuania. It is also a sector attracting most foreign investments. Information technologies are one of the fastest-growing sectors of the Lithuanian ICT market. The software market in Lithuania is growing rapidly. In the last years this is related to large-scale investments into the country's economy and a rapidly expanding market of IT and telecommunications services.

Lithuanian IT companies have potential to expand their export activities. The following makes Lithuanian IT companies attractive to international software developers:

1 qualified, multilingual and cost-effective workforce;
2 growing international experience and high quality of products and services;
3 well-developed telecommunications infrastructure;
4 a favourable geographic position in between CIS, Scandinavian and Western European markets.

C.11 SWOT analysis

Strengths	**Weaknesses**
• Divergent composition of the economy; • Strong export-oriented manufacturing sectors; • Rising domestic market; • Growing service sector; • Growing investments; • Comparably low labour costs; • Improving credit conditions, low credit costs; • Rapidly growing lease market; • Relatively low profit tax; • Low inflation; • Growing ICT market size and value; Participation in international ICT programmes; • Qualified, multilingual and cost-effective IT specialists; • Growing international experience and high quality of IT products and services; • Well-developed communications infrastructure; • Favourable geographic position.	• Small domestic market; • Prevalence of labour-intense manufacturing, low-technology sectors; • Insufficient modernization; • Insufficient compliance with EU quality standards; • Insufficient capabilities of domestic companies to export; • Inefficient agriculture and its effects on other sectors, especially the food industry; • Loss-making oil refinery "Mazeikiu Nafta".
Opportunities	**Threats**
• Expanding export markets and opportunities; • Expanding international co-operation; • Continued investment growth; • Growth of crediting; • Integration-related inflow of fund; • Improved business conditions; • Growth of ICT market; • Ongoing energy restructuring; • "Mazeikiu Nafta" reconstruction and investments by the new owner "Yukos"; • Decentralisation of the electrical energy sector plus alternative energy sources from the EU; • Growth of electronics, oil refining and plastic and rubber industries and communications, retail and wholesale trade, real estate and financial intermediation sectors.	• Competition from cheaper products from developing countries; • Lack of qualified labour; • Growth of labour costs due to expanding regulations, bureaucracy and heavy labour taxation; • Growing pressure on the textile industry; • Insufficient compliance with EU regulations; • Dependence on external markets, in particular FSU; • Sensitivity (of State budget) to Oil trade (global Trade, and in particular FSU); • consequences of the closure of the Ignalina nuclear power station; • Threatened agricultural sector, food, textile and wood industries.

The factors underlined in the above SWOT are estimated by the authors to be the most relevant to IST-related developments in the country.

D. PRESENCE OF MOST RELEVANT ECONOMIC ACTIVITIES FOR IST APPLICATIONS

A greater use of ICT may contribute to network effects, such as lower transaction costs, higher productivity of knowledge workers and a more rapid innovation, with a positive impact on the overall economic efficiency. ICT investment and ICT use may have several effects at firm-level. They may help firms to increase their market shares at the cost of less productive firms and consequently to raise overall productivity. In addition, the use of ICT may help firms to expand their product range, to customise their services and to better respond to client needs or to innovate. Moreover, ICT may help reduce inefficiency in the use of capital and labour, e.g. by reducing inventories. These effects may all lead to higher productivity growth. ICT impacts on firm performance effects are expected to occur primarily, or only, when accompanied by other changes and investments, including investment in skills and organisational change. *(Pilat D., Wyckoff A. 2003.)*

D.1. Level of IT investment

In 2000-2001 a statistical survey was carried out to explore the levels of Lithuanian enterprises' expenditure on IT equipment and software. According to the results, the largest investments in IT in absolute terms were made in the telecommunications sector. Although in 2001 this sector invested in IT 55 percent less than in 2000 (EUR 64.2 million and EUR 29.7 million respectively), this indicator was still much higher than the nearest follow-ups, the financial sector (EUR 8.5 million in 2000 and EUR 16 million in 2001) and trade (EUR 9.6 million and EUR 17.4 million respectively).

The relatively large amounts of investment by telecommunication companies were determined by a fast growth of usage of mobile telephony services and redesigning of the activities of the privatized "Lietuvos Telekomas," an incumbent provider of fixed telephony networks and services. "Lietuvos Telekomas" alone invested EUR 129 million in 1999, EUR 139.8 million in 2000 and EUR 102.7 million in 2001 *(Lietuvos telekomas)*. During the years 1999-2001 "Lietuvos Telekomas" implemented fundamental changes in infrastructure, therefore the overall investment level in telecommunications was at its peak. A high scale of ICT investment in the banking sector could be related to intense competition in the banking sector, which increased considerably after the largest bank "Taupomasis bankas" (Savings bank) was sold to "Hansa Bankas" and "Lietuvos zemes ukio bankas" (Agricultural Bank) was sold to Nord/LB.

Table D1.: **IT investment by sectors, million euro**

	2000	2001
Manufacture of food products, beverages and tobacco products	3.5	2.8
Manufacture of textiles, leather and their products	1.4	1.6
Manufacture of wood and wood products	0.2	0.4
Manufacture of pulp and paper products	1.0	1.3
Manufacture of coke, petroleum and chemical products	0.4	0.8
Manufacture of rubber and plastic products	0.2	0.6
Manufacture of other non-metallic products	0.7	0.4
Manufacture of basic metals and metallic products	0.3	0.4
Manufacture of other machinery, n. E. C.	0.4	0.4
Manufacture of electrical and optical equipment	1.2	1.7
Manufacture of vehicles	0.5	0.3
Manufacture and recycling of furniture	0.4	0.4
Trade	9.6	17.4
Transport and storage	3.0	3.4
Hotels and restaurants	0.1	0.4
Post and communication	64.3	29.7
Financial intermediation	8.6	16.1
Real estate, renting and other business activities	5.7	7.3
Total	101.5	85.6

Reference: Statistics Lithuania, "Informacines technologijos," 2003

In 2000 and 2001 IT investment grew substantially in enterprises producing oil and chemical products (93.6 percent), enterprises producing wood and wood products (88.2 percent) and in trade (75.2 percent). However, the overall level of IT investment in 2000 and 2001, as reported by official statistics, declined by 18.3 percent. This could be explained by a reduction in investment in the telecommunications sector. About 51 percent of all IT expenditures were on computer equipment, 19 percent on software and 30 percent on IT services. It is expected that similar proportions of expenditures will be maintained in the next few years due to a relatively low level of computer equipment in enterprises and the ongoing trend of software legalization.

Expenditures on accountancy software still account for a substantial proportion of companies' investment. Around the year 2001 larger enterprises started introducing computer programmes for complex business operations, and this explains an increase in IT expenditure in trade and industry.

Table D2.: **IT expenditure by sectors, million euro**

	2000	2001
Manufacture of food products, beverages and tobacco products	2.5	3.3
Manufacture of textiles, leather and their products	0.8	0.9
Manufacture of wood and wood products	0.1	0.2
Manufacture of pulp and paper products	1.2	1.5
Manufacture of coke, petroleum and chemical products	0.4	0.4
Manufacture of rubber and plastic products	0.1	0.2
Manufacture of other non-metallic products	0.2	0.3
Manufacture of basic metals and metallic products	0.2	0.2
Manufacture of other machinery, n. E. C.	0.3	0.4
Manufacture of electrical and optical equipment	0.9	1.0
Manufacture of vehicles	0.1	0.1
Manufacture and recycling of furniture	0.2	0.2
Trade	6.8	9.0
Transport and storage	1.7	2.2
Hotels and restaurants	0.2	0.3
Post and communication	4.8	11.1
Financial intermediation	9.5	15.9
Real estate, renting and other business activities	4.4	5.1
Total	34.4	52.3

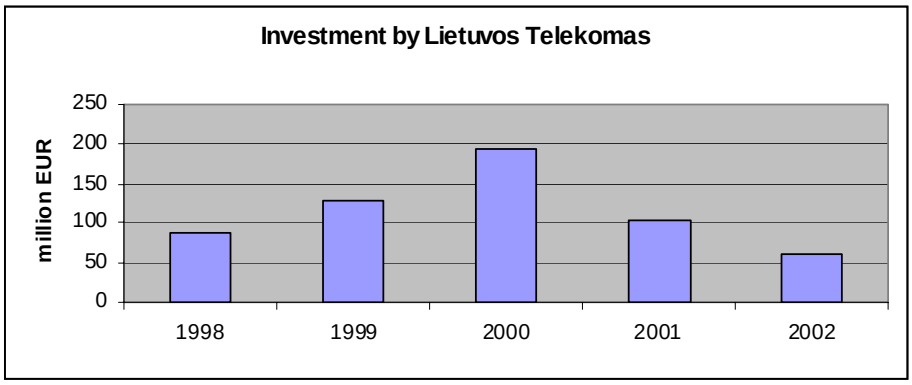
Reference: Statistics Lithuania, "Informacines technologijos," 2003

In 2001 private sector expenditures on IT almost doubled. It rose by 47.5 percent as compared with 2000 *(Statistics Lithuania, "Informacines technologijos," 2003; Committee for Information Society Development, www.ivpk.lt).*

D.2. History: effects of massive investment in IST

"Lietuvos Telekomas," one of the major foreign capital companies in Lithuania, is one of the biggest investors in the national economy overall and in the ICT sector in particular. "Lietuvos Telekomas" has invested more than EUR 500 million into the state-of-the art technologies and network digitization (see also box F1). Due to those investments, the range of services has been expanded and the quality improved. Started from digitalization and modernisation of the network, the rate of the network digitalisation reached 88 percent at the end of 2002. Currently "Lietuvos Telekomas" provides ADSL services, which are available to 85 percent of its customers, a broad range of new modern voice telephony, Internet and data communication (broadband, videoconferencing, leased lines, etc.) services.

Graph D1.



Reference: Lietuvos Telekomas

The biggest operator of mobile telecommunications, "Omnitel," has invested approximately EUR 290 million since it launched operation in 1991 and EUR 75 million in 2002. In 2002 the company's turnover was EUR 203.5 million. The investments planned for 2003 are EUR 46 million. By the end of May 2003 "Omnitel" had 855 000 subscribers and offered the broadest range of GSM services, Internet; data transmission; integrated services, mobile Internet (GPRS), IN based services, etc. The telecommunications company has secured 70 percent of the Lithuanian business market. About 90 percent of Lithuania's one hundred biggest companies use "Omnitel" services. "Omnitel" subscribers can use mobile services in 73 countries of the world supported by 173 GSM operators. Internet via "Omnitel" GPRS service is accessible in 14 countries.

In 1999 "Omnitel" opened the first eCommerce portal www.muge.lt in Lithuania. Currently, it represents the largest eCommerce portal in the country. In March 2001 a service "Your Team" was introduced, making it possible to provide short numbers for the customer's mobile subscribers and to connect them to a single system. In June 2001 "Omnitel" was the first in the Baltics to introduce GPRS applications for business - applications for brokers' network and data collection from electricity objects. In August 2001 the company launched the first in Lithuania mobile GIS & GPS based vehicle tracking system. In November 2001 TV chat via SMS services was offered - SMS text is displayed on TV screen online. In January 2002 the first prepaid refill service via internet banking together with Hansa-LTB bank was introduced and parking by SMS solutions were introduced in Vilnius and Kaunas in June 2002. In 2002 "Omnitel" offered Internet network services WLAN *(Zabulis 2003).*

D.3. Expenditures on R&D

Enterprises worldwide are the drivers of innovation. Overall, however, Lithuanian enterprises spend little on R&D. In 2000 business expenditures on R&D amounted to only 0.07 percent of GDP, or 12 percent of Lithuania's total expenditures on R&D, compared with an average of 1.28 percent of GDP for the European Union and 0.32 percent for the EU candidate countries in 2000 *(European Commission, 2002 European Innovation Scoreboard)*. Lithuania's gross domestic expenditure on R&D amounted to around 0.6 percent of GDP in 2000 (a slight increase from 0.57 percent in 1997) and 0.68 percent in 2001. The state budget provides the bulk of funding for R&D, around 88 percent, for research performed almost exclusively by public institutions (universities and state research institutes). According to other data (EUROSTAT), state funding comprised 61.72 percent of GERD in 2000 and 56.25 percent in 2001, while private sector investment constituted 31.56 percent and 37.11 percent in 2002 and 2001 respectively (the rest of funding came from abroad) *(Eurostat)*.

Table D3.: **Expenditure on R&D as a percentage of GDP**

1995	1996	1997	1998	1999	2000	2001	2002
0.48	0.52	0.56	0.57	0.52	0.60	0.69	0.68

Reference: Statistics Lithuania, www.std.lt/web/main.php?parent=358

Even if actual resources devoted by the private sector to R&D are greater than the official data suggest (this is possible because taxation rules are unfavourable for deducting invested funds), the country's R&D expenditure is much lower than the EU or OECD average *(World Bank, March 2003)*.

Table D4.: **R&D financing sources**

	1995	1996	1997	1998	1999	2000	2001	2002
Total, mill. ECU/euros of which	24.1	33.2	49.7	55.8	52.6	75.0	92.4	99.6
state budget funds, %	68.7	70.4	72.0	74.4	72.4	57.9	53.3	NA
customer's funds, %	24.7	22.2	17.6	17.2	14.7	12.1	9.7	NA
other funds, %	6.6	7.4	10.4	8.4	12.9	30.0	37.0	NA

Table D5.: **Expenditure on R&D sectors**

	1995	1996	1997	1998	1999	2000	2001	2002
%								
for basic research	52.6	39.5	41.1	46.6	55.7	41.7	35.3	40.9
for applied research, funds	39.6	41.6	44.1	43.3	34.5	36.3	29.8	36.3
for experimental development	7.8	18.9	14.8	10.1	9.8	22.0	34.9	22.8

Reference: Statistics Lithuania, www.std.lt/web/main.php?parent=358

Box D1.: Private investments in to R&D.

"Achemos grupe" concern, specializing in the production of fertilizers, has sponsored the installation of a technological laboratory in Kaunas Technology University, Chemical Technology Faculty in 2003. The investment over one and a half year exceeds half a million litas (~EUR 145 000).

In 2002 a mobile telephone service provider "Bite GSM" within its sales outlet in Kaunas established a laboratory of mobile solutions for carrying out research and practical experiments in the areas of mobile telecommunications, data transfer technologies and creation of application solutions. This laboratory, according to the contract, will be used by Kaunas Technological University.

Reference: "Verslo zinios" 25 June, 2003

Sixty three percent of total R&D expenditure in the private sector comes from the ICT sector. This is the highest figure among countries of the Baltic region. R&D expenditure makes almost one percent of total turnover in the ICT sector in Lithuania (5 percent in Finland and 0.3 percent in Estonia) *(RISO, Department of State Informations Systems, 2003)*.

D.4. Innovation policy

In the field of innovation mostly independent efforts of individual companies are being taken and meaningful goals and priorities for financial support from the state and a longer-term vision at the national level are non-existent. In Lithuania there are 26 state research institutes covering a broad range of specialized fields of research, from humanities to technology. However, much of the research conducted by the scientific community is irrelevant to business, because industrial demand has no influence on the decisions regarding funding of state-financed universities.

Though a strategic document for the national Innovation policy, the White Book on Science and Technology, has been drawn in 2001, Lithuania does not have a clear vision or governmental policy in the sphere of R&D. The government has declared support for research

activities as its objective, although this is not further specified. Innovation funding systems do not exist in Lithuania. The allocation of public funds for research and creation of technologies is not regulated by law. Investment expenses are not tax deductible. As a result, private expenditures on R&D are underestimated in official statistics. Besides, low levels of R&D funding and numerous other funding issues persist. The quality of spending is not adjusted to the requirements of a market economy. A major part of government financing consists of institutional funding for R&D institutions - lump-sum budget transfers provided to institutions on a per capita (employee or student) basis - designed to maintain existing staff, facilities and equipment. Moreover, R&D funding provided on the basis of competitive grant selection has been modest by all standards. Program or project funding of R&D is close to zero in Lithuania.

The legal framework for investment in Lithuania is geared toward equity finance and debt finance through commercial banks. But knowledge-based companies at an early stage of their development are too risky for commercial banks because their cash flows are not sufficiently predictable and security against fixed assets is often not practical.

The Lithuanian investment management industry has developed rapidly from a low base in recent years. Although the industry was originally funded from bilateral and multilateral institutions, the country has increasingly attracted private investors, primarily from the Nordic countries. About ten venture funds are currently active in Lithuania, with more than USD 130 million in uncommitted funds. These funds have approximately USD 55 million in committed investments in the country *(World Bank, March 2003)*. However, more sophisticated crediting mechanisms are used on a small scale. As investment policy of the venture funds is rather conservative. The liquidity and capitalization of the equity market is relatively low, although some developments are expected due to the upcoming rise of pension funds. So the set of instruments available for private equity investment is limited, leaving common equity as the only instrument typically used in the country.

The Government, municipalities and the private sector cooperate on specific projects, such as clusters, incubators, technology parks, industrial parks and business innovation centres. The municipality of Vilnius, the capital of Lithuania, is one of the most active in this field. But while in principle these institutions serve as vehicles for an effective transfer of knowledge and technology and spur innovation, many are developed without preparatory work necessary to identify market needs and without adequate operating procedures and staffing. A positive aspect is that the assignment of plots for them is quicker than in other cases. But such institutions provide some educational functions at best, so their actual role is more nominal. It can be concluded that the creation of clusters, industrial and technology parks and the like is not a demand-driven result but represents a consequence of activities of specific interest groups and reflects quite ineffective usage of public funds.

The demand for scientific personnel to provide R&D services seems to be low. Only 4 percent of Lithuania's R&D personnel are employed in the private sector. According to a survey carried out by Statistics Lithuania in 1999, less than 4 percent of enterprises develop new technologies in cooperation with public research institutions. An effective functioning of Lithuania's innovation system is constrained by a large gap between enterprises and the R&D community, unsatisfactory R&D output, overemphasis on public-sector-driven R&D, the aging of the Lithuanian research population and associated brain drain, a large number of R&D-related institutions, a low level of funding and outdated funding approaches. A vast majority develops new technology in-house (54 percent), with other enterprises (9 percent) or

with foreign specialists (23 percent) or acquires it through licences (10 percent) *(World Bank, March 2003)*.

Lithuanian companies do not make proper use of available EU financial support for R&D. Comparison of statistics on distribution of participation from the business sector and R&D institutions in the EU member states shows that Lithuania is far behind them with small and medium enterprises and industry participation only in 12 percent of the funded 5FP projects as compared with up to 50 percent in the EU *(Agency for International Science and Technology Development Programmes in Lithuania)*.

D.5. Advancing innovation

Biotechnologies and pharmacies, ICT and laser technologies are the most prominent sectors in applying innovations. These sectors, along with electronics and mechatronics, are considered to be of major importance for the development of a knowledge-based economy.

For the purpose of advancing science-based industry, promotion of innovation and formation of clusters, representatives of enterprises of those sectors, scientists and politicians set up an association "Knowledge Economy Forum" in 2000. The Forum initiated a National Agreement (signed in November, 2002) by major political parties and a number of prominent NGOs. The National Agreement lays down the same objectives. This policy trend receives public support and is recognized by major political parties, although results are more obvious in the private sector: since March, 2003 workshops have been offered by the "International School of Knowledge Economy," founded by the "Knowledge Economy Forum" and "International Centre of Business and Economic Research" (CIBER).

Box D2.: **"The Sunrise Valley"**
Knowledge Economy Forum proposed and promoted the idea of creating a knowledge economy cluster, called "The Sunrise Valley." This project received support from high-tech business, academia and Vilnius municipality and in May 2003 a public entity "Sauletekio slenis" responsible for Sunrise Valley cluster development was established by Vilnius University, Vilnius Gediminas Technical University, laser technologies company "Ekspla", telecommunication operator "Bite" and IT company "Alna". It's overall aim is the growth of knowledge economy and increased competitiveness of Lithuania worldwide, which is intended to achieve by creating favourable business conditions, promoting cooperation among business, research and education, investment in research and development, ensuring technology transfer & intellectual property rights as well as launching business support.

In addition to the "Sunrise Valley," there are five other business incubators and clusters in Lithuania: Visoriu IT park and Northern Town technology park in Vilnius and similar projects were launched by universities in Kaunas, Klaipeda and Siauliai. Although it might be too early to assess their achievements, few or no signs of activity can be traced.

Innovation occurs at the enterprise level in Lithuania, including in some high-tech industries (laser technology, biotechnology), but it has taken place in a relatively few, isolated cases, such as company "Fermentas" having its own research institute and producing unique products for the biotechnology industry worldwide (see Box D2.). However, the few success stories reflect Lithuania's potential for innovation rather than a systematic use of the country's knowledge assets.

Box D3.: Success story: "Fermentas"

Fermentas, ISO 9002 registered company, is one of the world leaders in the discovery, manufacturing and marketing of quality molecular biological and services to the international research community, working in the fields of genomics, proteomics and micro fluidics through key partnerships and collaborations. Fermentas originated from the Institute of Applied Enzymology in 1975 and continues to have a substantial in-house R&D program. Since 1977, Fermentas has engaged in a program of screening and characterization of restriction endonucleases (REs). Tens of thousands of bacterial strains have been screened and over 2 000 REs have been characterized. As a result of this program, 166 REs have been commercialized and Fermentas now possesses one of the world's largest collections (2 500) of RE-producing bacterial strains. In fact, REs from Fermentas comprise approximately 30% of all REs described in REBASE (a database of all identified restriction enzymes). Active screening continues to uncover new specificities, making Fermentas the supplier of choice for not only commonly used REs but also new, unique enzymes not supplied by other companies. During the past few years, Fermentas has been actively involved in protein engineering through rational design and *in vitro* protein evolution using REs and DNA polymerases as model systems. An extensive knowledge of REs, gained over the past 25 years, particularly structure-activity relationships at the molecular level, in combination with new proprietary selection methods for proteins with altered specificity, has resulted in a breakthrough in endonuclease engineering. Fermentas scientists have created two "artificial" specific endonucleases - Eco57MI restriction endonuclease and N.*Bpu*10I site and strand specific nicking enzyme - using patent-pending genetic engineering methods. Fermentas has 45 representatives abroad; it creates in average ten new products annually.

Reference: Fermentas.

Besides "Fermentas," there are several other Lithuanian companies in the biotechnology sector "Sicor Biotech" produces genetic engineering pharmaceuticals. "Biosinteze" produces biotechnological products designed for the production of animal feed. "Biocentras" develops biotechnological methods for removal of chemical pollutants. At the end of 2001 there were 16 laboratories and institutes associated with the production of classical biotechnological products and four laboratories associated with modern biotechnology. The total number of people working in this field is around 2 000 and there are around 400 members of scientific staff, including R&D *(Lithuanian Development Agency, Lideika, Petrauskas, Valiunas ir Partneriai, 2003. p. 197).*

There are about ten Lithuanian enterprises basing their activities on laser technologies and producing lasers, optical junctions, medical measurement equipment and providing laser-technology related services. More than 95 percent of lasers production is exported to Japan, USA, EU, Switzerland and more than 90 other countries. Lithuanian lasers are used in Japanese and Israeli nuclear research centres, in universities in the USA, Europe and Australia, in military laboratories of Pentagon, etc. *(Knowledge Economy Forum; Ekspla.)*

"Eksma" is the largest enterprise in this sector. It produces laser equipment for science and industry and medical measurement equipment and it has patented several devices of laser technologies. Revenues of "Eksma" have amounted to USD5 million each year since 2000. In 2001 the company had 92 employees. In 1987 Eksma was the first company to export a laser made in Lithuania. The company has established joint ventures with German and Austrian companies for the production of medical preparations and has worked with such scientific research institutions as National Institute of Materials and Chemical Research (Japan), Lawrence Livermore National Laboratory (USA), the Defence Research Agency (Great

Britain), Nuclear Research Center SOREQ (Israel), SAAB Dynamics AB (Sweden) and many others *(Eksma; Lithuanian Development Agency, Lideika, Petrauskas, Valiunas ir Partneriai, 2003, p. 192).*

"Ekspla" is a producer of picosecond lasers and laser systems for scientific research, industrial use and various detectors of light. The company holds more than 50 percent of the world market of picosecond lasers for several years. In 2001 annual turnover of "Ekspla" in 2001 was EUR 1.9 million and 35 employees worked in the company. *(Lithuanian Development Agency, Lideika, Petrauskas, Valiunas ir Partneriai, 2003, p. 192; Ekspla).*

"Light conversion Ltd" produces ultrafast parametrical generators of ultra-short impulses of widely tuned length waves, solid - body lasers and optic corealators as well as coherent gauges of distance, surface profile and thickness of transparent layers. The company is successfully competing on Western markets: the sales of parametric generators cover 60 percent of the international market. The larges proportion of the production output is exported to Germany and the USA. The company's turnover was EUR 1.6 million in 2001. The company had 27 employees in 2001 *(Lithuanian Development Agency, Lideika, Petrauskas, Valiunas ir Partneriai, 2003, pp. 192-193).*

In the early years of independence Lithuania was left with a legacy of a centralized and closed science system which depended on the military sector that provided substantial funding in narrowly specialized fields and a research community largely isolated from the rest of the world. Much of the former enterprise-level R&D capacity was lost in the course of privatization. Considerable progress that has been made in recent years in restructuring and modernizing the national innovation system has helped to retain significant talent and research capacity in Lithuania. Despite that, many of the current organizational structures tend to follow and even reinforce old practices of separating rather than unifying the basic partners for innovation. Compared with R&D systems in Western European countries, the Lithuanian system is inflexible in that nearly all public resources are fixed with existing institutes. A system of this kind is naturally inclined to resist any changes in priorities, division of resources and ways of working. Cooperation and interaction of companies with research institutes and universities is modest and occasional. The same is true of cooperation and interaction between research institutes and universities and among research institutes, as well as in programs where companies, universities and research institutes join their resources and competence. *(World Bank, March 2003.)*

D.6. Technical innovations in different sectors

The results of a statistical survey carried out in 1999-2001 by Statistics Lithuania show that 26.9 percent of survey participants implemented product innovations and technological process innovations in the said years. Enterprises with 250 and more employees were more active in innovation activities (63 percent) than middle-sized enterprises (36 percent) and small enterprises (21 percent).

A total of 35.8 percent of manufacturing enterprises and 22.1 percent of service enterprises implemented innovations in 2001. In 1999-2001 leaders in the introduction of innovations among service providers were enterprises selling computers and providing related services (54.5 percent of these enterprises pursued innovation activities), financial enterprises (47.1 percent) and electricity, gas and water suppliers (39.6 percent). The level of product and technological process innovations was high in petrol and chemical industry enterprises (66.7

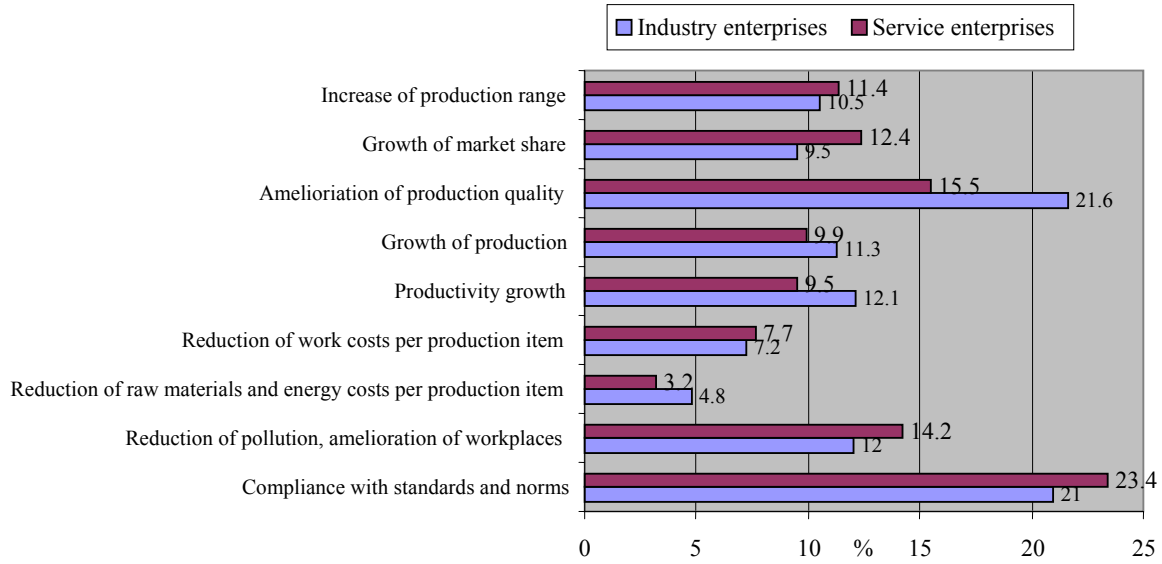
percent) enterprises manufacturing medical, precision and optical instruments (64.7 percent) as well as enterprises in the sector of manufacture of electric machinery and apparatus (54.5 percent), manufacture of food products, beverages and tobacco (46.3 percent) and manufacture of radio, television and communications equipment and apparatus (43.8 percent).

As the survey shows, most of the innovating enterprises (63.9 percent) cooperated with suppliers of software or equipment, materials and components, needed for their business. Important partner for 55 percent Lithuanian enterprises in developing innovative solutions were clients and for 42 percent of firms - business consultants. At the same time cooperation with state science institutes and non-profit organizations was not very active - only 12.3 percent of examined firms were engaged in such a conjoined action. 17.3 percent of enterprises were searching for innovative solutions cooperating with universities and other institutions of higher education, while 24.9 percent - with scientific enterprises. Cooperation with competitors was also important -28.7 percent of all innovating enterprises were using such an approach.

According to the survey results, enterprises pursuing innovation activities used various methods of protection of inventions and innovations. A total of 16.5 percent of manufacturing enterprises used trademark protection, 13.7 percent used the advantage of newly introduced production, 12.5 percent used secrecy and 5.2 percent used complex design and registration of industrial design. Of all service providers, 8.1 percent of enterprises used the advantages in respect of their competitors by introducing new products, 7.4 percent protected their innovations by the method of secrecy, and 6.5 percent of enterprises registered their trademarks.

The innovating enterprises also have made evaluations of the impacts of innovation activities on their performance. The major significance of innovation was attributed to compliance with standards and norms set by the state or a certifying company and to the improvement of production quality.

Graph D2.

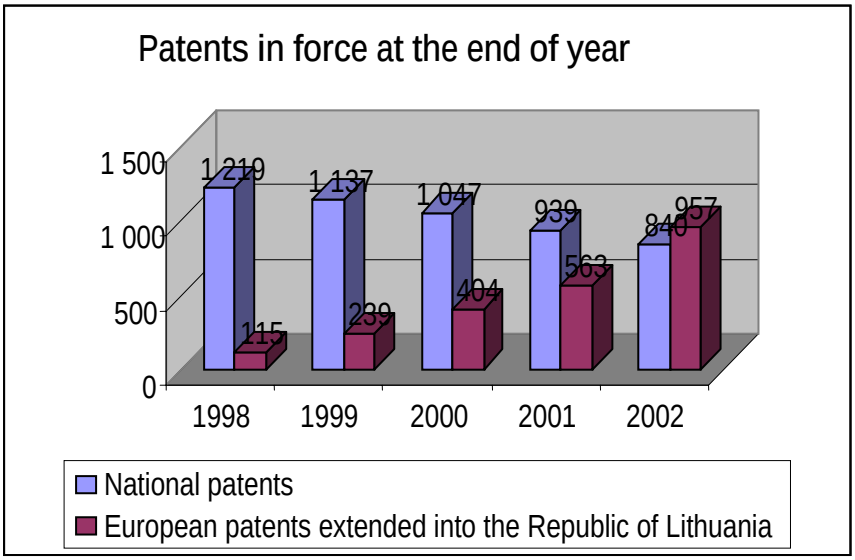


References: Statistics Lithuania, 1/2003, 2/20003; Statistics Lithuania, "Inovaciju pletra," 2003.

In 2002, a total of 131 patent applications were filed with the State Patent Bureau, including

85 (64.9 percent) by Lithuanian applicants and 46 (35.1 percent) by foreign applicants. The number is higher than in the past two years, 126 in 2000 and 123 in 2001. However, it is lower than in 1997 and 1998, when 202 and 205 patent applications were filed respectively. The number of issued patents has been decreasing since the midst of the last decade: 543 inventions were registered in 1997, 165 in 1998, 160 in 1999, 148 in 2000, 128 in 2001 and 104 in 2002. The number of national patents in force has also been shrinking in the past five years, but the number of European patents has been rising each year *(State Patent Bureau)*. The number of European patens per million population in 2002 (273) exceeded the EU-15 average level of 154 *(CORDIS)*.

Graph D3.



Reference: State Patent Bureau

According to the "Group for the Implementation of National Agreement," there is no US patents registered in the name of Lithuanian institutions, but there are Lithuanian researchers working in joint groups which register these patents in the name of institutions of other countries *(Nacionalinis susitarimas 2003)*.

The data from the State Patent Bureau testify to the poor situation of invention development and the overall level of R&D output in Lithuania. Partially this could be explained by relatively high fees for registration of intellectual property objects. The existing level of protection of intellectual property rights is another aspect related to the development of R&D. Many entrepreneurs and researchers still do not see the benefits of such protection. Ambiguities remain about who owns intellectual property rights of government-funded research and development projects. Many representatives of research institutes are unclear about the possibility of patenting innovations and their potential commercial uses. This ambiguous ownership status hampers commercialization and deters potential foreign investment in Lithuanian's intellectual resources. *(World Bank, March 2003)*.

D.7. Conclusions

The telecommunications sector accounts for the biggest share of all ICT investments. This sector is one of the most advanced in terms of introducing intellectual products and services. ICT investments in financial intermediation companies and the trade sector rank second and

third respectively, while industry seems to be investing less on IT products. A large share of investments go for computer equipment and software (around 70 percent of all investments), which reflects a transfer to more complex business operations modes and methods of activities.

Wider policy goals regarding the innovation system in Lithuania are non-existent, while state-financed research institutions, whose activities are for the most part incoherent with the needs of enterprises, are ineffective. Large numbers of research-related institutions with scanty interrelations, low levels of funding and outdated financing approaches constrain the advancement of the public R&D sector.

The R&D potential of the business community has been lost in the course of privatization, while private expenditures on R&D (as well as overall R&D investments) are particularly small. Private R&D is mostly based on autonomous efforts and only occasionally involves partners from other enterprises or scientific institutions, although activities of several enterprises are built on successful cooperation of national and foreign scientists and transfer of knowledge to industry.

The legal framework for investment allows a very restricted set of instruments, although such instruments may prove crucial for early-stage companies. Common equity is the only instrument typically used in the country.

D.8. SWOT analysis

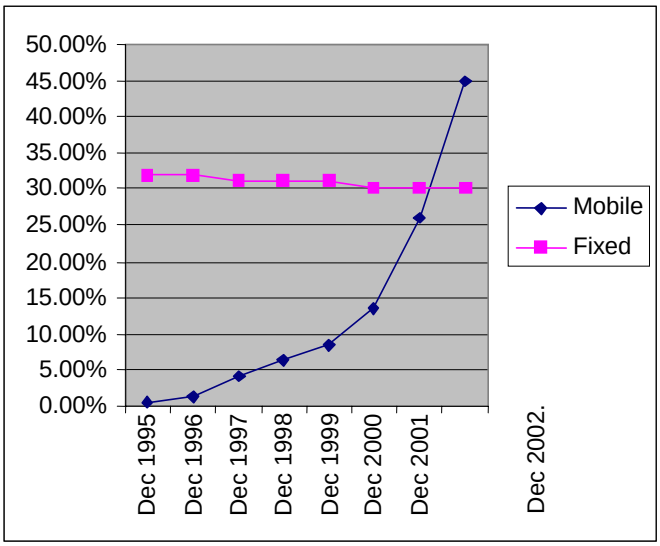
Strengths	**Weaknesses**
• Untapped human resources and scientific potential; • Most innovation initiatives come from the private sector without much support from government.	• R&D policy not adapted to market conditions; • 26 research institutes, covering wide range of fields, are old-fashioned, state-financed and ineffective; • Unsteady relations or a lack of relations between research institutes and the business community; • Feeble and fragmented R&D activities in the private sector; • A lack of sophisticated investment instruments; • Unfavourable investment accounting rules deter business expenditure on R&D and partly on ICT; • Little innovative results from R&D.
Opportunities	**Threats**
• Growing ICT industry (in terms of share of GDP) reflects the orientation of industry towards more knowledge-based activities; • Reorientation of public financing from institutional towards support for specific programmes, creating preconditions for competition among research institutions and privatization of state-owned institutes.	• A lack of long-term innovation policy; • Brain-drain trends (see Chapter G, Box G1) • Further governmental expenditures on arbitrarily selected sectors would distort incentives and resource allocation for R&D by private actors; • Inefficient participation in frameworks and funding programs.

E. IST PENETRATION RATES - TIME SERIES ON INFRASTRUCTURE, EQUIPMENT AND USAGE

E.1. Telecommunications

The telecommunications market in Lithuania is marked by a rapid growth of mobile penetration, which exceeded the usage of fixed-line telephony in 2002. However, monthly expenditure for mobile communication per person is comparably low: according to the largest mobile operator "Omnitel", an average client bill is around 14 euro, while European average is about EUR 40. *("Verslo Zinios" 8 July, 2003)*

Graph E1.: **Fixed and Mobile Telephony Penetration**



Reference: World Bank Knowledge economy Forum in Helsinki, March, 2002, presentation of the Lithuanian case study.

At the beginning of 2003, a total of 47.6 percent of the population in Lithuania used mobile connection services. In July 2003 the level of usage was over 51 percent, and it is expected to reach 55 percent at the end of 2003 *(Ebiz.lt)*. It increased by 40 percent in 2002 only. The number of clients of the fixed line network tends to decline, although business customers of "Lietuvos Telekomas" remain stable in this respect. Some customers are disconnecting their fixed telephones in response to tariff rebalancing and some are substituting mobile services for fixed services as the providers of mobile services cover all the country's territory. The overall number of fixed lines during the last three years has been diminishing. It decreased by 4.6 percent (42 900) to 886 700 during the first quarter of 2003 and by 20.1 percent since the beginning of 2002. The characteristic feature of telecommunications use in Lithuania is that many subscribers to mobile networks are not users of the fixed network *(Ebiz.lt)*.

Table E1.

	1995	1996	1997	1998	1999	2000	2001	2002
Number of public fixed phone lines, thousand	941.0	992.6	1 048.2	1 109.8	1 144.6	1 180.1	1 144.5	929.6
Number of fixed lines per 100 inhabitants	26.0	27.7	29.4	31.4	32.6	33.8	32.9	26.8
Subscribers to mobile telephony service	NA	51.0	150.8	267.6	343.6	508.9	1 018.0	1 631.6
Number of subscribers of fixed line telephony per 100 inhabitants	NA	1.4	4.2	7.6	9.8	14.6	29.3	47.1

Reference: Statistics Lithuania, www.std.lt/web/main.php?parent=424

According to public survey, people located mobile telecommunications in the third place in terms of market liberalisation, after retail trade and catering (*Spinte tyrimai, 2003*). "Omnitel" and "Bite GSM" have made their pricing systems more transparent. After these changes average user prices decreased, while the prices for companies, organizations and other entities with large numbers of subscribers increased. Services are also getting more global. In 2003 a contract of network partnership between "Vodafone" and "Bite GSM" was signed. It will allow "Bite GSM" clients to use services of "Vodafone" in 24 European countries *("Verslo Zinios" 22 July, 2003).*

Faced with increased competition, "Lietuvos Telekomas" has changed it strategy as well: it started active marketing, decreased the tariffs for overseas calls and from fixed to mobiles and lowered internet connection fees. A long-term goal of the company is to have a data transmission as a major income generator. "Lietuvos Telekomas" continued developing its ADSL-based access network. Currently, ADSL services are available to 85 percent of "Lietuvos Telekomas"' customers. The company offers several "DSL Takas" service plans with different speed and price schemes. During 2002 the number of ADSL users increased from 2 400 (end of 2001) up to 10 500 *("Lietuvos rytas," 14 July, 2003)*. "Lietuvos Telekomas" predicts that 21 000 internet users will be employing DSL technology at the beginning of 2004 *(Ebiz.lt)*.

"Lietuvos Telekomas" offers its customers a broad range of new modern voice telephony (ISDN Duetas, Directory Inquiry Service 118, lines 900, 800, 700, telemarketing services, etc.), Internet (Tako Zona, ISDN Takas, DSL Takas, Tako Pastas, etc.) and data communication (broadband, videoconferencing, leased lines, etc.) services. In 2002 the rate of the network digitalisation reached 88 percent, up from 20 percent some five years ago *(Lietuvos telekomas)*.

"Omnitel" introduced GPRS services in February 2002. They are also provided by "Bite GSM" *(Information Society Development Committee)*. Both operators provide the service in more than 20 countries *(Omnitel; Bite GSM)*. At the beginning of 2003 there were about 9 000 users of GPRS services in Lithuania, about eight times more than at the beginning of 2001 (1 100). "Omnitel" had about 6 000 GPRS service clients and was planning to increase the number four to five times in a year. About 3 000 people used "Bite GSM" GPRS. A 150-percent increase is predicted *(Ebiz.lt, www.ebiz.lt/article.php3/1/4736/1)*. In addition, "Bite GSM" also provides HSCSD (High Speed Circuit Switched Data) services. At the end of 2002 it had over 550 users of HSCSD *(Ebiz.lt, www.ebiz.lt/article.php3/15/3928/7)*.

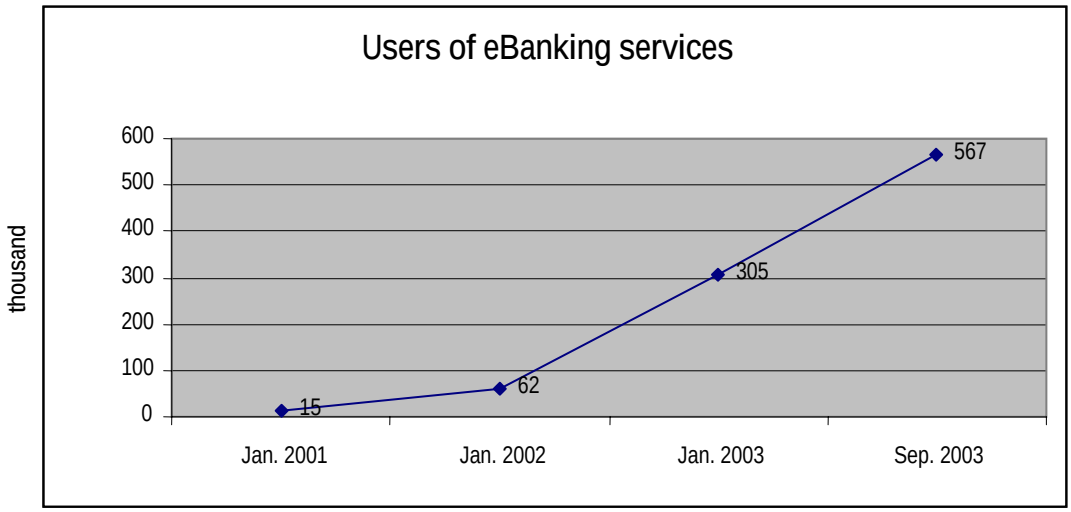
Mobile service providers and representatives of governmental institutions generally think that

it is too early to issue licences for UMTS (Universal Mobile Telecommunications System) services in Lithuania, although preparations have been made in this direction since 2001. In spring 2003 "Omnitel" CEO Zabulis predicted that UMTS service will commence in Lithuania not earlier than in 2006 *(Ebiz.lt, www.ebiz.lt/article.php3/23/4889/0)*. EDGE (Enhanced Data Rates for Global Evolution) technology is seen by "Omnitel" as dispensable as well, since the CS3/CS4 technology, which is implemented by the company, allows speeding up the data transfer by means of GPRS connection *(Ebiz.lt, www.ebiz.lt/article.php3/15/5643/2)*. "Bite GSM," on the contrary, announced plans to use EDGE from the beginning of 2004 as a very promising and fast connection *("Verslo zinios" 10 October, 2003)*.

E.2. IST in financial services

In the banking sector the first step of providing electronic services was with software operating under the Electronic Account Handling Agreement, which enables users to perform bank transactions directly from PC. But later a shift was made towards online banking services. Since the second half 2000, when eBanking services were introduced in Lithuania, the growth of their use has stabilized.

Graph E2.



References: Naujoji Komunikacija, www.nkm.lt/081/aktualijos.htm#bankininkyste, "Lietuvos rytas" 2003.10.13.

At the end of September 2003 there were about 567 000 users of internet banking services. Of these, more than half (316 000) were subscribers to *hansa.net*, provided by "Hansa Bankas." At the same time "Vilniaus bankas" service "VB Internetas" had 213 000 subscribers, and the third follow-up, "Nord/LB Lietuva," had 17 600 users of its eBanking service *(Lietuvos rytas," 13 October, 2003)*. eBanking services include managing of personal or corporate accounts, national and international transfers as well as currency exchange and service payments, including public utilities and trade securities. At the beginning of 2004 personal income report online service should be introduced. In the second half of 2001 some banks started offering lending services online, phone-banking services and services via e-mail *("Verslo zinios" 19 September, 2003)*. In September 2003 there were over 93 thousand of subscribers of mobile banking services - almost 9 times more than at the beginning of 2003 *("Verslo zinios" 23 October, 2003)*

At the end of the first quarter of 2003 there were about 1.6 million banking cards issued by

commercial banks (up from 0.9 million in January 2002). In 2002 the total number of transactions made by using banking cards reached EUR 2,173 billion, and it was 3/4 larger than in 2001 (EUR 1.197 billion). In September 2003, there were 1.11 million "Visa" paying cards in Lithuania, or a half of all "Visa" cards in the Baltic States *("Verslo zinios" 19 September, 2003).*

In March 2003 the Central Securities Depository of Lithuania started to sell government securities online only, transacting through eBanking services. Monthly turnover of such trade reaches EUR 300 000. A financial brokerage company "Jusu tarpininkas" has offered online trade of stocks since the end of 1999. The turnover of such online trade was EUR 4.25 million in 2002 *(Naujoji Komunikacija, www.nkm.lt/index.phtml?lst=articles&ptid=1&tpid=4&arid=448).*

E.3. eCommerce

A survey conducted by "Taylor Nelson Sofres" in 2001 showed that 84 percent of internet users had never shopped online. In the period from June 2001 until June 2002, a total of 66 to 63 percent of the EU population never used online shopping *(Flash Eurobarometer 125*).

At the end of 2001 there were 32 web sites of Lithuanian enterprises offering online shopping services. Eight of these web sites make it possible to pay with bank cards, and twelve others make it possible to make payments through internet banking services *(Lithuanian Union of Computerniks)*. At the beginning of 2003 the number of web sites grew to 44. According to the data of HansaBankas, the turnover of 13 online shops using the *hanza.net* eBanking service comprised EUR 1.5 million in 2002 *("Verslo zinios" 19 September, 2003).*

A low level of online shopping can mainly be attributed to small supply of goods. And internet stores have to stand their ground in competition with supermarket chains. Nevertheless, there are several exceptions: the successful online store www.24x7.lt offers computer hardware and software, items of household appliances and mobile phones. Its annual turnover reaches EUR 150 000. Online bookstores are also noteworthy: this kind of internet trade is one of the most popular as big discounts (compared to ordinary shops) are offered. Due to intense competition monthly turnover of such shops rarely exceeds EUR 6 000 but they are especially popular during Christmas and at the start of the school year *(Naujoji Komunikacija, www.nkm.lt/index.phtml?lst=articles&ptid=1&tpid=4&arid=448).*

E.4. IST in public administration

The main data that state and municipal institutions provide on their web sites pertain to their activities and contain contact information, such as lists of telephone numbers and e-mail addresses of the staff. Web sites of central government institutions often provide drafts of legal acts, although the information is not always up-to-date and comprehensive. Municipalities tend to describe the local legal and economical environment for business. Ministries provide plans and reports of their activities. Governmental websites provide statistical data and some specific information, such as taxpayers' codes, lists of certified products, customs tariffs and rules, ongoing bankruptcy procedures, etc., but rarely in other languages than Lithuanian. Mainly there is only one-way online interaction: various kinds of information are provided for the public and business, almost all legal acts and some forms can be found or downloaded from the net, but it is an exception when any feedback can be given. Such services as registration with official institutions via internet or fax are unavailable. Some statistical information can be submitted online to the official bureau of statistics, Statistics

Lithuania. Documents from the Register Centre can be ordered online. Social contributions' payers declarations can be filled up and delivered electronically, although manual supply of the same forms is still requested. (For ICT usages in public administration service see also Chapter B.) According to a sociological survey carried out in mid-2001 by "SIC Gallup Media," more than 56 percent of all Internet users in Lithuania used eGovernment services (i.e. about five percent of the population).

There is a portal (www.svarstome.lt) devoted to public discussions on major questions of debated legislation. Citizens may express their opinion on such topics as pension reform, development of the educational system and analysis of IT instillation policy in the educational sector. There is no legal obligation for experts in working groups to take into account the opinions expressed. The portal is not very popular though but it is maintained as part of public consultation policy.

Major problems hindering the expansion of eGovernment services are not technical. Although registers and databases are not properly regulated and handled, work on creating a portal for providing public information and public services has been postponed because of a lack of financial resources. The most important factor is that the government does not recognize citizens as users of its services. On the grounds that obligations to provide information or other eGovernment services are not clearly established by law, state institutions generally avoid such actions.

According to Statistics Lithuania, there were 61 PC on average in every central government and municipal institution at the beginning of 2002. In June the number reached 65. There was 0.4 PC for each public servant. In June 2002, there were 0.4 PC per person in public administration institutions. In each public administration institution there were 90 employees working with PCs. Of them, 68 percent used internet. A total of 97.2 percent of public administration institutions had access to internet, and there were on average 46 PCs connected to internet in each institution. An average of 61 employees in each institution used internet. A total of 50.1 percent of state and municipal institutions had their web sites which provided information on these institutions, their work plans and public services. A total of 92.3 percent of all ministries, 62 percent of their subordinate institutions and 87.9 percent of all municipalities had their web sites. More than a third of all state and municipal institutions provided some public administration services through internet *(Statistics Lithuania, "Informacines technologijos," 2003.)*

E.5. IST in health services

"Alna" presented a report on demand for information and assessment of IT infrastructure in the health care sector under a project "Consultancy assistance for the assessment of demand of information and IT infrastructure in all levels of health protection" carried out by the Ministry of Health Care of the Republic of Lithuania, 28 January, 2003. Comments from the report are presented in Box E1 *(Ministry of Health, www.sam.lt/esveikata/docs/AtaskaitaB.pdf, 2003).*

Box E1.: Conclusions from the "Alna AB" report

Most health care establishments have local networks and servers. A total of 23 percent of computers have no access to internet. Out of those with internet access, 30 percent use dial-up connections and others have faster and permanent connections such as DSL. About 40 percent of all health care establishments use technique with Pentium and older processors as servers, while 30 percent have Pentium III or better processors. Various types of operational systems are used in the servers, including those not suitable for the purpose - Windows 95 and Windows 98. All establishments use various types of software, and only one IS - "Sveidra" - is standardized. Only about 75 percent of software is legalized. A very small portion of medical equipment that could be connected to computers. The number of equipment for teleconferences and demonstrations is exceptionally small. Operational management is quite expeditious and constantly informed about the current status (e. g. numbers of patients, free beds, financial status and status). But most data are not keyed into computers but analyzed without use of computer programs. A total of 58 percent of medical staff use computers but level of computer literacy is low. Doctors use computers for filling out documents, communicating via e-mail and browsing the internet. Most specialists would like to acquire more skills in working with PCs, so it may be concluded that, with a higher level of computer literacy, administrative efficiency would improve conspicuously (In Lithuania health care specialists spend more than half of their work time on filling out papers - diagnoses, conclusions, journals, prescriptions etc. Most data on specific case histories, diagnoses, curing methods and likewise are collected - even from the internet - not in electronic form, but in paper documents.) There is a demand for the exchange of information on patients among several health care establishments. Since most data are recorded in paper case histories, it is quite difficult for other health care establishments to obtain needed information. Results of medical investigations are transferred to doctor manually and that may take one working day. Radiograms cannot be transmitted among several doctors (e. g., when needed for consultation) because they are stored in different places - by patients, doctors, in archives, etc. Health care establishments would like to get information on patients' health insurance directly from the social security databases. But the potential for cooperation in this sphere has not been exploited. A patient cannot register via internet or email for a doctor visit. One must spend from 10 to 30 minutes at the reception to get a coupon, even if prior registration by phone has been made.

There is a demand to raise the level of ICT usage in the health care system. This is seen as a possibility to improve the quality of services and to ameliorate working conditions for the staff. But the overall system does not provide incentives to change the situation, and reform is not foreseen, albeit being continuously discussed.

E.6. IST in educational services

In 1996, there was on average one PC per 100 pupils in secondary (general) schools. In 2001 the number was 2.5 PCs per 100 pupils. In the school year 2001-2002, there were on average 8.7 PCs per 100 students in higher education institutions *(Statistics Lithuania, "Informacines technologijos," 2003)*.

In the school year 2001-2002, only 33.9 percent of all secondary (general) schools in Lithuania had access to internet *(Ibid.)*. According to official data, about 900 of around 2 000 secondary schools and gymnasiums in Lithuania in 2003 had access to internet, although surveys by "Spinter tyrimai" show that more than 90 percent of all schools use internet. The Ministry of Education and Science's data show that there are about 23 000 computers in secondary schools, of which 13 000 are connected to internet *(Baltic News Agency, 13 May,*

2003). (The EU level of schools connected to internet in March 2001 was 89.0 percent and in March 2002 it was 93.0 percent) *http://europa.eu.int/information_society/eeurope/2002/benchmarking/list/2002/e_learning/schools_connected/index_en.htm*).

Box E2.: Survey "Analysis of IT Implementation Policy in the Educational System in Lithuania,"
carried out by the Democracy Institute, financed by the Open Society Fund, December 2002. Major conclusions of the analysis are the following: The framework of legal and strategic documents on IT implementation in education is not complete in terms of consistency. -78 The goals of IT implementation in education and their priorities are not clearly stated. -78 The sequence of work laid down in the documents is difficult to implement. -79 The attention to the Lithuanian language in electronic media is insufficient. -80 Importance of the digital divide problem is not emphasized enough. -81 Though the level of computerization in schools is not satisfactory, the present infrastructure is sufficient to cope with computer illiteracy in schools. Further computerization of schools shall not be self-fulfilling target but a means for achieving new goals. -82 Due to centralized procurement, schools have no choice in selecting HW and SW. Either this choice shall be provided or presently purchasable specifications have to be approved as standard (in case of SW- MS Office). -83 Computerization of schools is usually seen in its narrow sense - as a tool for computer literacy. Wider outcomes of the process (such as influence to learning of other subjects) are not analyzed. -84 Production of learning applications is highly centralized. -85 Teacher training programs are consistently carried out, but the funding is insufficient. -86 There are no means to cope with computerization side-effects foreseen. -87 Institutional responsibility of IT implementation in education is scattered, the management is centralized in state level with undervalued role of municipalities and communities. -88 Regulating documents doe not cover IT security issues. -89 The funding is scarce and not stable.
Reference: Institute of Democratic Politics, 2003

E.7. IST in households

According to surveys carried out by Statistics Lithuania *(Statistics Lithuania, "Informacines technologijos" 2003)*, 19 percent of all Lithuanian households had a computer in the first quarter of 2003. During the last several years this number has been growing fast: in the first half of 2002 it was 12 percent, and in the second half of 2000 it was just over 6 percent. In five biggest cities 19 percent of households had a computer in 2002. The indicator for other towns was 10 percent and for rural areas it was 5 percent. (According to OECD data, 47.3 percent of households in Germany, 32.4 percent of households in Ireland and 59.9 percent of Swedish households had access to home computer in 2000 (*OECD*). The rapid rise of PC usage is expected to continue, up to the level of 35 percent of all households *("Verslo zinios" 19 September, 2003)*.

Table E2.: **Households with computers, %**

	1996	1997	1998	1999	2000	2001	2002	I Q 2003
All households	1	2	2	3	5	9	12	19
5 biggest towns	2	3	4	5	10	14	19	30
Other towns	1	1	1	2	4	6	10	20
Rural areas	0	0	0	1	1	3	5	7

Reference: *Statistics Lithuania, www.std.lt/web/main.php?parent=889*

Almost 37 percent of all persons aged from 15 to 74 had a possibility of using a computer either at home or at work in the first quarter of 2003. Half of them used PC daily, while a third about once a week. The biggest share of all persons using a PC on a daily basis was among working people. Students were the largest group among those who used it at least once a week. About 12 percent of the population used computers at home. About 3 percent used computers at home for professional purposes *(Statistics Lithuania, www.std.lt/web/main.php?parent=163&module=540&id=604).*

The level of internet connection in households is rising less rapidly. A total of 48 percent of all households with a computer, or 5.9 percent of all households, had access to internet in 2002 and in the first quarter of 2003 the rate was 6.2 percent (5 percent in 2002). In the biggest cities 55 percent of households with computers (10 percent of all households) and 34 percent of households with a computer in rural areas (1.7 percent of all households) used internet. (By mid-2002, 40.4 percent of EU households had Internet access, according to the eEurope Benchmarking Report for 2002, up from 18.3 percent in March, 2000). *http://europa.eu.int/information_society/eeurope/2002/benchmarking/list/2002/internet_users_june2002/since_lisbon/index_en.htm*). Due to the new marketing policy of "Lietuvos Telekomas" (see below), introduced in September 2003, the level of internet usage in Lithuanian households is expected to double in one year *(Ebiz.lt, www.ebiz.lt/article.php3/1/5531/4).*

Table E3.: **Households with access to internet, %**

	December, 2000	**2001**	**2002**	**I Q 2003**
All households	2.3	3.2	4.1	6.2
5 biggest towns	4.8	6.3	NA	9.7
Other towns	1.2	1.8	NA	7.2
Rural areas	0.3	0.6	NA	1.1

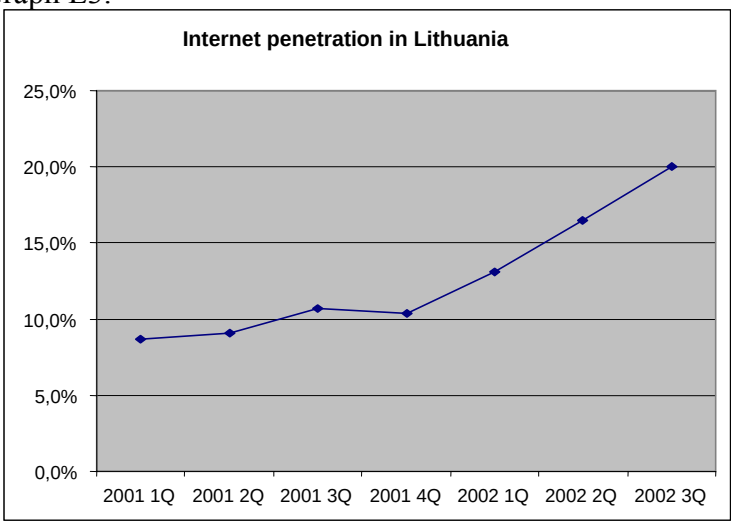
Reference: Statistics Lithuania, www.std.lt/web/main.php?parent=890

A total of 72.7 percent of students and pupils use internet, while the level among working population is about 25 percent. A total of 6.2 percent of all Lithuanians uses internet at home. Half of internet users have their private e-mail account, while 20 percent use e-mail through office account.

Only 0.7 percent of all households had ordered goods or paid for the services via internet in 2002 as well as in the first quarter of 2003. The majority of non-users of eCommerce indicate that there is no need for ordering goods or services online *(Statistics Lithuania, www.std.lt/web/main.php?parent=163&module=540&id=604).*

The internet penetration doubled in the first three quarters of 2002 as it rose from 10 to 20 percent. In the spring of 2003 the number of internet users was 21.9 percent (according to the "TNS Gallup" data) or 24.4 percent (results of a survey by Statistics Lithuania). In spring 2003 it was forecasted that by the end of the year the internet penetration rate would exceed 30 percent, although in September the same was predicted for the summer of 2004 (*Ebiz.lt. www.ebiz.lt/print_article.php3/1/4595/4; "Verslo zinios," 2003.10.06).*

Graph E3.



Reference: World Bank March, 2002

Although internet use in Lithuania is increasing, it is still quite low as compared to the European level. According to the Flash Euro barometer 88 data, 41.9 percent of the EU population used internet more or less frequently in 2000 *(http://europa.eu.int/information_society/eeurope/2002/benchmarking/list/source_data_pdf/fl88va.txt).*

Differences of IST usage depend on personal revenues. Of all people earning over 1 000 Litas per month (approx. EUR 290), 46 percent had a computer at home and 19 percent were subscribers to internet services. And only 2.4 percent of persons whose income was less than 400 Litas (approx. EUR 115) had a PC, while none of them was connected to internet. This also explains divergences between rural and urbanized in IST usage areas.

Financial constraints were an important factor for the comparatively low level of internet access in the households. About 30 percent of all households without Internet access claimed that a high subscription fee and high user charges were the main reasons for this, while 22 percent indicated expensive equipment, and 7 percent indicated "other" reasons, such as limited technical possibilities of their computers, absence of conditions for households living in rented apartments or recently acquired computers. More than half of the households polled said they had no need to access Internet or use electronic mail *(International Trade Centre UNCTAD/WTO, October 2002).*

Table E4.: **Internet connections tariffs of "Lietuvos Telekomas"**

Plan	Peak time	Off peak time	Monthly fee	Additional fees	Type and internet connection speed (download/upload)	Notes
"Atviras takas"	Workdays 7 a.m. - 20 p.m.: LTL 0.11 - 0.15/ min (EUR 0.0318 - 0.04344/ min)	LTL 0.03/ min (EUR 0.00868/ min)	-	Connection fee – LTL 0.04 (EUR 0.0116)	Phone line: up to 64 kB/s(ISDN line - up to 128 kB/s)	Different tariffs are applied according to the time spent online
"iD1"	-	-	LTL 77 (EUR 22.3)	Subscription fee – LTL 99 (EUR 28.7), fees for surfing the net over the limit	ADSL :256/128 kB/s	60 hours / 1200 MB per month, and on holidays - without restrictions
"iD2"	-	-	LTL 39 Lt (EUR 10.7)	Subscription fee – LTL 99 (EUR 28.7), fees for surfing the net over the limit	ADSL: 256/128	60 hours / 1200 MB per month
"Tako zona"	7 a. m. - 6 p. m.: LTL 0.12 (EUR 0.0347)		LTL 118 (EUR 34.2)		56/ ISDN - 128 Phone line/ISDN	Unlimited access from 18 p. m. - 7 a. m.

Reference: Lietuvos telekomas

Table E5.: **GPRS and cable internet**

Plan	Tariffs	Additional fees	notes
GPRS Internet service by Omnitel	LTL 0.009/ kB (EUR 0.0027/ kB) – LTL 9.216/ MB (EUR 2.67/ MB)	-	Payment for downloaded/ uploaded volumes of information
GPRS Internet service by Bite GSM	LTL 3 -7 /MB (EUR 0.87 - 2.03/ MB) depending on mobile service monthly bill amount	-	Payment for downloaded/ uploaded volumes of information
Cable TV (Skaineta)	From LTL 69 (EUR 20)	Subscription fee LTL 135 (EUR 39.1)	For subscribers of cable TV network

References: Omnitel; Bite GSM; Skaineta.

Due to increased competition in telecommunications market (after the abolition of the monopoly of "Lietuvos Telekomas"), internet connection costs were lowered significantly in 2003, first of all by the telecoms and subsequently by operators of cable TV networks and providers of wireless connection. Until 2003 the use of internet by modem connection at non-working hours and 20 hours per month could raise a monthly bill of LTL 156 (EUR 45), which was about 15 percent of an average statistical monthly salary in Lithuania. In the second half of 2003 the bill for the same level of usage was only LTL 36 (EUR 10.4). Although internet services of cable TV networks have advantages to modem connection, the costs were also higher (approximate average EUR 30 in 2002) and even in the largest towns it was not available everywhere. The GPRS connection is mostly used by business people, while wireless connection (by radio waves) was expensive, about EUR 90 per month *(Baltnetos komunikacijos)*, so it was largely available for households by joint lease.

E.8. Conclusions

Business and households are sectors where the levels of ICT penetration are rising most rapidly. Providers of telecommunication services are playing a major role in this respect, both by providing ICT services and by representing the advanced level of IST. Other sectors, such as financial services and trade, represent the general tendency of growing ICT usage. Overall ICT penetration is lower in industrial sectors, although incoming foreign and domestic investments are changing the situation.

The public administration sector is lagging behind the private sector in terms of ICT usage. eGovernment in Lithuania manifests as having a website for almost every institution, although services provided on the net are scarce: mainly some information is provided and only one-way communication (either government to business or business to government) is possible.

Health services are one of the least influenced sectors in terms of advancement of information society technologies. Due to low levels of funding and an ineffective system of health care services, general conditions of work in medical institutions are not improving significantly. The computer literacy level among medical staff is quite low and health care institutions do not exploit ICT possibilities, such as connection to common databases, exchanging of urgent and relevant information, etc.

Recognizing the need for education on IST-related matters, the educational sector encounters the problem of absence of clear goals and concrete plans of IT implementation in education. The present infrastructure is sufficient to cope with computer illiteracy in schools, though computerization of schools is still recognized as a self-important goal but not as a means for achieving broader goals such as higher quality of education. Wider outcomes of the process (such as influence on learning of other subjects) are not analyzed and funding for the purposes is scarce and unstable.

Usage of internet and related services is really low in Lithuania, as compared to the EU level. Still, there are several positive signs: the competition in telecommunications market (after its liberalization since January 2003) has brought significant reduction of internet connection costs. eServices are becoming more popular among population as banks and other companies expand the supply of online services and their benefits. This, along with overall economic growth and increasing income of households, indicates the trends towards the improvement of situation.

E.9. SWOT analysis

Strengths • Expanding ICT-related sectors (telecommunications, IT industry and services) and increasing level of ICT usage in service sectors; • Steady growth of internet penetration in business and public sector as well as in households; • Private initiatives to support ICT infrastructure.	**Weaknesses** • Low level of ICT penetration in such sectors as education, health services, lower-tier municipal institutions; • Narrow scope of eGovernment services, a lack of detailed and sound public policy on the matter.
Opportunities • Growing competition in ICT services diminishes costs for end-users and offers new services; • Recognized need for expanding eGovernment services; • Private initiative pursuing social goals (such as internet penetration, ICT literacy) have a snow-ball effect attracting both private and public partners; • Diminishing costs for internet and hardware speed up the internet penetration in households.	**Threats** • Insufficient pace of growth of ICT penetration in public sector and households; • Inefficient use of EU funds for IST projects.

F. INSTITUTIONAL CAPACITIES AND REGULATORY BACKGROUND

F.1. Telecommunications

F.1.1. Regulation/deregulation

The last amendments to the law on Telecommunications came into force on 1 of January, 2003. It has brought essential changes into telecommunications regulatory policy in Lithuania. The law abolished a monopoly right for the fixed telephony of "Lietuvos Telekomas"; set Communication Regulatory Authority (CRA) as independent regulator of telecommunications market with the obligation to guarantee an effective competition (based on the 25 percent SMP concept); abolished licensing for telecommunication activities that need no radio frequencies; defined radio frequencies allocation procedures; defined the rights of the users, including the carrier (pre-)selection and number portability right (comes into force from 2004) and to receive universal services. The law states that the loss of providing universal services is compensated by the decision of the government and by means of the service providers. The procedures as well as the scope of the services shall be decided by the government. In spring 2003 the latter decision was not announced. The law was prepared with respect to the old (1998) EU telecommunication regulatory framework, but some provisions, such as abolishment of licensing, carrier (pre-) selection and number portability right, come from a new framework (2002).

In order to comply with the new EU regulatory framework after accession, the Lithuanian Government has adopted a conceptual framework for the Law on Electronic Communication (2003). The new law will have to embody three aspects: technological convergence, a more flexible regulation (making the sector-regulation closer to general competition rules) and closer cooperation of the regulators in the EU. A part of needs caused by technological convergence - namely integration of regulating institutions and procedures of different communication service providers, including the procedures for radio spectrum allocation - is not foreseen in the Lithuanian framework. Telecommunication regulator (CRA) will continue to deal with telecommunication providers and the broadcast regulator - the Radio and Television Commission of Lithuania - with the broadcasters separately. The law on Electronic Communication is under preparation and is planned to be adopted at the end of 2003, or the first half of 2004 at the latest.

LFMI considers that the first versions of the draft law show a further tendency to increase the rights of CRA to regulate in terms of the scope of regulated activities, a variety of tools (including the price cap), the right to make a final decision and the level of intrusion. On the other hand, no provisions are foreseen to secure separation of legislative and control functions of CRA and to increase its responsibility for actions harmful to consumers and service providers. Seeking to escape any corrections to the CRA's policy, a provision that decisions of CRA are not suspended during the case investigation in court is included into the draft proposal of the law on e-communication.

Present practice of telecommunications regulation is rather controversial. First of all, 52 by-laws to the amended law had to be prepared in half a year. The by-laws were prepared by CRA and there was no time left for any discussions with the operators and the public. In general the provisions clearly exceed the principles of minimum regulation level and proportionality that are declared in the EU directives as well as in the law. CRA also considers interconnection prices as an obstacle to competition among all operators and aspires

to regulate them.

Meanwhile, already in January CRA announced SMPs (Significant Market Power) in four markets - public fixed communication networks and services - incumbent operator "Lietuvos Telekomas"; leased lines services - "LT"; public mobile communication and services: "Omnitel" and "Bite" (two from the existing three mobile operators); national network connection - "LT" and "Omnitel". It also assigned the obligations for SMPs foreseen by law: transparency, non-discrimination, separation of accounting, obligation of network connection, transparency and access to the infrastructure, etc. Mobile operators took CRA to court. CRA submitted an appeal, which was rejected by the court and the obligations for the SMP operators were suspended. In May 2003, the court satisfied the complaint of the operators: it repealed SMP status and all obligations set up by the CRA for "Omnitel" and some of the obligations for "Bite" (according to the requests provided in their complaints) (*Baltic News Service, 16 May, 2003*).

F.1.2. Conclusions

1 A positive fact of telecommunication regulation was to abolish exceptional rights for providing fixed communication services: since 1 January, 2003 this market has been liberalized;

2 A positive fact of the change in the institutional setup was to establish CRA - as an independent (from the Ministry of Communication and the Government in general) regulator;

3 The trend to increase exceptional (with respect to general competition policy) regulation of telecommunication both in terms of the scope of activities and in-depths of the rules, is a negative one;

4 Extensive regulation is embodied in legislation (first of all by providing CRA with strong authority and powerful tools to intervene into business activities) and results from the tendency of regulating bodies to exercise their powers without relevant respect to market rules;

5 There are efforts to adjust legislation to technological convergence by converging some of regulations, however institutionally and in terms of most procedures (e.g., allocation of the spectrum) regulation remains separate and for some activities - double;

6 Intrusive regulation of telecommunications violates the interests of consumers as operators have to take a heavier burden of regulation costs and the targets of regulations not always are wanted by consumers. The initiative and motivation to invest in these businesses is much suppressed. It has a crucial impact on information society, as the telecommunication sector is the most vital driving force for its development in Lithuania.

The corresponding institutional implementation capacities have been described above, in chapter B.

F.1.3. Privatisation

In July, 1998 "Amber Teleholding" (50 percent "Telia AB" and 50 percent "Sonera OY") acquired 60% of Lithuanian Telecom and the company was transformed into a joint-stock company AB "Lietuvos Telekomas". The investor paid LTL 2.04 billion or LTL 4.17 per share (EUR 0.45 billion or EUR 0.9 per share at 1998 rates). It was the most expensive privatisation deal in Lithuania. The company was granted exclusive rights in fixed

telecommunications till 31 December, 2003 and the right to raise service prices by 10% plus inflation annually. In 1999, 5 percent of AB "Lietuvos Telekomas" was transferred to employees at a nominal price of LTL 1 (EUR 0.23). The employee's obligation was to keep shares from trading for 1 year, except trading between employees.

In 2000, 25 percent remaining state-owned shares of AB "Lietuvos Telekomas" was sold on London and Lithuanian Stock Exchanges. This was the first time in Lithuania when the company shares were sold in such a way. The 10 percent left over shares remain a property of the state and the rest of shares are traded on Lithuanian and London (Global Depository Receipt programme) Stock Exchanges *(State Property Fund).*

Box F1. "Lietuvos Telekomas"

Till 2003 the Company has already invested over 1.8 billion litas (0.5 billion euros in 2003 rates) into modern technologies and digitalisation of its network, the part that is invisible to the majority of people. In 2002 more than 80 per cent of investments were allocated for modernisation of the network. This allowed the Company to complete digitalisation of its network in five largest cities of Lithuania. In late 2002 the rate of the network digitalisation reached 88 percent, some five years ago it was 20 percent. "Lietuvos Telekomas" continued developing its ADSL-based access network. Currently, ADSL services are available to 85 per cent of "Lietuvos Telekomas"' customers. The Company offers several *"DSL Takas"* service plans with different speed and price schemes. During 2002 the number of ADSL users increased from 2.4 thousand (end of 2001) up to 10.5 thousand.

"Lietuvos Telekomas" offers its customers a broad range of new modern voice telephony (ISDN Duetas, Directory Inquiry Service 118, lines 900, 800, 700, telemarketing services, etc.), Internet (Tako Zona, ISDN Takas, DSL Takas, Tako Pastas, etc.) and data communication (broadband, videoconferencing, leased lines, etc.) services.
In 1998 Lietuvos Telekomas had ten thousand employees, in 2003 - 3.4 thousand.

The Company allocates substantial funds for implementation of support programmes and educational projects. One of the major long-term projects is the education support programme "Kompasas" (years 2000-2003). Lietuvos Telekomas is one of the founders and sponsors of the alliance "Langas i Ateiti*" (Window to the Future*). The aim of the alliance is to encourage Lithuanian people to use Internet at a larger scale thus raising the standard of living and improving competitiveness of the country.

Lietuvos Telekomas' Group, i.e. parent company and its subsidiaries, currently employs more than 4 thousand professionals. The Company regards its qualified and experienced employees as its invaluable asset. Employees are provided with excellent opportunities to study and improve their competence as well as have good career prospects.
References: Lietuvos telekomas; "Lietuvos rytas" 14 July, 2003

F.1.4. Conclusions

6 Privatisation of "Lietuvos Telekomas", despite the provision of the exceptional rights, was the most positive act in telecommunication policy;

7 To complete privatisation in this field, the last state owned telecommunication operator (performing a mixture of public and commercial functions) - Lithuanian Radio and Television Centre (LRTC) has to be sold.

F.2. State Registers

A present condition of the state registers is a big obstacle to IS development in Lithuania. The major shortages are (1) an overall lack of integration, (2) an out-of-dated technical base, (3) poor data and poor management (in some registries). Without register integration public institutions can not exchange information efficiently and can not provide the citizens with eServices of one-stop-shop principle (though, this principle is declared as a goal in numerous policy documents and statements). Without this principle, most of eGovernment services loose their sense, as people have to approach different institutions and carry paper documents with them anyway. No eGovernment neither eBusiness services based on poor data can be reliable (such inconsistencies as duplicated IDs in the registers or duplicated registers make eServices of very low value). Existing administrative set-up, based on institutional autonomy, and out-of-dated technical base do not allow creating eServices of good quality (if any).

A survey "The Status of the State Registers and Databases: analysis and evaluation", carried out by company "Sintagma" in 2001, concludes that the legal background is incomplete: requirements are numerous, but in practice the entire legal part is in place only for 5 per cent of the registers. This is mainly due to the lack of resources and poor management. Interconnection between different parts of a register is insufficient: a legal entity, a physical data base and information technologies are often treated separately. Usually the latter two parts are underlined at the expense of the first one. Creation of the registers is hardly coordinated at all. Sixty-three per cent of the registers are financed from the state budget. Fifteen per cent are self supportive, namely the Real Estate Register-Cadastre, the Register of Pharmaceuticals and the Register of the Road Vehicles. The registers' levels of modernisation differ markedly.

Box F2. Real Estate Register-Cadastre - presently a state enterprise "Centre of Registers" (www.kada.lt)
The company was established in 1997 under the Ministry of Justice as a profit seeking organisation. It carries out cadastre work, legal registration and valuation of land and other legal property. Since 2002 "Centre of Registers" has been assigned as a manager of the Register of Enterprises.
The enterprise is comparably well equipped in technical terms and provides customers with some eServices (e.g. possibility to order certificates electronically, search in both registers). Some services are public, some - charged. The register is self-supportive. Nevertheless, the procedures for the users are long and costly. The service provider is a pure monopolist and most of the services it provides are not optional for the citizens (such as different certificates demanded by other institutions or banks).
LFMI considers that the activities of this enterprise clearly demonstrate that when a certain technical level is achieved, economic concerns become urgent. In order to solve them, preconditions for the competition should be created.

These problems were acknowledged by the Government and a **conceptual framework for Integrated System of the State Registers** was adopted in 2002. Besides a primary goal - to integrate the main registers - some new provisions on data supply activity, which are important for business, were foreseen. Namely, it is stated that distribution of data can be performed by private companies on competition basis. A framework implementation plan was prepared by the institution in charge - Information Society Development Committee - in 2002, though not adopted by the Government yet. According to the plan, the central legal act on state registers - the **law on the State Registers** is being amended to put it in line with the

conceptual framework. Provisions for integration, quality and efficiency were foreseen in the draft law (April, 2003), namely: data input shall take place in the sole register and shall be circulated among the appropriate registers; managers of the registers (that have to be state institutions or state-owned companies) are obliged to treat equally competing data distributors despite their type of ownership (presently outsourcing is impossible in practice and in a part of registers - legally as well); requirements for private entities, willing to be engaged in data distribution business, shall be listed in the by-laws; supply of the information free of charge is provided for the subjects of the register, related registers, courts and law enforcement institutions for carrying out their functions (present law provides this for all state institutions). After this law is adopted, respective amendments to the specialised registers will follow.

F.2.1. Conclusions

- Integration of the state registers is one of the major preconditions for eGovernment and eBusiness services to develop;
- Despite a rather good understanding of the problem and a rather good quality of conceptual framework, the integration process is doomed to be slow and costly due to the institutional interests, unreformed public administration system and a tendency towards simple centralisation (instead of soft integration);
- Competition, if allowed in register-data distribution market, could move the process quicker.

F.3. eSignature

The **law on Electronic Signature** came into force rather early - on 11 July, 2000, however the law wasn't functioning due to several reasons. First of all, the law appeared to be pure transmission of EU legislation, without relevant respect to the market concerns. The law foresaw the same legal force with hand-written signature only in the case of Public Key Infrastructure (PKI) qualified-certificate. Thus, technological neutrality of eSignatures was not preserved in the legislation. To meet the market demands and technological neutrality principle**, amendments to the law** were adopted in June, 2002. According to the amended legislation, eSignature has the same force as a hand-written signature and shall be admitted as evidence in court if the parties agree. This change of legislation made new eServices and tele-services possible - especially those provided by banks, as they already had their own user authentification systems for eBanking. The latter approach is also supported by the Civil Code (effective from July, 2001) which states that eSignature is equated to the hand-written one if it is possible to identify the person and the text is protected. However, public institutions are reluctant to use eSignature equivalents existing in the market and do not provide eServices at the excuse of the infrastructure absence for the qualified certificates services, based on PKI.

Another reason for non-functioning of the law (2000) was institutional - the law foresees an eSignature Supervision Institution, which was appointed only in April, 2002. The functions of eSignature supervision are assigned to the Information Society Development Committee which is in charge of secondary legislation, registration of service providers, voluntary accreditation and supervision. A set of by-laws, such as "Requirements of signature equipment," "Requirements for certification service providers issuing qualified certificates," "Procedure of registration of certification-service providers issuing qualified-certificates," "Procedure of eSignature supervision" were prepared by the Committee in 2002.

In 2003, there is no qualified certificate provider in Lithuania. The Central bank is creating

one for its own use (communication with the European bank and Lithuanian commercial banks) and has not been planning to provide public services so far. According to the specialists and analysts, the amendments to the law on eSignature haven't solved all important problems of its application, especially regarding the use of eSignature of a legal person and archives of eSignatures as well as eDocuments themselves. The idea to create state-owned infrastructure for qualified certificates is periodically on the agenda at different levels of IST policy. This idea is very attractive to many IST sphere officials and politicians (The supervision institution - ISDC is strongly in favour of this), but the budget constrains have sustained the Government from being involved in this expensive and risky business so far. Due to the same reasons, former ambitious plans to introduce ID cards carrying eSignature were made more according to the market demand and ID cards were produced without eSignature.

F.3.1. Conclusions

- After the law on eSignature has been amended and the new Civil Code entered into force, legal preconditions for eSignature services to function are being created, but a legal uncertainty exists due to a lack of courts' practice in applying the new Civil Code in general and provisions on e-issues in particular;
- eSignature services, though not based on PKI, exist in the market and are provided mainly by the banks;
- eSignatures with qualified certificates are requested from the security point of view, but they are not feasible from the economic point of view so far. Provision of this service on public money would be an inefficient and socially unjustified action, harmful for competitive eSignature market development.

F.4. Internet

The Internet, as a transport to carry information is subject to the law on Electronic communication that is presently (2003) under preparation.

The content of the Internet is regulated by the **"Procedures for harmful information control and restricted public information distribution in public computer network,"** approved by the Government in March, 2003. The statements of Procedures derive from other Lithuanian legal acts and European experience in providing a safe Internet. Both legal provisions and self-regulating means are foreseen in the Procedures. There are many public and private organisations involved in safe-Internet matters: the Information Society Development Committee, educational institutions, the Ministry of Culture, the Ministry of Education, the Ministry of Interior, the Police, the Ethics Commission of Journalists and Publishers, etc.

Another recent (April, 2003) document related to Internet content is a Government decision **"On General Requirements for the Internet Sites of the State Institutions."** The goal of the document in general is to improve the quality of the state institution's internet sites. There are requirements for the general structure, items of mandatory information, restrictions on commercial use, requirements for updating and information in foreign language, a possibility to ask questions and to receive answers in e-form foreseen in the document. Some technical requirements (such as data formats) and management of the site are defined as well. All state institutions have to comply with the regulations until July, 2004. ISDC performs annual monitoring of the state institutions' sites.

F.4.1. Conclusions

- Despite a big concern of numerous public institutions, so-called "safe Internet" can not be secured by administrative measures. Therefore actions pursuing this goal tend to have negligible effects;
- Standardized requirements for the Internet sites of the state institutions are needed, as separate institutions, being not market agents, lack motivation to provide their "consumers" with convenient services (such as information in English or timely updates).

F.5. Copy-right protection

Copy-right is regulated by national legislation, international treaties and conventions. Liability for copyright infringement is foreseen by the Code of Administrative Violations. Collective administration of the copyright is carried out by the Agency of Lithuanian Copyright Protection Association (LATGA). Collective administration of the related rights is carried out by the Agency of the Association for the Protection of Related Rights (AGATA), which was set up in 1999 on the initiative of performers and producers of phonograms. The rights of the authors of computer programmes and databases and their successors in title are administered by the "Infobalt Copyright Agency" established in 1997. The Ministry of Culture is the institution, responsible for the implementation and coordination of the copyright policy in the country.

A conceptual framework for Copyright and its implementation plan for 2000-2003 were adopted by the Government in 2000. It stated in the Framework that according to various sources, the illegal market of products under the copyright exceeds the legal one several times. Lithuania also is one of the transit countries for illegal production. General attitude of the population towards this issue is rather tolerant, which is greatly influenced by economic factors such as a large difference in prices between legal and pirate production and lower purchasing power in comparison with many countries-copyright holders. The major goals of the conceptual framework are the following: to create an efficient legal base for copyright protection, to improve its enforcement and to change public opinion through educational and information campaigns.

One of the first steps was to revise the law on Copyright and Related Rights (1999) with respect to the EU directive 2001/29, Lithuanian membership in WTO and a new Civil Code.

According to the "Infobalt Copyright Agency", which deals with software copyright issues, a continuing improvement of legislation is one of the most important factors for achieving an effective intellectual property copyright protection. Another major target is public opinion and apprehension of pirates, copying, usage and distribution of illegal software.

Box F3.: Survey of legal SW use by IT professionals, end-users and academic youth, Infobalt, 1998 (444 respondents)

According to **IT professionals,** an average share of legal software in their companies is 62%. The legalization of pirated software is already being started in 29% companies and 41% of IT professionals think that the companies they work for will start the process in future.

There are several reasons why the companies choose the legalization path. Besides the legal amenability taken up if pirated software is used (89% of IT professionals know this well), there are problems arising when the illegal products are used. The most common problem mentioned by 48% of IT professionals is a lack of the software vendors guarantees for the technical assistance. No information on upgrades and no manuals for usage are also important shortcomings disturbing a fluent and successful business.

End-users work with computers mainly both at home and at work (46%) or only at work (34%). Fifty nine per cent of end-users definitely know that a part (10% that all) of the software installed in their computers are pirated. An average share of legal software in end-users computers is around 50%. The intentions of the legalization of the pirated products are mentioned by 33% of this group of respondents. The main problems arising when the illegal products used are also mainly a lack of the software vendors guarantees for the technical assistance (50%) and no information on upgrades (36%).

It is supposed that our end-users do not understand properly the seriousness of the illegal software copying or downloading because 65% of them believe that pirating is only a breach of the copyright, but do not consider it as a crime equal to theft (only about 30% of end-users consider it being a serious crime like theft).

According to **academic youth,** legal software in the computers they use makes 41% in average of all the software installed. Most of the young people (82%) think they are able to distinguish a pirated and legal software.

Half of young people similarly to end-users consider pirating only as a breach of the copyright (50%), but do not think about it as about a crime equal to theft. Around 40% of youth consider it being a serious crime like theft.

Reference: Infobalt, www.infobalt.lt/agentura/english/visi/english.htm

As the "Infobalt Copyright Agency" states, a lot IT users in Lithuania are not aware of the software licensing rules and sometimes a lack of knowledge makes them to become pirates. In years 1999-2000 the Agency together with the biggest software vendors (MS, Novell, Symantec) carried out a broad public anti-piracy campaign, including direct e-mailing for enterprises, targeted seminars and Internet advertising. This intense campaigning had substantial results - the rate of pirate production, as Microsoft Baltic announced, decreased by 11 per cent during the year. In spring 2000 the Agency has started the Software Register which is another tool for pirating prevention. In 2000 BSA Lithuania (Business Software Alliance, see Annex B3.) was established which took over foreign vendors interest representation, the Infobalt Agency now is more focused on the protection of local SW producers' rights.

According to the Agency, in 1999 the pirated software made around 81 percent of Lithuania's software, in 2002 - 65 percent (business applications packages). The most recent survey of BSA shows that the level of pirated software decreased to 53 percent in 2002 (in 2001 it stood

at 56 percent) and that the opinion of the society towards this issue is slowly changing. BSA has a target to decrease this level to 35 percent until 2005 (*"Verslo zinios"2003.06.04)*. Since 2000 Lithuania (as well as Latvia) is included in the list of the countries where copyright protection is considered insufficient. According to the report of the US Trade Mission, the copyright legislation in Lithuania is improving, but its enforcement remains a problem (*"Verslo zinios," 6 May, 2003*).

Box F4.: Survey of enterprises "Tax administration and property protection"
The survey was carried out in March 2003, as a part of LFMI project „Protection of Ownership Rights and Public Policy on Economic Sanctions". Half of the survey participants think that intellectual property is protected less than other forms of property in Lithuania. Twenty nine per cent state that they are treated equally. Weaker protection was emphasized more by small business and trading companies. Difference in protection of intellectual and other type of property was not identified more often by industry and big enterprises.

The majority (52 percent) think that intellectual property shall be protected at the same level as other types of property. Special (higher) attention for its protection would be given by 20 percent of those polled.
References: Lithuanian Free Market Institute, www.freema.org; Lithuanian Free Market Institute http://www.lrinka.lt/Projektai/index.phtml, 2003.

Unlicensed software used to be a big problem for public administration institutions (especially antivirus and word processing). To solve it is one of the directions of the information society policy. In 2001 the Information Society Development Committee launched a project, the goal of which is to license the software, used by public administration institutions until 2004. The Committee collects applications from the institutions and purchases needed software on the tender basis. According to ISD Committee, the number of applications of 2003, in comparison to 2002, is decreasing. However, bearing in mind initial situation and the amount of money spent for purchasing SW for public administration institutions, the problem remains unsolved. Different ways how to proceed are being analysed by the Committee (centralised or un-centralised purchasing). One of the provisions related is open source promotion activities, as for example, within a pilot project Open Office that was installed in the Ministry of Environment, a department in the Ministry of Education and Ministry of Interior.

F.5.1. Conclusions

- The level of pirated software, though being comparably high, is gradually decreasing and public opinion is changing towards recognition of the intellectual property as respectful equally with the other types of property;
- Pirated software in public administration institutions remains a problem;
- The level of pirated products, despite public opinion, depends also on the level of income and most of all, on the level of prices for the intellectual products considered by people to be reasonable. Bearing in mind that the level of income in Lithuania and in the developed countries differ much more than prices of intellectual products in the respective markets, the existing level of pirating is expectable;
- Strict punishment actions to combat piracy evoke a strong resisting reaction and can non-proportionally damage small businesses.

F.6. Privatisation and de-regulation of other services

Private ownership makes about 72 percent in Lithuania today *(Government of the Republic of Lithuania, www.euro.lt, 2002).* Privatisation and economic restructuring are being continued. The privatisation of Lithuania's commercial banks ended in March 2002 with the sale of a 76.01-percent state-owned stake in the Lithuanian Agricultural Bank to the German "Norddeutsche Landesbank Girozentrale." Today all banking, lease and insurance market is private. Financial sector market is an open market - restrictions for foreign capital have been abolished several years ago.

The restructuring of the energy sector is underway. In May, 2002 thirty-four percent of the Lithuanian Gas company was sold to a strategic investor - a consortium of the German "Ruhrgas" and "E.ON Energie." Another 34 percent of the Lithuanian Gas is to be sold to a gas supplier, very likely to the Russian "Gazprom." The "Lithuanian Energy" split into five enterprises. The separated companies, including the "Eastern Distribution Network," the "Western Distribution Network" and the "Mazeikiai electrical power plant," are now scheduled for sale. Privatisation is expected to increase the efficiency of the energy sector, but newly adopted laws on electrical energy and natural gas set out a number of market constraints that may obstruct the accomplishment of this goal. For instance, the laws envisage licensing of all activities in the electrical energy and natural gas markets and territorial restrictions on the construction of electrical energy distribution networks and natural gas distribution systems. However, in the future the price of electricity will depend on integration of Lithuanian energy system into the Western European one. Lithuania and Poland have jointly asked for the EU support to building a power bridge between these countries. Some restrictions for foreign capital (in general or non-transatlantic community) have been applied in some privatisation cases of energy enterprises.

The 2003 privatisation programme also includes the Lithuanian Airlines, the shipping companies "Klaipedos Transporto Laivynas" and "Lietuvos jurų laivininkyste," established in June 2002 after reorganisation of the privatised "Lisco." Reform of Lithuanian Railway is foreseen by a number of policy documents and legal acts, but is hasn't been started yet. The plan is to separate the operator from the infrastructure, which will remain state owned. Private operators would be allowed to use the infrastructure and to compete. This reform most likely will be promised and started, but there is a very little probability that any significant changes will be carried out in the short and mid-term future. Road haulage transport is entirely private and due to big share of transit, actually operates according to the EU and international regulations.

F.6.1. Conclusions

- Privatisation and deregulation are most important preconditions for the growth of competitiveness, development of new products and services as well as its quality;
- Privatisation process in Lithuania is rather successful, though there still are entities to be privatised;
- Deregulation is going much slower, often becoming re-regulation (like in case of telecommunications), which is a wasted opportunity for the development of the sector and growth of the living standards.

F.7. SWOT analysis-IS

Strengths	**Weaknesses**
• Big share of private property, ongoing privatisation; • Almost finished privatisation of ICT market; • Liberalised telecommunication market • Strong competition in mobile telecommunication market; • Finished transmission of *acquis*.	• Lack of skills and understanding due to the new and fast-changing subject; • Out-dated system of public administration, narrow institutional interests • Unstable regulatory environment; • Overregulation of telecommunications; • Wide-spread believe in ability to solve all problems by administrative measures, disregard to market laws; • Inexperienced regulatory bodies, if their policies are right.
Opportunities	**Threats**
• To redesign public administration and to cut bureaucracy using the EU know-how, financial support and spirit of changes; • While drafting new laws to leave behind administrative and intrusive regulation systems and to implement rules that support innovations, a variety of services and investments in telecommunications, data distribution, Internet services, eSignature services, etc.; • Inexperienced regulatory bodies, if their policies are faulty.	• To delay the reform of public administration and other structural reforms, to make it formal or pursuing improper goals; • To increase centralisation of registers and to suppress any competition in the field of data supply; • To start one or several of periodically appearing initiatives of new commercial projects, based on public funds.

All the factors in the above SWOT are estimated by the authors to be the most relevant to IST-related developments in the country.

G. EDUCATIONAL SECTOR (SECONDARY AND TERTIARY), LABOUR FORCE SUPPLY, TRAINING IN IST-RELATED SUBJECTS

G.1. Achievements in secondary and tertiary education

As stated in the World Bank's "Knowledge Economy Report," while adjusting to economic changes developing countries are faced with greater challenges than OECD countries. First, they must overcome long-standing problems: expanding coverage to achieve universal access to basic education, expanding secondary and tertiary education, and implementing institutional reforms to strengthen the linkages between formal and non-formal education and the labour market. Second, developing countries need to raise the quality of education through changes to content, pedagogy, and the use of modern technologies, as well as cost-effectively expand access to post-school learning for adult learners (*World Bank, March, 2003*).

In the case of Lithuania, the target to expand coverage of education is not a topical one. According to the data presented in the WB Report, adult literacy in Lithuania is 99.5 percent, which exceeds respective indicators of Western Europe (EU countries 98.8, G7 - 99 percent). According to the Eurostat, the proportion of people aged 30 to 34 with tertiary education qualifications was 43.4 percent in 2000, which is the highest indicator among EU member countries and candidates. *(Eurostat, 2002, Figure F12.).* The number of enrolled in tertiary education is one of the biggest in the world, markedly exceeding the OECD average: 78 and 45 % of secondary school graduates enrolled in tertiary education respectively *(Nacionalinis susitarimas, 2003).*

According to Lithuanian statistics, enrolment in all levels of education is increasing, and unemployment of university graduates is low (see Annex G.). There are twenty six higher education institutions in the country and 40 students in tertiary education per 1 000 inhabitants (*Conference "ES issukiai aukstajam mokslui" (Eng. EU challenges for higher education), Vilnius 5 May, 2003.*). However, the rest of the challenges mentioned by the World Bank are of imperative for Lithuania.

Important changes to content, pedagogy, and the use of modern technologies may also be indicated, but these novelties have not changed the structure and the essence of education. Quality, applicability, cost efficiency and flexibility according to the needs of the user are not at the level expected by society from the educational system.

G.2. Reforms in secondary and tertiary education

Lithuania is implementing some comprehensive reforms in secondary education. At present the network of secondary education institutions is being reorganized. This reform is closely connected to the reform of the education model itself. Until the beginning of the reform, twelve-grade education consisted of three stages: 4 - 5 - 3 years. A new model split it into 4 - 6 - 2 years with the first ten years being compulsory universal education and the remaining two years being gymnasium grades. Before the reform (and in most cases up until now) a child used to finish the 12^{th} grade at the same school where he or she started education at the age of six or seven. Now, especially in cities, the system is being gradually reformed into a model containing three different schools: first a child goes to a primary school for four years, then to a secondary school until the 8^{th} grade, and finally to a gymnasium (upper secondary education). During the transition period different models that do not fit into the new system are allowed. The reform is being administered by municipalities in quite a different manner and at different pace.

Up until 2000 schools were financed from municipal budgets on an institutional basis with no clear principles of resource allocation. In 2000 the system was reformed along the new principles. First of all, approximately two-thirds of necessary resources are allocated not on the institutional basis, but according to a formula based on the number of schoolchildren of a particular school and adopted by using several variables (the size of a city, grade, etc.). The amount of finances which goes after a pupil is called "a pupil's basket". Second, this part of finances comes from the state budget through municipalities, but not from municipal budgets. Third, it is allocated to all private schools on the same basis as to municipal ones.

Education programmes, textbooks and other materials have changed dramatically during the past several years. Education is not very integrated until now, but there are many changes in education programmes with more integrated programmes, more choice of subjects, and a more democratic environment at schools.

Many changes have been made in tertiary education, but tertiary education has not been reformed in the same manner as secondary education. The main difference is that the autonomy of universities has always been a top priority. The main changes are the emergence of non-university higher education in 2000, the introduction of bachelor's and master's degrees instead of a specialist diploma degree, and the rise of the private sector in tertiary education.

Education of about a half of all students in public high schools was financed 100 percent by the state, while the rest of the students in public schools and students in private institutions paid full market price for their studies. The financing system of tertiary education was changed considerably in 2002. Fifty percent of students pay a uniform 1 000-litas (EUR 290) fee per year in any school for any course (those with turn in a good performance and who prove that they need financial support do not have to pay at all), while the remaining part of the costs is covered by the state. Students in private education institutions are not supported.

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

The goal to replace the soviet-style education system was for a long time the main factor affecting the development of education. During the past five years the main focus has been on becoming more integrated into the Western education and research area. Study programmes and curricula have and are being changed to implement more democratic and innovative methods of learning, to use more modern technologies (which are still not sufficient, primarily because of financial reasons), and to adapt the whole education system to European standards.

The number of school children was increasing because of a high birth rate around 1986, but it has been falling steadily because of low birth rates in recent years. The evolution of secondary education is mostly affected by the secondary education reform. It is also important to note that municipal and state-owned schools are not financially independent and are heavily regulated.
There was a tendency to give more autonomy to institutions of tertiary education, but the trend has been reversed and the regulations were tightened. Financially institutions have become more autonomous because their budgets are approved by the Parliament, not by the Government. On the other hand, however, a funding mechanism that dismisses the elements of a market from tertiary education has made this autonomy but formal.

Private high schools are discriminated both in the phase of establishment and during

operation. To establish a private educational institution: (1) a permission to conduct an educational activity is required (not required for state (municipal) institutions); (2) natural persons are not allowed to establish a school; (3) the establishment of private high schools is a politicised process. In the operation phase private schools are discriminated in the following respects: (1) students in private schools, unlike those in state-owned schools, do not receive public financing; (2) private schools are discriminated in allocating quotas for subsidised study loans; (3) students in private schools, unlike in state-owned schools, are not eligible for scholarships; (4) despite a much lower level of financing, private schools are controlled and regulated to the same extent as state-owned schools, and in reality this controls is even stricter.

Study programmes tend to cover more specific areas and to include less general programmes even at the universities. Study programmes are basically approved on the initiative of tertiary education institutions and their agreements with the Ministry of Education and Science. There is still a tendency to have more programmes (and students as well) in social sciences and (though not to that extent) IST-related sciences. Presently about 700 IT specialists are prepared annually in the system of tertiary education in Lithuania (output of IT specialists has been increasing during last years). The number of students is also steadily increasing, as is the number of students studying for a second time and seeking a second profession. IT specialists still are one of the most wanted in labour market.

There is a strong tendency towards establishing more institutions of tertiary education: some institutions have been established in the regions on the basis of big national universities and several new private institutions have been established (though there are very tight and bureaucratic requirements for establishing a private education institution). On the one hand, comparably more institutions are specialised, on the other, interdisciplinary studies get more widespread gradually. A tendency exists to open branches of foreign universities in Lithuania. A new trend may also be observed towards opening more tertiary institutions for non-university higher education.

Institutions of tertiary education are faced with significant problems related to teaching personnel. Professors are usually either above 50 or under 30. Many professors and almost all the best teachers do not treat teaching as their main activity - most of them work in business. Fewer young people seek PhD than is needed to satisfy the needs of universities. According to the Ministry of Education, some 500 PhD graduates are needed annually to satisfy the need of high schools, while the actual number of graduates does not exceed 200. On the other hand, the figure 500 is not sufficiently grounded. A demand for high schools can be overestimated due to the fact that research and teaching are not separated in universities. PhD studies are of lower prestige than in the past (especially in the Soviet times when most talented young people used to choose this type of career), consequently there is less competition and lower-quality output.

“Brain drain” is a problem in some cases (see the Box below). Staffing problems are especially severe in new institutions of non-university tertiary education. On the other hand, those professors and institutions who satisfy strict formal requirements do not necessarily offer really good quality.

Box G1.: Indications on the size of "brain drain"

According to the sociological survey (Sprinter), at the end of 2001 approximately 200 thousand Lithuanian inhabitants were living abroad. Most of them left the country for one year period. It is forecasted that some 40 thousand more people will leave Lithuania in the near future. Departing people are usually younger, better educated and single. *(European Committee, "Socialine apsauga Lietuvai istojus i ES", 2002 (Eng. Social Security after Lithuania's accession to the EU, European Committe of Lithuania).*

Historically Lithuanian emigration was oriented towards the US, Canada and Australia. Presently emigration to the EU countries (UK, Ireland, Germany, Norway, Sweden and Denmark) is increasing and will continue to increase as Lithuania joins the EU. People are leaving abroad to study and to look for better paid jobs (National Labour Exchange).

According to a survey of the National Labour Exchange "Would you like to work or live abroad?," 8.9 percent of the respondents expressed their wish to leave the country; 54.2 percent would like to do it for some period of time, and 26.5 would not like to leave the country *(Farmacija ir laikas, 2003)*

According to a survey on the employment of recently trained persons carried out by the Institute of Labour and Social Research, 18 percent of university and college graduates tried to get jobs abroad in 2002 (8 percent in 2001) and 72 percent of them succeeded. Only 15 percent of the employed abroad worked in their professional field. The survey results suggest that a bigger share of present students would prefer to be employed in the US than in the EU or other countries. Students of informatics and informatics engineering as well as of religion and theology consider their education to be appropriate for employment abroad most often of all. *(Statistics Lithuania, 1/2003, p. 25-27).*

New forms of education are being introduced. The demand for general education for adults by distance learning is increasing rapidly. In 2002 adult participation in lifelong learning was 3.3 percent in Lithuania *(European Commission, 2003)*. In 2000-2001 school-year 14 000 adults studied in adult centres and schools, of which 2 500 studied extramurally (see Annex G).

At the moment teachings for several professions are provided with distance/part time refresher course, e.g.:

- around 130 specialists have graduated courses on methodology of distance education;
- since 1995 distance refresher courses on finances and banking are provided with commercial consideration by public institution "The Lithuanian Banking, Insurance and Finance Institute." More than 4.5 thousand public officers have already attended these courses;
- since 1998 a distance learning program on special English is provided with commercial consideration by Public Service Language Centres.

In 1995-1999 while implementing PHARE multilateral distance learning program Vilnius Distance Studies Centre and Kaunas Regional Distance Education Study Centre were established. For implementing this program, the Ministry of Education and Science has established a budgetary institution "Lithuanian Extramural Education Centre" *(Ministry of Education and Science, 2003).*

Box G2.: Lifelong learning. Kaunas Regional Distance Education Study Centre
The number of continuing education students in Lithuanian universities in the year 2000 was 27 000. Majority of them have studied in Kaunas Regional Distance Education Study Centre at Kaunas Technology University, which in 1999 joined SOCRATES program University Continuing Education Thematic Network THENUCE and acquired rights for establishing Baltic Relay Centre). KTU, together with other Universities and education centres, provides courses on:
- European Law and Institutions (EUROLI)
- European Law in the Fields of Trade and Services (EUROLAW)
- Introduction into Distance Studies
- Information Literacy and MS Office Professional Skills (INFORA)
- Upgrading Skills of the English Language (MEBA)
- Basics of Computer Literacy for the Disabled (ADIS)
- Information Technology Skills for Disabled Youth (ITSDY)
- Others

Reference: European Thematic Network in University Continuing Education

G.4. Tertiary sector and research performance (IST)

Some institutions of tertiary education (universities and colleges) offer studies and perform research in the field of IST. However, only two institutions are known to be important centres of tertiary education and research in the field of information technologies and the most prestigious places to study IST: Vilnius University and Kaunas Technology University. Vytautas Magnus University, Vilnius Gediminas Technical University, Klaipeda University, Siauliai University and other institutions of tertiary education are also involved in research. The State Institute of Informatics and Mathematics is a research but not educational institution. Kaunas Technology University and Vilnius Gediminas Technical University are big centres of research in engineering.

The largest institution of tertiary education - Vilnius University - specifies “Technologies of Information Society” among its 53 research activities. The Department of Informatics and Programme Systems of the Faculty of Mathematics and Informatics is involved in a number of international and national research projects and research activities (information for every year can be found at http://www.mif.vu.lt/mif/mokslas/mokslas1/index.htm). The Faculty also offers consultations related to information systems and IST technologies. Research of communication systems in knowledge-based economy is one of the activities pursued by the Faculty of Communication. The University publishes a journal “Sciences of Information.”

Kaunas Technology University is another institution of tertiary education that has high reputation as a centre of study and research in the field of IST. Research activities are concentrated in the Faculty of Informatics and the Centre for Implementation of Information Technologies. The University publishes a journal “Information Technology and Control” *(Kaunas University of Technology).*

Research performance of tertiary education is extensive but in general inefficient. There are separate structural units, such as departments or even individual professors with their students, performing valuable research (such as, the Laser Research Centre and the Quantum Electronics Department in the University of Vilnius as well as the State Institute of Physics and the Ultrasound Research Centre in Kaunas Technical University, that carry out scientific research in the field of laser technology *(Nissinen M., 2002)*. However this is an outcome of

local initiatives and traditions but not the system itself.

If judged by formal criteria, such as a number of international publications, Lithuanian researches are lagging behind the EU average more then five times, behind Estonia - more then 3.5 times. There are no European or US patents registered on the name of Lithuanian institutions (though, there are Lithuanian researchers working in joint groups which register these patents on the name of the other county institutions). Low assessment of the Lithuanian research performance by these indicators is also due to the unknown procedures, lack of relations and high costs, but there is no doubt that its quality is unacceptably low (*Nacionalinis susitarimas, 2003)*. Inefficient participation in the 5th framework programme, under which only two thirds of all Lithuania's contribution was regained, provides another example.

G.5. Budget of tertiary education institutions

According to the World Bank report, government financing (in terms of total spending - *the author's comment*) of formal education and training in Lithuania is comparable to the levels in countries with similar per-capita income and appears to be functioning adequately (*World Bank, March 2003*). A total of 6.5 percent of GDP is allocated for education in Lithuania. (EU average in 1999 was 5.0%) *(Nacionalinis susitarimas, 2003*). The Group for National Agreement in Lithuania states that studies are even over-financed at the expense of research, because the number of students is constantly growing, but financing per student is diminishing and is markedly lower than in other European countries (EUR 844 per year in 1999) (*Nacionalinis susitarimas, 2003; Nacionalinis susitarimas, www.gunsi.lt, 2003*). It means that less research is related with one student education and that the education system is targeted toward quantity, not quality.

Budgets of institutions of tertiary educations are formed according to the number of students, but decisions of the Ministry of Education are crucial in budget allocation. Every student pays a uniform fee, while the rest of the costs of the studies are covered by the state. There are no subsidies for students in private institutions of education. The Lithuanian Free Market Institute has proposed reforming the system by introducing a voucher-based scheme, supplemented with social support for needy students and a programme-based support for research projects *(Lithuanian Free Market Institute, www.lrinka.lt/Projektai/Svietimas.phtml, 2003*).

Income tax deductions for study fees are valid only when a person pays for his or her own education. Tax incentives also have to be introduced to extend the application of income tax deductions (to allow saving for education, to include mutual support, insurance and saving schemes). Commercial loans for studies are already available on the market (*Hansabankas information*).

G.6. ICT - related education: output

A number of tertiary level graduates in science and technology is increasing gradually: in 1997 it made 7.3, in 2000 - 12.1 per 1 000 inhabitants aged 20-29 (see Annex G.). In the school year 2000-2001 the total number of ICT related students in Lithuania was 15 057 (12 679 for bachelor degree and 2 379 for master degree). In 2001-2002 these numbers increased to accordingly 18 456, 15 868 and 2 588. Despite the increase of general number of students (11.8 percent) it is still obvious that ICT related education gets more popular with absolute increase of 22.6 percent *(Statistics Lithuania, "Svietimas," 2002).*

In 2002, 27 and 20 percent of all students at six biggest universities in Lithuania were at ICT programs for Bachelor and for Master degree respectively:

Table G1.: **A total number of students of different ICT specialities in six main universities in 2002**

Study program	Bachelor degree	Master degree	Total
Mathematics	299	72	371
Statistics	153	32	185
Computing	1 511	267	1 778
Electronics engineering	670	198	868
Transport engineering	489	106	595
Mechanics engineering	679	139	818
Electricity engineering	574	147	721
Economic engineering	70	47	117
Chemical engineering	226	87	313
Total	**4 671**	**1 095**	**5 766**

Reference: Ministry of Education and Science

G.7. ICT - related education: labour force

Unemployment among young people is higher than the average, but unemployment of educated labour force is lower. (See Annex G).According to Eurostat, Lithuania is among those candidate countries where youth unemployment is higher than the EU average. Like in most other candidate and EU member countries, tertiary school graduates are overrepresented in the service sector, with 80 percent of graduates starting their carrier in the said sector *(Eurostat, www.eurostat.com)*. Presently the most demanded in the market are graduates of informatics and information systems, Western European languages, psychology and consulting, separate fields of management *("Respublika," 7 June, 2003).*

As mentioned above, the output of ICT specialists in Lithuanian Universities has been increased (with financing increased less than proportionally), however evidence of quality improvements is scant (see the box below). The quality of the recently trained remains a concern for employers, especially with regard to the abilities to work in specific projects. Due to their global character, ICT specialists are a potential segment for brain drain, but many of them get better-paid jobs without physical emigration by working in larger Lithuanian companies or foreign companies through direct contracts or intermediates. Migration from public to private sectors as well as migration to other professions can be observed.

Box G3.: Employer's opinion on IST labour supply

- a mini-survey carried out by LFMI in September 2003. Ten leading ICT service companies of different size and scope of activities (telecommunications, SW production and sales, consulting, etc.) were asked if they were satisfied with the supply of ICT specialists. Major findings were the following:

- The respondents were unanimous that there was a shortage of qualified labour. The number of recent graduates is sufficient, but experienced employees are in high demand.
- Due to a growing output and high prestige of the profession, there is a better choice of recently trained specialists and so a better chance to recruit more talented ones. Two respondents noted improvements in the quality of university education.
-University education is insufficient; therefore employers pay more attention to training and integration of new employees. The biggest weaknesses of university education mentioned by the respondents are: a lack of skills to apply theoretical knowledge, to find solutions on ones own and to work in a team; a lack of knowledge of management (stressed by the majority of respondents), law and finances.
- Experienced project leaders, project managers, CRM consultants and specialised technicians are the most lacking specialists.
- Emigration of ICT specialists is moderate. It fluctuates depending on overseas demand. Now it is lower than in 2000-2001, but it could increase as a result of EU accession.
- Domestic migration of specialists is from the public sector to the private sector and from small and medium enterprises to large ones.

Conclusions: In general big ICT companies can solve personnel problems by retraining, offering higher salary and buying certain service or procedures from companies world wide. For small and medium enterprises these problems are crucial: they cannot afford proper investments into training, higher salaries or more specialised employees. From the standpoint of the employee, the Lithuanian ICT market is too small to offer good career opportunities and too risky to seek specialisation.

Reference: Lithuanian Free Market Institute

According to a recent survey on employment of recent graduates carried out by the Institute of Labour and Social Research, only 45 percent of university and college graduates consider their speciality as reflecting market needs (26 percent of those polled considered it more as reflecting marked needs than not). It is emphasised in the survey that a total number of employees with higher education and the share thereof has decreased during the past two years from 339,600 in 1996 to 278,400 in 2001 and from 20.7 to 18.1 percent respectively *(Statistics Lithuania, 1/2003, pp. 25-27).*

As the study "Evaluation of the State of Human Resources in Lithuania" conducted by the Centre for Social Analysis and Consulting in 2003 indicates, 70 percent of tertiary education graduates do not work in their professional field *("Kauno diena," 2003.09.11).* It is emphasised that the educational system in Lithuania is inefficient. Educational institutions are mainly preoccupied with their own existence, but not the quality of education. The study concludes that this is the reason why neither the professions offered nor the skills taught nor the evaluation system corresponds to market needs. According to the study, the skill gap is obvious on the Lithuanian labour market: while there is a shortage of qualified labour force in certain areas, universities in most cases proceed with their "production" patterns. Often the actual quality of training does not correspond to the declared one. A low prestige of professional training (which is essential for ICT manufacturing) is one of the reasons behind this situation.

G.8. ICT - related education: mobility of recently trained

Sociological surveys show that the most mobile segment of the population (especially in terms of emigration abroad) are young, well-educated single persons. The mobility trend within the country is towards big cities: after graduating from a very small proportion of graduates of tertiary education return home to rural areas. A lack of teachers in rural schools (especially English and ICT teachers) is one of the consequences of this trend.

G.9. Conclusions

1 There are no serious problems with accessibility to education in Lithuania. However, its continued increase is still a political target.

2 Inefficiency and low quality of education are major concerns.

3 A voucher-based financing of secondary education could provide good opportunities to improve cost efficiency.

4 The tertiary education system requires a substantial reform to allow market demand and quality orientation in the sector.

5 Research is financed on a low scale if compared to other countries (private financing is particularly low).

6 Financing of education is quite high compared to total government expenditure and other counties, but is poor in per student terms.

7 For the educational system to meet market needs, it has to become less formal and more integrated.

8 Despite increased number of ICT students, there are not enough of good quality specialists that are necessary for value added in ICT business.

G.10. SWOT analysis – education

Strengths	**Weaknesses**
• High adult literacy ratio; • Big number of people seeking tertiary education; • Soviet-content of education is changed; Comparably cheap education of ICT specialists; • Dynamic development of IST and public interest in IST.	• The educational system is not labour market-driven; • Low standards and inadequate market orientation in tertiary education; • Insufficient funding in per student basis; • Scarce motivations to become a researcher; • No clear division between universities and colleges; • Overestimation of formal education; • Unclear opportunities to "formalize" non-formal education; • Discrimination of private institutions in tertiary education; • A lack of interdisciplinary approach in tertiary education; • Lack of knowledge of teachers to use ICT in education; • IST is treated as a separate subject only and not integrated into the learning process in general (especially in secondary education).
Opportunities	**Threats**
• Voucher-based reform of financing in secondary education opens opportunity to introduce market principles; • Opportunities for education in EU; • Emergence of non-university tertiary education; • Opportunities to get more resources for tertiary education from the private sector (if legitimate); • Opportunities of the EU support (exchange programs, Structural funds); • Growing role of business community (especially in demand planning and setting quality standards); • More efficient methods of learning, using ICT.	• Deadlocks in tertiary education (e.g., going from college to university); • "Brain drain" among professors; • Insufficient prestige of the researcher career; • Slow change of mentality of academic society, their reluctance to admit young teachers; • Overcapacities of the educational system because of its inflexibility, demographic fluctuations and political decisions. • Increased "brain drain" of ICT specialists; • Further deepening of IST as a separated, but not integrated into general socio-economic discourse field of activity and learning; • Substantial fall of ICT education quality due to the poor funding, poor management and resulting "brain drain."

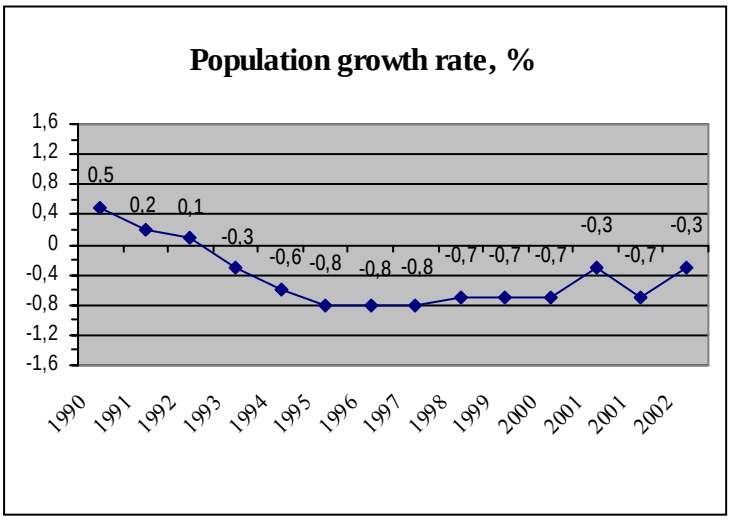
The factors underlined in the above SWOT are estimated by the authors to be the most relevant to IST-related developments in the country.

H. NATIONAL AND REGIONAL DEMOGRAPHIC DATA AND PROSPECTIVE

H.1. Demographic situation

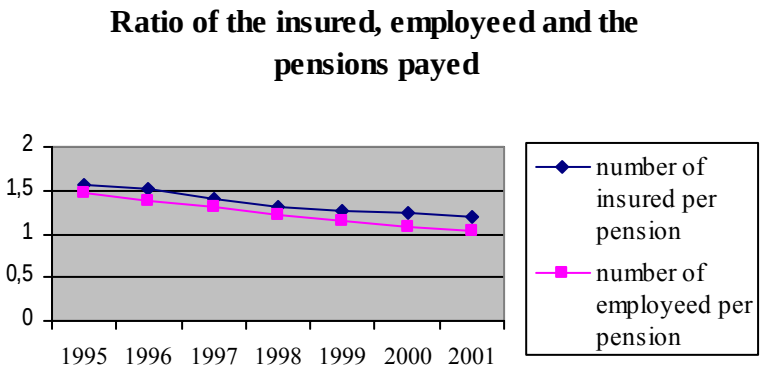
The demographic trends in Lithuania have been negative for some time now (see the charts below) and no changes are anticipated. The society in Lithuania is aging mainly due to low birth rates: the population under working age made 20.6 percent of total population in 2002, down from 24% in 1990; the population of working age comprised 59.6 percent, an increase from 56.8% in 1990; and the proportion above working age constitutes 19.8 percent, as compared with 19.1 percent in 1990 (see Annex H). During the last decade the average life expectancy declined by 0.3 years for men and increased by 1.2 years for women. In 2002 the average life expectancy was 71.9 years. *(Statistics Lithuania,"Statistical Yearbook of Lithuania," 2002, p.77)*.

Graph H1.



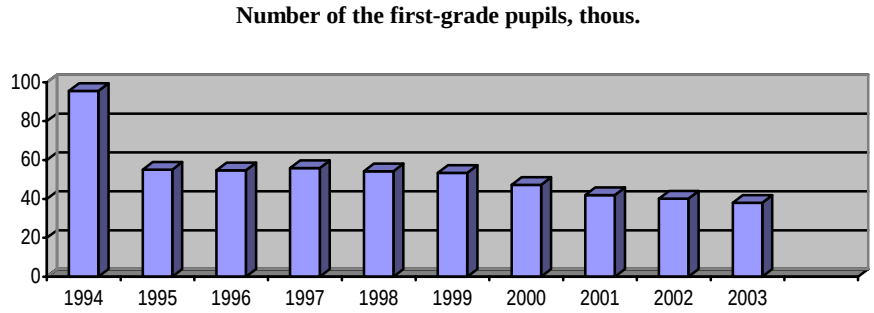
Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, p. 58.

Graph H2.



Reference: State Social Security Fund of Lithuania

Graph H3.



Reference: Veidas, 4 September, 2003

The Lithuanian family is changing towards the North European type. Families are getting smaller and non-formal. The number of divorces per 100 marriages increased from 35.1 in 1990 to 69.9 in 2001; the extra marital birth rate increased from 12.8 percent in 1995 to 25.4 percent in 2001. Legislative measures are being taken to increase birth rates as this target is underlined in many planning documents (political programmes, strategies, etc.). However, such measures might be economically inefficient as well as socially and morally harmful ("profiting from children" is an already well-known phenomenon and widespread among certain population segments).

According to the latest population census of 2001, non-Lithuanians comprise 16.55 percent of the population in Lithuania. Poles account for 6.74 percent, Russians constitute 6.31 percent Russians, and Byelorussians make up 1.23 percent. All other minorities (Ukrainians, Jews, Germans, Latvians and Roma) comprise less than one percent *(Statistics Lithuania, "Statistical Yearbook of Lithuania" 2002, p. 188).* National minorities are comparably well integrated in the Lithuanian society (see the box below).

Box H1.: National minorities in Lithuania.
Lithuania adheres to numerous international treaties for protection of national minorities. On the global level these include the UN International Covenant on Civil and Political Rights, the UN International Covenant on Social and Economic and Cultural Rights, while on the regional level they are the European Convention on Human Rights and the Framework Convention on the Protection of National Minorities. The rights of members of national minorities are stipulated in the Constitution of Lithuanian and other laws.

The Polish minority inhabits mainly Eastern Lithuania where it forms predominantly Polish councils of local government, in the Vilnius district and Salcininkai municipalities. The Russian community is dispersed throughout Lithuania but a significant proportion lives in major towns of Vilnius and Klaipeda. As to national parliamentary elections, there is a trend that two or three representatives of the Polish minority are elected in predominantly Polish constituencies, while the Russian minority is represented through the existing set of political parties. Mass media depict national minorities from different perspectives: the Russian minority is viewed as the most integrated minority and the main topics revolve around its cultural life. Writings about the Polish minority mainly deal with political and educational issues. *(Beresneviciute V., Nausediene J., 1999/1(3), pp. 67-78)*

The Roma minority attracts the harshest attitudes. They are depicted as a highly criminalized, uneducated and drug-abusing community. As other research on school pupils in the multicultural environment conclude, most teenagers living in the multicultural environment of Eastern Lithuania display some degree of social distance towards teenagers of other ethnicity. One tenth of pupils' social distance reaches a level of unwillingness to see certain persons live in Lithuania. (*Ministry of Education and Science, 22 October, 2003).* The emergence of national minorities who are physically distinct from Lithuanian residents raises a more general problem of Lithuania becoming an attractive place for economic migrants.

In 2002 there were 21 Russian and Polish newspapers. They amounted for 10 percent of total annual circulation of newspapers in Lithuania. There are two Russian newspapers and one Polish newspaper published five times a week *(Statistics Lithuania,"Culture, press and sports 2002," 2003. pp. 32-33).* The Russian daily *Litovskij Kurjer* is available online at www.kurier.lt. The local Polish radio station *Znad Wilii* broadcasts in the Vilnius district where the majority of Poles live.

Schools of secondary education provide instruction in Lithuanian, Russian, Polish and Byelorussian. Currently 902 schools operate in Lithuanian, and 201 schools use languages of national minorities as instruction languages. Due to demographic changes the number of schools decreased by 9.0 percent from 2000 until 2002. The same trends can be observed in schools of national minorities. However, the closure of non-Lithuanian schools remains the main issue of political debate at the local and national levels *(Ministry of Education and Science of the Republic of Lithuania, "Svietimas 2002", 2003, p. 92).* There are certain possibilities to continue education in the native language after completion of secondary education. In 2002 there were 639 and 254 students seeking university education in Russian and Polish respectively *(Statistics Lithuania, "Svietimas 2001," 2002, p. 104).*

Table H1.: **Employment rate by ethnicity**

	Employment rate 15-64 years, %	Unemployment rate, %
Total	59.6	13.8
Lithuanians	60.5	12.8
Russians	54.3	20.3
Poles	55.5	17.8
Other nationalities	57.6	17.4

Reference: Statistics Lithuania, "Labor force, employment and unemployment 2002," 2003, p. 13.

Female population made up 53.2 percent of total population in 2001. Women employment is about the same level as male. In 2001 these indicators were 50.3 and 49.7 percent respectively *(Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, pp.93-94)*. According to Eurostat, women employment in Lithuania reaches 58 percent and thus exceeds the EU average (55 percent) and the EU Lisbon Target for 2010 (56 percent) *(European Commission, 2003, p. 34).*

A high rate of suicides is a serious problem in Lithuania. In 2001 it was 44.1 per 100,000 inhabitants, of which 82 percent were male, 53 percent were urban inhabitants *(Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002).*

The dynamics of the population indicate a likely shortage of labour resources in the future. Although today unemployment is relatively high in Lithuania, a lack of skilled labour force is already a problem (see also Parts A and G). This concerns not only top-level management and

specialists with higher education, but also skilled specialists in certain fields (e.g., in the electronics, textile, furniture and confectionary industries).
Negative demographic trends are putting huge pressure on the social sector.

H.2. Main economic and social effects of population dynamics

H.2.1. Education

For an economy to grow, a small country should have a well-educated population. This means an increase in spending for education both in terms of quality (content, structure and management) and quantity (demand for skilled labour and life-long learning). This suggests that enterprises themselves will engage significantly in educational activities, therefore favourable conditions for private investments into education are crucial. For an educational system to function efficiently, respect for market needs and competition among educational institutions are needed. Bearing in mind the "brain drain" processes (see Box G1.), it would also be reasonable to redesign the financing of education in order to get value for the tax payers' money spent on education.

H.2.2. Pension system

The public pension system, based on the pay-as-you-go principle, directly depends on the ratio of pensioners to working population. Today the rate is 1.2 employed to one pensioner (see the chart above). According to the Ministry of Social Security and Labour, the present pension system is not financially viable and will have a substantial budget deficit starting from 2040, even if GDP maintains a high rate of growth *(Ministry of Social Security and Labour, 2001)*.

The retirement age is being increased until it reaches 62.5 years for men and 60 women in 2006. Limits on pension benefits for working pensioners had been introduced, but the Constitutional Court found them to be anti-constitutional, so the limitations were subsequently revoked. Although the rate of social security contributions is high (34 percent), pensions are rather low. The average pension was LTL 330 (~ EUR 96) in 2003.

According to the Law on Pension System Reform (2002), starting from 2004 people will have a right to direct 2.5 percentage points of their social security contribution to private pension funds (the pension component makes 25.9 percentage points of the social security contribution). This share will be annually increased until it reaches 5.5 percentage points in 2007. In the long term this reform is expected to increase pensioners' income, to alleviate demographic problems, to facilitate labour market changes and to increase personal responsibility for pension provision.

H.2.3. Health care system

An aging population is a huge burden on the health care system as the bulk of its expenses are allocated for the treatment of the elderly. The State Health Care Insurance Fund has been faced with financial problems for the past several years. Debts to health care and pharmaceutical providers that accumulated in 2001 have not been settled yet. Restrictive measures on spending (especially on drug compensation) have been introduced, but they have limited access to health care services. These measures are giving temporary relief for the budget at the expense of the quality and timeliness of health care and hence future budget expenditures. However, the introduction of co-payment is still politically unacceptable. Therefore, serious problems in health care financing, accessibility and quality are very likely.

H.2.4. Change of employment forms

An aging society along with a new economy is bringing changes into employment patterns. People live longer and work longer, and the forms of employment are becoming more diverse. This requires a more flexible labour regulation and social security system. A rigid concept of employment and the pay-as-you-go pension scheme are the biggest obstacles to new forms of employment.

H.2.5. Foreign labour

The recent policy on foreign employment in Lithuania was shaped with respect to post-soviet country immigration issues and was restrictive in all respects. Foreigners willing to work in Lithuania have to obtain work permits through long and complicated procedures. This applies to all kinds of workers, despite the fact that there is a lack of skilled labour (especially top managers) in Lithuania. In 2002 work permits were abolished for EU citizens, but all restrictions remain for citizens of other countries. "Socialinis pranesimas" (Eng. *Social Report)* of the Ministry of Social Security and Labour states that in the future Lithuania is very likely to have to "import" young work force from other countries, but this subject is not discussed publicly yet *(Ministry of Social Security and Labour, 2001).*

H.3. Conclusions

1 Lithuanian population is aging and this trend is likely to persist in the future.

2 The demographic framework is putting an additional pressure on all social sectors (particularly on the pension and health care systems) and is changing the pattern of employment. It is a new challenge for labour regulation and education policy alike.

3 Possibilities of solving problems of an aging population through immigration policy, which is passive and in general restrictive today, could be contemplated.

H.4 SWOT analysis

Strengths	**Weaknesses**
• The society is rather adaptable, including with respect to IST use; • Young generation is actively seeking education and career.	• Demographic trends are negative; • The population is rather old, with the experience of a planned economy and deep imprints of socialistic mentality; • Older generation is a much less active user of IS services and participant in IS in general; • A lack of structural reforms in the social area: health sector is already faced with financial difficulties; pension reform starts from 2004.
Opportunities	**Threats**
• Demographic and competition pressure to reform the social sector and labour regulation and thus to decrease labour costs and increase the flexibility thereof; • Attracting labour force from abroad, both Lithuanian emigrants and foreigners.	• Negative demographics; • Aging society; • Lack of labour force; • Likelihood of "birth rate support" programmes, consequently an inefficient and complicated social care system, crippled motivations, etc.; • Delayed structural reforms and consequently a budgetary pressure and the country's lower attractiveness to live and to invest in.

The factors underlined in the above SWOT are estimated by the authors to be the most relevant to IST-related developments in the country.

I. CULTURAL AND SOCIOLOGICAL DATA

I.1. Changes in employment structures

During the transition years a sharp shift occurred in employment from the public to the private sector. In 1991 the private sector employed less than 30 percent of Lithuanian workers. Now it employs about 70 percent. Much of this growth occurred in small and medium-size enterprises.

In the earlier 1990s jobs in services increased, industrial and construction jobs declined, while agriculture played the buffer role. Many dismissed industrial workers had trouble finding new jobs in urban areas and so they moved to rural areas to take up farming. Many of these migrants were elderly, low-skilled workers. This urban-rural migration increased agricultural employment from 18 percent of the workforce in 1991 to 23 percent in 1994 (see the chart below).

Since 1994 employment has continued to shift from industry to services, but agricultural employment has fallen, to 17.7 percent of the workforce in 2001. During the same period the share of industry fell to 18.1 percent - while the share of services rose to 59 percent (see the table below). In the service sector, employment is the highest in wholesale and retail trade, repair of motor-vehicles, motorcycles, personal and household goods (over 15 percent) and education (over 10 percent).

Table I1.: **Changes in employment structures**

Sector	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Agriculture, hunting and forestry	19.5	22.4	23.3	23.7	24.1	21.7	21.4	20.1	19.8	17.7
Fishing	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Mining and quarrying	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Manufacturing	26.9	23.6	20.0	18.4	17.4	17.3	17.3	17.2	17.7	17.9
Electricity, gas and water supply	1.6	1.9	2.2	2.6	2.5	2.5	2.5	2.4	2.3	2.3
Construction	9.1	7.1	6.6	7.0	7.2	7.1	7.1	6.6	6.1	6.2
Wholesale and retail trade; repair of motor-vehicles, motorcycles, personal and household goods	9.6	9.7	13.4	12.8	12.7	14.8	14.7	14.4	14.7	15.4
Hotels and restaurants	1.0	1.1	1.3	1.2	1.1	1.6	1.5	1.6	1.8	1.8
Transport, storage and communication	6.7	5.6	5.5	5.8	5.7	5.7	5.9	6.4	6.3	6.0
Financial intermediation	0.8	1.2	1.5	1.2	1.0	1.0	0.9	1.0	1.0	1.0
Real estate, renting and business activities	2.3	2.2	2.2	3.0	3.1	3.2	3.4	3.3	3.6	3.7
Public administration and defence; compulsory social security	2.7	3.2	3.6	4.1	4.1	4.2	4.3	4.4	4.8	5.1

Sector	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Education	7.4	7.7	8.4	8.7	8.9	8.9	9.2	9.6	10.2	10.7
Health and social work	5.6	5.4	5.9	6.2	6.2	6.4	6.6	6.7	7.0	7.0
Other community, social and personal service activities	6.4	8.6	5.8	5.0	5.7	5.2	4.8	5.8	4.2	4.6
Activity of private households with paid personnel	-	-	-	-	-	0.1	0.1	0.2	0.2	0.3

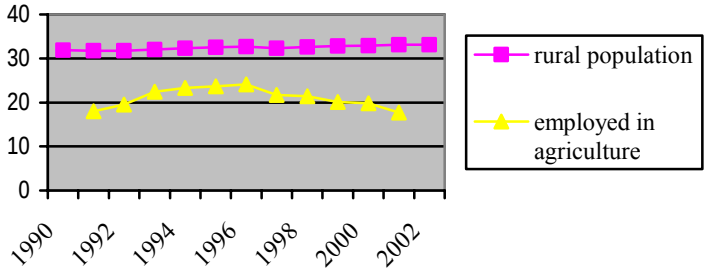
Reference: Statistics Lithuania, 1994-1995, p. 96; "Statistical Yearbook of Lithuania" 2002, p.93.

I.2. Mobility in society

Since 1990 a ratio of urban and rural population has been rather stable, while agricultural employment has decreased (see the chart below). Low territorial migration of the population diminishes employment opportunities across the country. However, it is expected that further urbanisation will reduce the share of rural population. An inevitable decrease in agricultural jobs will intensify this process.

Graph I1.

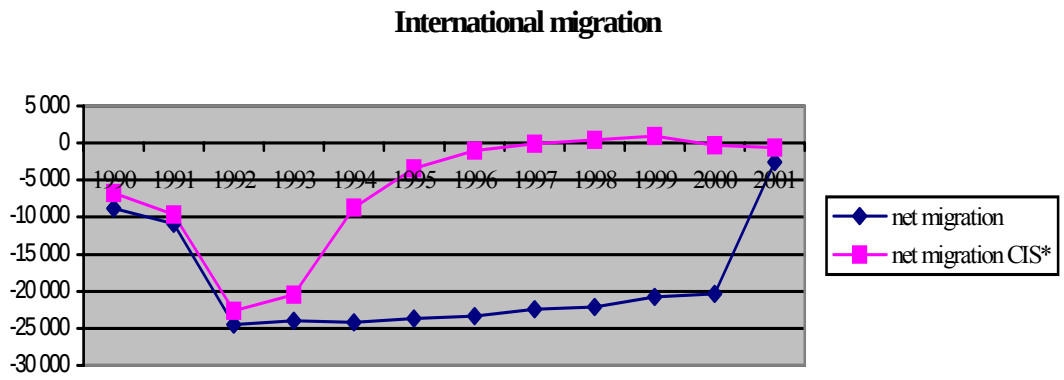
Rural population and employment in agriculture and forestry, %



Reference: Statistics Lithuania, 1994-1995, p. 96; "Statistical yearbook of Lithuania" 2002, pp. 58, 93.

Migration saldo has been negative for the most part. More people have emigrated than arrived to live in Lithuania (see the chart below). In the first years of Lithuania's independence emigration was caused mainly by the Russian-speaking population leaving for their homeland. Later emigration to Western countries increased, mainly due to economic reasons. While a number of people working abroad are still registered in Lithuania, the actual number of those living abroad in a given year can be bigger than reported officially.

Graph I2.

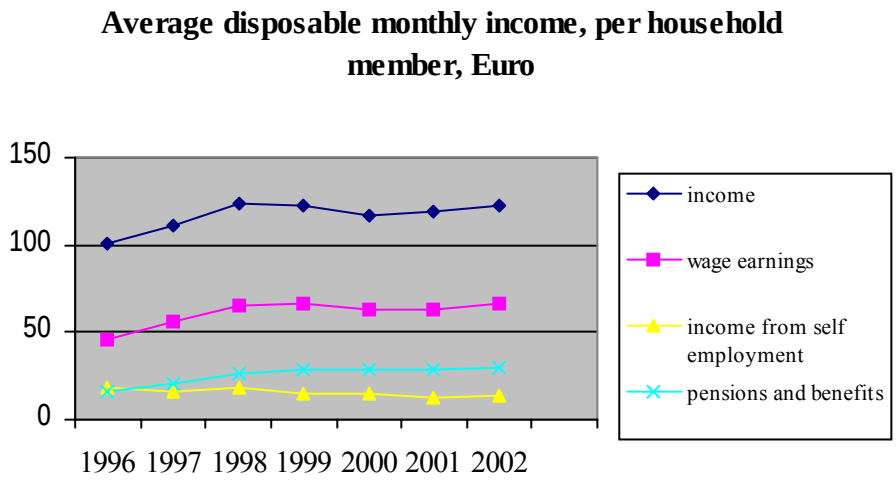


Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, pp.77-78.
** CIS- Commonwealth of Independent States*

I.3. Changes in income distribution

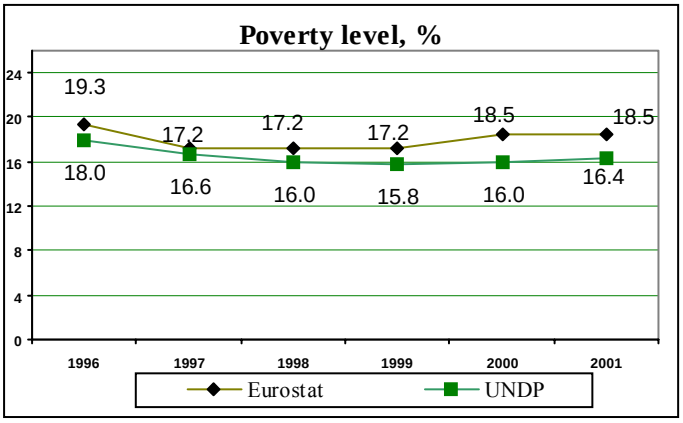
The level of poverty in terms of the relative poverty margin did not change much in the years 1996-2001 and stood approximately at 16 percent (see the chart below). It would be hardly useful to measure this variable in earlier years as the national currency was unstable and inflation was high. Even today household income is one of the most debated indicators as there are large differences depending on methodologies used (see Annex A. Data inconsistency). Therefore quantitative estimations of income level and income distribution as presented below should be viewed with caution.

Graph I3.



Reference: Statistics Lithuania, 1998, p. 191; 1999, p. 192; 2000, p. 194; "Statistical Yearbook of Lithuania" 2002, p. 173; http://www.std.lt/web/main.php?parent=900, 2003.

Graph I4.



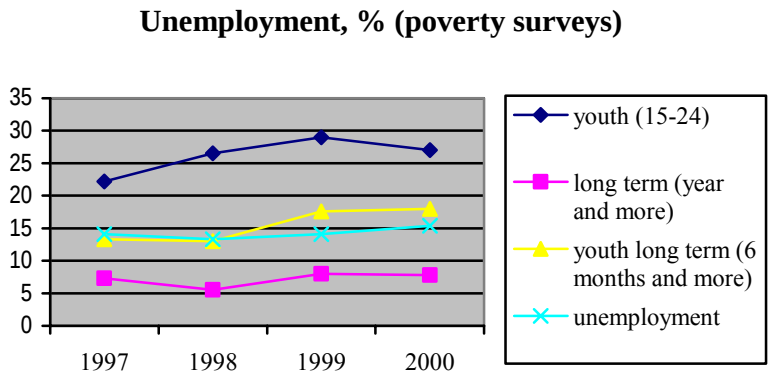
Reference: United Nations, December 2002; Dobravolskas A., 2002

The deep poverty margin is equal to LTL 125 (~ EUR 35). Calculating formally, 0.8 percent of the population lives below this margin. However, expenditures of households in decile I are very close to this figure, so around 10 percent of the population are at the deep poverty margin (*Dobravolskas A., 2002)*. Passive social security measures, such as social allowances and compensations for heating/hot-water expenses, are used to cope with the problem of deep poverty.

Poverty is spread mostly among the following social groups: the unemployed, farmers, families with three and more children, people with primary education and single people with children. As many analysts note, poverty prevention policy should be targeted not at those social groups, but at the causes of poverty. However, the current system of social care in Lithuania is in many cases based on differentiated treatment of separate social groups.

Unemployment is the main cause of poverty, in particular with regard to youth unemployment (15-24 years old), long-term unemployment (a year and more) and long term youth unemployment (six months and more) (see the chart below). Contrary to popular belief, the youth is a more vulnerable group in terms of poverty than pensioners (the former usually have no dwelling property and have dependants). Unemployment is inversely proportional to the level of education. According to a survey of the National Labour Exchange, people with such professions as pedagogy, business administration and management and humanities have the biggest difficulties to find jobs after high school graduation.

Graph I5.



Reference: Ibid

Disregard for market needs is a serious weakness of the present system of higher education. The main problem is with the financing framework whereby the student does not bear financial responsibility for his/her choice and universities do not compete explicitly neither for teachers nor for students. Free education programmes cause a surplus of students in certain specialities (more on education see chapter G).

According to a recent World Bank report, the so-called skill gap (percentage of the unemployed who do not find jobs because their skills fall short of employer requirements), elaborated in the chapter G, reaches 22 percent in Lithuania and is higher than in other transition countries (*World Bank, October 2002*).

A large share of the unemployed does not seek employment. As economic theory suggests and practice of different countries demonstrates, this problem aggravates when social allowances are increased. This side-effect of social support has been already understood, so poverty prevention measures are directed mainly towards active measures and, in particular, towards the reduction of unemployment as the main cause of poverty.

An increase in the number of students is also affecting poverty statistics. The system of study crediting is not functioning on a wide scale and labour regulations do not allow the majority of students to find jobs, so students are funded mainly by their parents.

Rural population is another social group whose members are often found to be poor. As stated in Chapter A, the agricultural sector in Lithuania contains only fragments of a market economy. Small farms prevail. Economic relations and job division and consequently employment are weak in rural areas. Competition is distorted, resources are allocated inefficiently. The structure of income and consumption in urban and rural households differs markedly. In 2001 disposable income in urban households was 1.5 times higher than in rural areas, while wage earnings were 2.9 times higher. The share of expenditures on food (including expenditures in kind) in rural households was 1.3 times bigger than in urban households, while that on communications was 5.5 times bigger. Although rural inhabitants in absolute terms spend less on communications than urban inhabitants (EUR 3.8 and EUR 7.7 per month per capita respectively in 2001), the share of these expenditures in their total expenditures is bigger *(Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002; http://www.std.lt/web/main.php?parent=900, 2003).*

Box I1. Mobile service penetration in regions

A survey on the level of usage of mobile telephony in districts (municipalities) of Lithuania, conducted in June 2003 by "TNS Gallup," revealed the existing disparities. The highest level of penetration was in the capital: 70.8 percent of Vilnius inhabitants were users of mobile services. The biggest towns were also in the lead in terms of mobile penetration. In eight districts the penetration level exceeded the national average of 52 percent. In most of the other 52 Lithuanian districts the indicator was considerably lower, the bottom being in the district of Lazdijai, 13.2 percent

Reference: "Verslo zinios" .25 September, 2003

Social infrastructure (schools, pharmacies, cultural centres) is less developed in rural areas, however communication infrastructure is comparably good: road and electricity networks are of high density, mobile communication network is covering nearly the whole territory of the country (with some quality differences); the fixed telecommunication network is scarcer but improving in rural areas. Differences between rural and urban areas can be characterised as

regional disparities, but with some limitations. First of all, rural areas differ considerably across the country. Secondly, industrial urban settlements, as mentioned earlier, are not concentrated in one or two parts of the country but are spread evenly throughout the whole territory. Given that access to roads is good and the country is small, these disparities (in terms of employment, education, information and culture) can be substantially smoothened even without changing the place of living. Life style is changing in rural areas as generations change, but this process is very slow. It could accelerate if market relations were allowed to prevail in agriculture (first of all, free land sale and less price regulations).

Income inequality remains high in Lithuania. As research findings on income inequality from the Centre of Social Policy Studies indicate, the Gini index was 35.4 percent in 2001 *(Lazutka R., 2002)*. Income inequality in Lithuania was fairly high, over 30 percent, in the period 1996-2001. The Gini index increased since 1996 and remained almost the same in 1998 and 1999, but it went up in 2000. As the aforesaid research indicates, polarisation of the middle layer has taken place in recent years, while income differentiation between the richest and poorest groups has slightly contracted.

The income distribution ratio varied between 4.2 and 6.5 in the years 1996-2000. In 2000 consumption of households in decile X exceeded respective expenses in decile I 3.8 times for food, 9.4 times for communications and more than 35 times for leisure (*Dobravolskas A., 2002)*.

Differences in income distribution may be seen as a natural outcome of the market economy, but they can also indicate ill-founded policies that do not create opportunities or motivations for people to earn more. The latter is the case in Lithuania: intrusive and costly regulations are limiting opportunities, especially for small businesses, while social allowances and promises of a better future from "good governments" "good presidents" or "the EU" are stifling motivations to work.

I.4. Changes in consumption patterns

Income and consumption rose steadily from 1996 until 2000 but they dropped in 2001 in the aftermath of the Russian crisis. In 2002 income began to grow again (see Annex I). In the period 1996-2002 wage earnings increased by 41 percent; income from self-employment (first of all, income from agriculture, plus income from business, handicrafts and freelance) decreased by 25 percent. The share of state and social security benefits in disposable monetary income increased from 17 percent in 1996 to 28.3 percent in 2002 (*Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002: http://www.std.lt/web/main.php?parent=900, 2003).*

According to official statistics, average household expenditures on food gradually decreased: from 61.7 percent in 1993 to 40.7 percent in 2002. Expenditures on recreation and culture, health care and communication are increasing (see Annex I). This indicates improvements in people's well-being, but also an increase in prices of certain categories of services, such as communications and health care. Changes in consumption patterns are more evident on the supply side when observing the growth of certain businesses, including the sales of PCs. Statistical household surveys usually under-estimate household income and expenditure. They also under-represent richer households, possibly due to the fact that better-of households more often refuse to participate in official surveys, as their money flows are bigger and the payment for participation in the surveys is comparably small).

I.5. Cultural patterns

The general public receives the most information from television. This mode of information transmission is also considered to be the most forceful. There is one national public television, three national commercial televisions and a number of regional televisions plus cable TVs. Radio is another popular media outlet. There are two public radio stations and more than ten commercial stations operating nation-wide. The most popular television stations are LNK and TV3 (both commercial), with about 25 and 22 percent of viewers respectively. Local and cable television channels rank third (20 percent), followed by "Lithuanian Television" (13 percent) and TV4 (11 percent). The state-run "Lithuanian Radio" enjoys a large audience, with about 13 percent of listening time. Other popular radio stations are "Radiocentras" (15 percent), "Pukas" (12 percent), "M-1" (10 percent), "Lietus" (7 percent), and "Russkoje Radio Baltija" (7 percent).

TV and radio are more popular than the press and Internet mainly because of economic considerations, as the latter media are too expensive for the average user. According to the sociological survey, TV is also the most popular way of spending leisure time: 63.1 percent of those polled named TV, while only 29.2 percent, reading *(Spinter tyrimai, 2003; "Delfi," 2003.06.24)*.

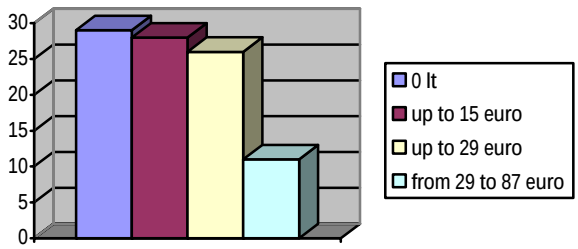
The major national dailies are "Lietuvos Rytas" (with a reported circulation of 50 000), "Kauno Diena" (40 000), "Respublika" (35 000), and "Lietuvos Zinios" (8 000). "Verslo Zinios" (10 000) is the most popular business paper. According to a 2001 survey, only 64 percent of the population above 18 years in the five largest cities subscribe to some periodicals. Despite that, public confidence in the press is high.

Internet users include for the most part young (including school-age) and educated people. Public Internet sites are widely used in political and cultural debates. Academic discussions are more common in specialised sites. The most popular information portals are "Delfi," targeting the Baltic States, takas.lt, run by Lithuanian Telecom, sala.lt, the site of the radio station M-1, and the websites of the news agencies ELTA and BNS.

According to a recent survey of the Lithuanian population from 18 to 75 years of age, books are mainly bought by Vilnius inhabitants and young people. As the survey shows, 35 percent of those polled buy books, 35 percent borrow them, and 17 percent go to the libraries. Sixty seven percent of those polled read fiction, 14 percent prefer reference books for their studies, and six percent use professional literature.

Graph I6.

Annual expenses on books, %



Reference: "Veidas," 17 April, 2003

In general Lithuanians are not a risk-taking nation. The stereotype of the national character is the following: slow, closed, discontent, pussyfoot, pessimist, albeit hardworking and patient. Lithuanians usually have difficulty in showing their best traits and establishing new contacts. This can be explained by educational traditions and religion (Roman Catholics), but still only partially. Lithuanians are clearly lacking positive cold rationality, which helps our Northern neighbours to solve matters in a simple and the least emotional way possible. National character is one of the reasons for a low level of entrepreneurship in Lithuania.

A number of people consider themselves as losers of the Independent Lithuania because of smaller social guarantees (first of all, lost job guarantees). Differences in opinions on major public policy issues stem from these two opposite approaches, as of losers or winners. According to *Eurobarometr* surveys, 27 percent of the population are expecting their life to improve within the coming five years (the lowest rate among the candidate countries), 21 percent believe that it will get worse. Thirty-two percent of the population expect deterioration in their professional life in 2003 (the highest rate among the candidate countries), and only 17 percent expect improvements. In 1993 the Soviet-type state administration system was evaluated as positive (+3 points), while the present system as negative (-5 points). In 1996 the estimates were -4 and -16 respectively *(Savukynas V., 2003).*

As sociological surveys show, politicians in general are not trusted and political parties are not popular. According to a survey carried out by *Vilmorus* in September 2003, 52.7 percent of the population do not trust the parliament (*Seimas*), while only 13.7 percent do; 65.5 percent do not trust political parties; 7.5 percent do; 58 percent of the population do not trust public officials *(Ibid).* People have the biggest confidence in the media and the church.

Personalities matter in Lithuania more than ideas (this can be very well observed in political elections). Leaders determine success of public institutions, organisations or even firms more often than the structural and organisational setups thereof. Solidarity and cooperation are new qualities that need to be learned. However, Lithuanians can hardly be called true individuals. This strange attitude to solidarity and cooperation stems most probably from long experience of the Soviet regime where solidarity meant giving up one's own interests and where individualism could not mature due to disrespect for individual needs and property. However, wider international cooperation, study and work experience, learning of foreign languages and new generations will gradually change these attitudes.

Box I2.: Corruption

An opinion poll conducted by the Lithuanian branch of Transparency International in April 2002 revealed that 77 percent of Lithuanian citizens and 60 percent of businesspeople think corruption is a serious drag on civil and business development. The most vulnerable areas are courts, customs, public procurement, traffic police, offices issuing licenses and permissions, and tax inspections. According to the Special Investigation Bureau, corruption occurs in as much as 75 percent of public procurements. The leading complaint is related to the issuance of permits, such as licenses, certificates, approvals, or warrants. The sources of corruption are the following (1) cumbersome legislation (2) extensive business regulations (3) inefficient public administration system (4) insufficient implementation of programme budgeting principle (5) inefficient public services, such as health care and education.

Reference: Freedom House, 2002, pp. 263-264.

I.6. Role of NGO's

NGOs play a fairly significant role in the Lithuanian society. NGOs are active in many different areas of social life and are quite numerous. Most NGOs are engaged in the social sector and deal with social care, patient activities, educational and youth affairs. Information society policy is exceptional in terms of the role of NGOs. As mentioned earlier, many NGOs participate both in IS policy advocacy and implementation (see B35.).

I.7. Conclusions

1. Lithuania has a non-proportionally (first of all, in terms of economic output) large rural population which has been rather stable so far.
2. Mobility of the working force within the country is low.g
3. Migration saldo is negative. The "brain drain" process is taking place and will most likely accelerate in the future.
4. The average welfare of the population is rising, although statistics report a reduction in income from self-employment.
5. Social differentiation is rather significant, as income and consumption patterns in urban and rural areas differ markedly.
6. The diversity of goods and services consumed by households is expanding. The share of expenditures on food is decreasing.
7. Bearing in mind the skill gap, difficulties faced by employers in finding the right employees, high unemployment and a substantial number of the passive unemployed, the policy target shall be reoriented from job creation to improvement of labour supply.
8. Labour supply can be improved by loosening labour regulations (for example, by abolishing the minimum wage) and modernising the educational system.
9. In general Lithuanians are not a risk-taking society, but they have maintained the traditions of hard work.
10. Corruption is entrenched in heavily regulated areas and state monopoly sectors (such as customs offices, Land Management Offices, health care, licensing and permits, etc.). It discourages economic activity and lowers the standard of living. Opportunities to abuse official power are one of the factors that stimulate participants of the aforesaid structures to resist changes.
11. Cultural habits are changing rapidly due to changing generations and intense communication with other countries.

I.8. SWOT analysis

Strengths	**Weaknesses**
• Population income is increasing; • Consumption items of households are becoming more diverse; • Peoples' aspiration for a better life and self-expression is strong.	• Wide differences in wealth, including differences between urban and rural households; • High unemployment and skill gap; Corruption; • Lack of entrepreneurship, cooperation and risk-taking traditions.
Opportunities	**Threats**
• Creating an attractive business environment and so facilitating self-employment and reducing unemployment; • Changing cultural habits towards openness and innovativeness; preserving industriousness as a value.	• While reducing social differentiation, redistribution might increase and public social services might expand; • Delayed structural reforms may sustain corruption-like relations; • Continued promises of „a better future" instead of information about a real state of affairs and planned reforms; • Letting the nagging and backward-looking segment of the population to dominate; • Encouraging „brain drain" if the improvement of the business environment fails.

The factors underlined in the above SWOT are estimated by the authors to be the most relevant to IST-related developments in the country.

DIAGNOSIS

1. Macro-economic and demographic background

Lithuania has created strong foundations of a market economy and achieved a strong and steady economic growth, accompanied by relatively modest fiscal deficits, low inflation and a stable currency. Inflation continues to be very low, largely due to intense competition and a strict fiscal policy. A rule-bound monitory policy and completed privatisation of the banking sector has facilitated competition and enhanced credibility of financial services and has driven down interest rates. This created better conditions for doing business, including new ICT start ups.

The fiscal deficit is likely to increase under the pressure of co-financing required by Structural funds, Lithuania's contributions to the EU budget and leftist government spending, but it is likely to remain within 3 percent. Today Lithuania complies with all Maastricht criteria set for the EU members that wish to join the EMU. In 2003 Lithuania has become a member of NATO and will join the European Union in 2004.

As the economy is small, strong export and investment growth have been major factors of the country's economic progress. A rising domestic market and continued export and investment growth are expected to sustain a robust economic development. This can be well observed in ICT service as well as in some ICT industries. Continued privatisation and restructuring (mainly in the fields of energy and transport) as well as EU membership (first of all, the common market and lowered investment risk) are seen as additional sources of Lithuania's long-term economic growth.[1] Productivity grew rapidly (on average by 6.3 percent in the period 1991-2001). This was also affected by fairly stagnant wages, which have started to pick up in the last two years. Rising wages and commercial lending as well as a falling price of money have promoted private consumption and investments, including computers, mobile telephony, the Internet and other ICT goods and services.

Table 1.: **Main Macro Economic Indicators**

	1996	1997	1998	1999	2000	2001	2002	2003*
PPP GDP per Capita, €	6 170	6 850	7 380	7 310	8 080	8 730	n/a	n/a
GDP Growth, %	4.7	7.0	7.3	-1.8	4.0	6.5	6.7	9.4
Inflation, %	13	8.4	2.4	0.3	1.4	2.0	-1.0	-0.1
Budget Deficit, %		1.0	1.3	0.3	1.6	1.5	2.2	n/a
Current Account Deficit, %	9.2	10.2	12.2	11.2	6.0	4.8	5.3	8.9
Unemployment, %	16.4	14.1	13.3	14.1	15.4	17.0	13.0	n/a

** First quarter*
References: Statistics Lithuania, Bank of Lithuania, Ministry of Finance

[1] The European Committee under the Government of Lithuania estimates that a successful integration will contribute approximately 1.14 percentage point to the country's GDP growth per year.

The present macroeconomic background is favourable in Lithuania. The risks of deterioration exist but can be managed if desired (except for strong negative external factors). Political stability could decrease slightly, but not to such an extent as to create serious threats for economic activities.

Lithuanian **population** is aging and this trend is likely to persist in the future. Lithuania has a non-proportionally (first of all, in terms of economic output) large rural population, which has been rather stable so far. The domestic mobility of work force is low. Migration saldo is negative. The "brain drain" process, including ICT specialists, can be observed and is likely to expand in the future. The average welfare of the population is rising, although statistics report a reduction of income from self-employment. Social differentiation is rather high as income and consumption patterns in urban and rural areas differ significantly, affecting also the access to and the use of ICT. Yet, the diversity of goods and services consumed by households is increasing.

The demographic framework is exercising an additional pressure on all social sectors (particularly on the pension and health care systems) and ultimately on the budget. This has prevented a decrease of labour costs.[2] Demographic trends are also changing the pattern of employment as more and more people tend to work on a flexible schedule and employers increasingly need flexible work force. This is a new challenge for labour regulation and education policy.

A falling employment rate and high unemployment, especially among the low-skilled, have been causes of concern for some time now. These trends have been largely affected by the ongoing restructuring. Upon the completion of major restructuring projects (except for the Ignalina Nuclear Power Plant and Lithuanian Railway), this factor will recede.[3] Unemployment is being pushed down by a steady economic growth. However, a skill gap remains a major weakness of the Lithuanian labour force, especially in the ICT industry, while public policy has not addressed it properly. Labour taxes, labour market regulations and general business conditions are other factors upholding a high level of unemployment and discouraging a risk-taking, innovative entrepreneurship. Although Lithuania has a proportional system of income taxation, a high personal income tax and a lack of a "ceiling" on social insurance contributions result in high costs of qualified labour. The introduction of progressive income taxation is envisaged in the program of the present administration, although plans to implement it in the near future have been revoked recently. A mandatory minimum wage is a clear obstacle to employment for the low-skilled. Yet, it is likely to be increased further.[4] Business conditions are not favourable enough for self-employment, which would be natural for the Lithuanian economic and demographic structure. Favourable business conditions are especially important in countries which lack entrepreneurship, cooperation and risk-taking traditions.

[2] In Lithuania the general tax level is comparably low, 33.3 % GDP in 2003, but labour is taxed quite heavily as social security contributions are 34 percent, while the personal income tax is 33 percent.

[3] A reform of the Lithuanian Railway is foreseen in a number of policy documents and legal acts. It would entail large-scale dismissals. However, the implementation of this reform on a needed scale and in the near future is very unlikely.

[4] The surveys show that people, especially in rural areas, are willing to work for less than the minimum wage.

Given the skill gap, difficulties that employers face in finding the right employees, high unemployment and a high level of passive unemployment, policy should be targeted towards the improvement of labour supply rather than job creation. Some public discussion on the topic is evolving, so some positive changes can be expected, but not in the near future.

Labour supply can also be enhanced by more flexible labour regulations and modernisation of the educational system. Immigration policy, which is passive and in general restrictive today, could help to solve some problems of an aging population. Without changes in policy, unemployment will remain a serious concern in the near future.

Positive **export** trends are reflected in an accelerating pace of growth in almost all commodity groups, with refined oil products, textile and apparel, wood and furniture as leading sectors. Labour-intensive relatively low-technology industries prevail in the export structure and will have to increase the use of ICT in order to increase productivity. Given that 40 percent of Lithuanian exports go to the European Union (2003 IQ), exports will continue to expand as the terms of trade with the EU improve: customs procedures are being simplified, companies continue to strengthen their trading links in the European Union and export markets are expected to recover.[5] Productivity and efficiency growth in manufacturing will contribute to export expansion in all markets.

ICT industries – mainly production of electronic components, electrical and optical equipment – made 8.7 percent of all industrial output and 10.6 percent of exports in 2000. The success of other export-oriented sectors depends on the size, the level of competition and the value of the currency (for countries other than the EU) of their sales markets plus their own productivity growth.

Major risks for export development are related to the situation in the export markets and competitiveness of Lithuanian producers. The former is an external factor and it has not been encouraging so far, while the latter presents a challenge for Lithuanian public policy and enterprises alike. The volumes of Lithuanian export are also sensitive to the trade regimes with Eastern markets, first of all with Russia and Ukraine.[6] The Russian market is also interesting for ICT industries, especially services. Trade regimes will become slightly more restrictive after Lithuania joins the EU.[7] The Lithuanian government is likely to pay significant attention to economic relationships with Russia. However, they will depend on Russia's accession into the WTO, its internal reforms and progress in adopting EU's *acquis* in trade-related areas. The Kaliningrad factor can also play a role of a catalyst in promoting more active EU-Russia relationships.

Export to Russia and other countries of the US dollar zone have been affected mostly by a sliding dollar.[8] This has had a rather profound negative effect on the Lithuanian food industry and consequently on agriculture, which ultimately causes social problems and exerts a pressure on the state budget.

[5] A decline of exports to the EU countries from 49 percent to 40 percent in 2003 has largely been due to a change of the dealer of the Mazeikiai oil refinery production from the UK to Switzerland.

[6] Ukraine accounted for 2.6 percent of total Lithuanian exports and for 1.6 percent of total imports in 2002, Russia made up 12.1 and 21.4 percent respectively *(Statistics Lithuania, 2003/1, p.97)*.

[7] Changes in the Lithuanian trade regime with Ukraine will be particularly prominent as the existing FTA will be denounced.

[8] According to Statistics Lithuania, the US constituted 3.5 percent of Lithuania's total exports in 2002.

The vulnerability of the Russian market is impeding Lithuanian exports and general economic relations with this country which otherwise could be much broader. However, Lithuanian business people know and have faced a number of times the risks, both political and economic. Therefore they should not be regarded as not being addressed.

It can be predicted that wholesale and retail trade, construction, transport, storage and communications will constitute a growing share of GDP. Likewise, a sizeable growth is projected for financial intermediation, which will be reinforced by the pension reform.[9] It is envisaged that the initial effect of the Structural Funds will boost the construction sector, with a lesser impact on industry and education.[10]

Improving credit conditions, co-financing of investment projects from the European Union and the need to maintain competitiveness at a high level are likely to sustain positive prospects of investment growth. Considerable investments are envisaged in all industries, including the oil refining, food, textile and apparel, wood and furniture and chemical industries as well as the ICT services. The EU Structural Funds are expected to have a marked influence on investment growth. According to the Ministry of Finance, a major effect of financial assistance from the European Union on investments is envisaged in 2005, when real gross capital formation is expected to grow up to 10 percent. By the end of 2006 a share of gross capital formation is predicted to amount to 23 percent of GDP *(Ministry of Finance, http://www.finmin.lt/finmin/index.jsp)*.

However, the effect of Structural Funds will depend on (1) administrative capacities, (2) the quality of projects, and (3) sector efficiency. Administrative capacities for the management of Structural Funds inflows are being strengthened and a number of consultancy firms are ready to provide services for applicants. However, there are still serious doubts about administrative capacities as well as abilities of SME and especially the rural population to use them properly. The third factor – sector efficiency – remains a most crucial one in the field of human capital improvement (social care, employment policy, health care and education). There are no plans or intensions to use Structural Funds for fundamental changes, so there is a threat that additional funds, if injected into inefficient systems, will sustain or even deepen the existing weaknesses. For example, a continuous increase of university enrolment with the same amount of financing decreases the quality of education, so additional funds without the replacement of the present principles will only sustain this flawed trend. Therefore the success of absorbing Structural Funds cannot be separated from domestic policies in the respective fields.

Considerably low interest rates on loans have created favourable conditions for **investment** funding from borrowed funds. The loan portfolio has increased sizeably in recent years and credit volumes are likely to grow at a steady pace in the near future. Intensifying investments processes have also been reflected in a remarkable growth of lease of investment goods, including computers and ICT services, and construction volumes. However, more sophisticated crediting mechanisms are used on a rather small scale. A number of venture funds are operating in Lithuania (most of them of foreign capital), but their investment policy is rather conservative. The equity market is marked by a relatively low liquidity and

[9] The pension reform will start from 2004. It will allow participants in the present pay-as-you-go system to direct 2.5 percentage points of their social security contributions to private pension funds.

[10] The Lithuanian General Programming Document envisages that 40.1 percent of structural funds will be used for the development of the socio-economic infrastructure, 25.8 percent will be allocated to industry, 18.6 percent to the development of human recourses and 15.6 percent for rural development and fishery.

capitalisation, although some developments are expected due to the expected rise of pension funds.[11]

The bulk of ICT investment goes to the telecommunications sector. ICT investments in financial intermediation and trade rank second and third. Industry seems to be investing less in ICT products. Large parts of investment are allocated for acquiring computer equipment and software (around 70 percent of all expenditures), which indicates a shift to more complex business operations modes and methods of activities.

In 2003 "European Investment Monitor" by "Ernst & Young" included Lithuania in the top twenty territories in terms of investment attractiveness. Lithuania has moved by nine positions to locate fifteenth. This is attributed to an improving investment climate, including a strong and credible banking sector offering favourable terms of crediting. Other factors include relatively low labour costs, a low profit tax (a general tax rate of 15 percent and 13 percent for SME), low inflation and expanding relationships with foreign companies.

Despite a formal recognition of a market economy in Lithuania, there are several **unreformed sectors** that are impeding the country's economic development and income growth as well as the introduction of ICT in such sectors as agriculture, pension and health care systems, railway and public administration. The restructuring of the energy sector is underway. Privatisation of the Lithuanian Gas company and transportation enterprises is being continued. In this context non-restructured railways are one of the biggest challenges. These reforms would pose a challenge for any government for several reasons: they all are costly, they need sophisticated solutions and, most importantly, they are socially sensitive. Governments tend to avoid them, but the harm of delayed reforms is getting more and more evident to the voters over time and some steps have to be undertaken. The pace of the pension reform to date shows that only moderate changes can be forecasted.

Structural reforms are badly needed, but there is little likelihood that they will be implemented to a needed extent. Pension reform will start in 2004. The direction is good but the reform will be too slow. Changes in agriculture will be limited to compliance with CAP. Public administration, health care and railway reforms will be promised or carried out at minimum scale, but significant changes are unlikely in the short or mid-term.

The Ignalina nuclear power plant (INPP) and Mazeikiai oil refinery[12] are inherently inefficient as they were constructed for the large SU market, although in 2003 the oil refinery generated profits. Lithuania has pledged to dismantle the nuclear power plant with financial assistance from the EU. The closure of INPP will increase unemployment in the region and can drive up the price of energy.[13] However, the future price of electricity will depend on the integration of the Lithuanian energy system into the Western European network. Lithuania and Poland have jointly asked for EU support for building a power bridge between these countries. The Mazeikiai oil refinery was recently taken over by a Russian company JUKOS, which has the EU market as its export target and significant plans for restructuring the plant.

[11] At the end of 2003, ten pension funds were registered in Lithuania.

[12] The production of the Mazeikiai oil refinery accounts for more than 20 percent of the country's export on average and about as much of the country's total industrial output *(Ministry of Economy, Statistics Lithuania, 2002)*.

[13] INPP produces about 75% of energy in the country.

The present favourable macroeconomic situation provides a good opportunity to reduce the **budget** deficit and even to balance the budget, as proclaimed by the government. However, the draft proposal for the 2004 budget foresees the fiscal deficit of 2.95 percent. Only comprehensive structural reforms could justify a budget deficit and a growing state debt, but such reforms have been delayed so far. Failure to adhere to the adopted principle of programme budgeting precludes an efficient allocation of budget resources and obstructs the reform of public administration. This is especially relevant for a successful absorption of EU funds.

2. Public policies

Lithuania has a rather stable **political environment**. Although changes in government have been more frequent than parliamentary elections, national policies have remained rather stable. This is due to widely agreed strategic priorities of the country, mainly accession into the EU and NATO. After those goals have been achieved, a wider diversity of different political forces can be forecasted. Public discussion on "Lithuania's interests in the European Union" is underway. Bearing in mind scant communication with the business community and predominant institutional interests, a common independent position and its smooth implementation are hardly feasible.

Though policy changes (especially changes in the rhetoric) can be forecasted on separate issues, EU policies will be copied without a proper adjustment to domestic conditions, therefore the consequences will mostly depend on EU policies themselves. Participation in the EU decision-making will most likely lack clear priorities or rational conclusions from lesson learned.

A lack of **administrative capacities**, as repeatedly mentioned by the European Commission, results in inefficient public administration at all levels. For business and individuals it means high additional costs and disincentives to act (bureaucracy and incentives for corruption). Creating a flexible, modern, efficient and consumer-oriented system of public administration is an uphill task that requires knowledge and political will, plus authority to implement it. Foreign and local experts can help with the know-how, while political will is difficult to foresee. Even if political will to alter the current system of public administration is in place, resistance within the system might be too strong. Therefore the most realistic way of reforming the system would be evolutional: reforms of separate institutions, the replacement of elderly personnel, education and training. A proper implementation of eGovernment could facilitate this process. This scenario would take a longer period of time and would lead to less optimal solutions, but an entirely new scenario is hardly possible.

The general business environment, albeit improving mainly due to the country's maturing democracy and market economy, has still much room for improvement. The legislative process is fast and lacks a proper dialogue with society. Legislation itself is cumbersome and ambiguous and legal provisions are open to interpretation. This harms especially small firms which cannot afford legal consultancy services. Unclear and fast-changing legislation is the most frequent complaint on the part of business people.

There are many intrusive provisions directly limiting freedom of economic activities and contracts. The establishment and the closure of a company are costly and complicated, as are the procedures for land acquisition and construction. Despite the existence of different state support programmes for small business, recent changes in tax legislation have markedly

worsened their business conditions. Sole proprietors are also discriminated in the social security system as they have no right to receive social allowances regardless of the amount of income generated from business.

Restrictions on labour contracts, working time and place and remuneration are limiting employment opportunities for socially vulnerable groups (such as students, recent graduates and the low-skilled) and for freelancers, including researchers and IT specialists. They are also reducing the supply of cheaper flexible workforce for starting businesses. This especially harms the ICT sector, as the flexibility of staffing, working hours and working place is necessary here. This also prevents young people from gaining work experience, which is a major cause of their unemployment.

An expanded role of collective agreements and especially trade unions, which come mainly from EU legislation and international conventions, are alien for the Lithuanian society and therefore they do not perform their intended functions but pursue narrow interests and complicate agreements between employers and employees.

As IST businesses are fast-changing and knowledge-intensive, a favourable general business climate and conditions for small business is a top prerequisite for information society to develop. If this precondition alone is in place, consumer demand would make IST develop irrespective of other factors.

General business conditions can be improved if a political will exists. They can be improved gradually even by muddling through with sector legislation. The effects could be observed in a comparably short term.

Investments in R&D and technology innovation processes in Lithuania are sluggish (according to statistics, R&D expenditures were 0.67 percent of GDP in 2001). The reasons for this are manifold. First of all, companies have other priorities both in terms of funding and implementation schedules. It is cheaper and faster to buy and introduce technologies than to create them. In order to expand, companies had (and in many cases still have) to solve more imperative issues, such as sizing down the personnel, enhancing employee qualifications, modernising management, reconstructing buildings to meet growing energy prices, etc. On the other hand, there are no ready R&D solutions. Universities and state research institutions that are the main potential R&D suppliers are not market-oriented. Private research institutions are exceptions or are working on shorter projects or areas of wider application (such as economic, political or legal analysis). Third, R&D expenditures are not tax-deductible therefore companies which actually invest in R&D do not show it explicitly in their financial accounting. Fourth, the state does not have any clear policy regarding R&D investments. Presently budget allocations for this purpose are distributed on an institutional basis. Such allocations are inefficient. Proposals have been made to select a number of priority sectors and to channel public funds towards them. Although selected sectors would benefit in a short run, in the long term this would distort the allocation of resources and motivations on the market, reduce the diversity of economic activity and create preconditions for favouritism and corruption. If the state invests in R&D, it should do it on the basis of competitive projects that would be evaluated by formal criteria and could be initiated by any market agents.

In order to improve the efficiency of R&D, institutional funding should be replaced with project financing on competitive bidding. Due to a very strong lobby and public influence of the present academia, such changes are hardly possible. Public funding will most likely be concentrated on the so-called "priority sectors."
Tax disadvantages for private R&D can be removed by changes in tax legislation. The threat of possible tax evasion can preclude the implementation of such policy measures on a full scale, although some partial solutions (for example, a closed list of existing cases or products) are quite probable.

Such forms of state support for business or innovations as technology parks, business incubators or clusters can be viable if they are business-led. In Lithuania business incubators have not produced a success story yet. Clusters and technology parks are still being started by state or municipal initiatives.[14] They are not a demand driven result but represent a consequence of activities of specific interest groups and reflect ineffective use of public funds. The results can be positive only if a real business interest takes over the lead.

Labour force is one of the biggest concerns in the country both in terms of unemployment as the major cause of poverty and labour supply for a growing and differentiating economy, therefore **education** is a crucial factor for the future of Lithuania. Unlike in many other countries, access to education is sufficient in Lithuania. Enrolment in tertiary education, however, is one of the biggest in the world and markedly exceeds the OECD average: in 2001 78 percent of secondary school graduates were enrolled in tertiary education in Lithuania, while the OECD average was 45 percent. A number of students per 1 000 inhabitants in Lithuania reached 43 in 2001, while the EU-15 average in 1999 made 33. Enrolment in tertiary education continues to increase. Financing of education is high as compared to total government expenditure and with other countries: 6.5 percent of GDP, as compared with the EU average of 5 percent and the OECD average of 5.2 percent (1999 data) *(Nacionalinis susitarimas)*. Public financing of higher education is very close to the OECD average, but it is comparably low on a per-pupil basis. This has definitely an impact on the major concerns of education – low efficiency and low quality.

The content of education has changed markedly since the Soviet times, but the methods of teaching remain for the most part the same. Although Lithuania did not participate in the PISA survey, it is obvious that a lack of functional education, observed in other candidate countries, is characteristic of Lithuania as well. Universities still fail to teach students how to learn, how to make decisions, how to cope with uncertainties and changing circumstances, how to work in a group and how to acquire other skills necessary for the new world economy and information society. These qualities cannot be acquired by simple administrative provision given that present teachers lack such abilities themselves or abstain from exercising new forms of teaching because the system does not accept them. In order to change the quality of education, teachers have to be motivated to invest in the quality of teaching. Such motivations can be created by financial and organisational means (there is also a strong cultural aspect, but it cannot be changed by an act of will). The same means have to be applied to achieve efficiency of the educational sector.

[14] With the exception of Kaunas Technology park which at present reminds more of a business centre than a technology park.

The financing of education has to be changed according to the following principles:

- Budget funding for education is linked to a pupil, but not the institution (voucher-based financing which is now being implemented in secondary education provides good conditions to improve cost efficiency);
- Budget funds are allocated according to the number of students, regardless of whether the school/university/college is public or private;
- Universities have the right to decide whom to employ, how to employ and how much to pay the teachers. (Having lecturers-practitioners for ICT education is essential.);
- Universities are accountable to society for budget allocations;
- Bureaucratic procedures to establish a private school are abolished;
- Universities and colleges are allowed to charge for education additionally to the fixed state-subsidy per student.

These principles would increase the variety and create competition in higher education and would force administrations to enhance the quality of education, therefore the quality of staff, efficiency and respect of market needs. The chances of implementing these proposals are negligible with the present government and, most likely, with all left-wing governments. A right-wing government could introduce some of the principles, although political considerations would make the introduction of additional payment for studies a hard decision for any government. The influence of interest groups in academia who are satisfied with the present status is another obstacle.

Enhancing the quality of the educational system is a major precondition for the development of an information society. However, it is most likely that tertiary education will not be reformed radically. A gradual improvement of the quality and efficiency of education can be expected as a result of market pressures, a natural change of the staff, reforms and undertakings of individual departments and the expansion of the private educational sector. The potential of the market can be used for instilling changes in education: by creating equal conditions for private schools to emerge, the state would support a "top-down" reform that would be strongly resisted from within the system.

Information society policy is a rather young policy in Lithuania. It is sound in rhetoric but scant in action. It is often driven by pure intellectual speculations, international benchmarking and interests groups. Despite an impressive number of documents, it is still not properly integrated into general public policy, which is the core reason of its weakness. The best evidence is that the specifics of IST (such as the possibility to use eSignature instead of the manual signature and the stamp, the possibility of part-time employment, flexible employees or employees working at home; taxation of IST products and services, and the like) is not reflected in major general legal acts, such as laws on labour regulations, taxation, accounting, etc. A lack of a stable institutional framework is one of the reasons of this fragmented IS policy, therefore the establishment of a new ministry has been proposed. However, there are no reasons to believe it will work any better than the existing ones. Furthermore, given the prevailing narrow institutional approach, a separate ministry could even complicate the integration of IST dimension into general economic policy. In general, IS policy in Lithuania is but formal and superficial as in most cases it stems not from inside demand and understanding but from international "benchmarking" as well as pressure from local business, NGO and ICT professionals. This pressure (via personalities in and around the administration) often makes IS policies too technocratic: underlining technology is viewed as

a value in itself but not as a tool for achieving higher competitiveness and a higher standard of living.

eGovernment services are clearly lagging behind private eDevelopments, while the outmoded public administration system and narrow institutional interests tolerated on the governmental level are major reasons for this. Different political parties put different emphasis on IS policy. Presently the ruling leftist coalition (Social Democrats and Social Liberals) are exercising a clearly passive IS policy. If any steps are taken, they are dictated by the EU agenda and by the private sector in some cases. If the right forces win the elections (in the autumn of 2004), a more active IS policy can be expected. The risks associated with passive policies include the under-representation of one important actor – the government – in the IST market and a lack of a legal framework for IS activity (the latter in Lithuania is not the case). The risks associated with active information society policy include distorted motivations and competition on the IST market as well as overregulation of IS activities.

A sector approach to IST policy can be determined by the newness of the IS phenomenon. Therefore, a better integration can be expected in the future. Yet, if performed deliberately, integrated IS policy can markedly facilitate IS development.

3. The Lithuanian Information and Communication Technologies Sector

The Lithuanian ICT sector used to have rather strong traditions which were mainly sustained by the demand of the military industry of the SU. After the restoration of independence a loss of former funding and institutional changes aggravated the situation. Many activities were closed and specialists quit for other areas (e.g. business). The present ICT market in Lithuania is based on services, while industry is rather modest (8.7 percent of total industry in 2000). The ICT sector has shown a remarkable growth in recent years and the trend is towards continued growth. This can be explained by an unsaturated domestic market and especially a low-level utilization of modern technologies in public institutions, rapidly growing investments into the Lithuanian finance, energy and telecommunications sectors, interest of foreign companies in Lithuanian ICT specialists and expanding export of IT solutions. The still growing domestic demand, qualified specialists and a possibility to invest into the Lithuanian ICT companies on relatively favourable conditions have been factors that have lately attracted considerable interest of foreign investors.

Telecommunications is one of the fastest growing (According to Infobalt, the mobile communication market rose by 74% in 2002), innovative and expanding service sectors of the Lithuanian economy. It is also attracting the bulk of foreign investments, transmitting the Nordic type of corporate culture and practicing the so-called "socially responsible" behaviour in society (active in charity and projects of public concern). In terms of new business projects, the companies are rather conservative and not fond of big risky undertakings (such as 3G services).

Despite the granting of exceptional rights in terrestrial communications, privatisation of "Lietuvos Telekomas" was the most positive act in telecommunication policy. The last state-owned telecommunication operator – the Lithuanian Radio and Television Centre which performs a mixture of public and commercial functions – has to be sold in order to complete privatisation in this field.

The abolition of exceptional rights in providing fixed communication services has been another positive fact of telecommunication regulation. The fixed communication market was liberalized on 1 January, 2003. The establishment of a Communication Regulation Agency (CRA) as an independent regulator was another change in the institutional setup. Previously the Ministry of Communication, a political institution with relatively low professional capacities, was in charge of telecommunication policy and regulation. Expanding regulation, which is driving up the prices of services and distorting the market, is a negative trend. The law provides for extensive regulation (first of all, wide authority and powerful tools of CRA to intervene in business), which is reinforced by the inclination of regulatory bodies to exercise their powers without adequate respect of market principles. There are efforts to adjust legislation to technological convergence by converging some regulations. But regulation remains separate and for some activities it is overlapping institutionally and procedurally (e.g., allocation of the spectrum). Intrusive regulation of telecommunications, both fixed and mobile, violates the interests of consumers as operators have to carry a heavier burden of regulation costs and the targets of regulations are not always desired by consumers. Initiatives and motivations to invest in these businesses are much suppressed. This has a crucial impact on information society, as the telecommunication sector is the most vital driving force of its development in Lithuania.

Major threats for a further successful development of this sector are threefold. First, overregulation reduces competition, flexibility and initiative, while regulatory costs push prices up. Second, the burden and implementation procedures of social obligations, such as universal services, distort competition and increase consumer prices. Third, competition without cooperation between operators could lead to price wars and worsen their financial conditions.

Regulations of telecommunications can be reduced if there is a political will. If this is postponed, a potential of present IST movers can be lost and the process will slow down.

Information technologies are also a fast-growing sector of the Lithuanian ICT market (according to Infobalt, IT output made 5.0% of GDP in 2000, 5.5% in 2001 and an estimated 6-7% in 2002). A markedly fast growth of this sector in recent years is related to large-scale investments into the country's economy and a rapidly expanding market of IT services. Although massive investments by telecommunication, banking, retail-sale and other big-scale consumers are completed, the demand from households, public institutions and small businesses is growing. Lithuanian IT companies have potential to expand significantly their export activities. The following factors make Lithuania IT companies attractive to international software developers: qualified, multilingual and cost-effective workforce; growing international experience and high quality of products and services; a well-developed telecommunications infrastructure; and a favourable geographic position in between the FSU, Scandinavian and Western European markets.

There are four major factors hindering the IT market. First, the level of piracy on the domestic market and the potential export markets in FSU are still unacceptable.[15] Second, there are insufficient capacities for competition in the EU and the world market as well as difficulties in consolidation of companies within the Baltic region. Third, consumption is falling in the export markets and there are cheaper competitors there. Finally, there are legal and

[15] However, the level of pirated software in Lithuania is gradually decreasing and public opinion is changing towards recognition of intellectual property as any other types of property.

administrative constraints to expanding eCommerce and other eServices. Legal constraints usually entail over-restrictive regulations, state monopolies (as in the case of register data distribution) or a lack of court practice (as in the case of eSignature). The IT market would also expand faster if eGovernment undertakings started to develop more rapidly. Still, the government and public consider IT as one of the priority sectors of the Lithuanian economy: one of the clusters ("the Sunrise valley" in Vilnius) is allocated for IT and telecommunications and the number of IT students in universities is increasing. However, the fact that the Lithuanian IT sector has no comparative advantages with respect to the other candidate countries is somehow ignored.

Consolidation of the IT companies and essential improvements in the educational system are major preconditions for the successful development of Lithuanian IT companies.

4. Information society developments

A massive use of IST is a new but rapidly spreading phenomenon in Lithuania. At the end of 2002 telecommunication penetration reached 30 percent for fixed and 45 percent for mobile phone services, while internet penetration stood at 20 percent. **ICT penetration** is rising the most rapidly in business and households. Providers of telecommunication services are playing a major role in this respect, both by providing ICT services and by representing an advanced level of IST. Other sectors, such as financial services and trade, represent a general trend of growing ICT usage. The overall ICT penetration is lower in industrial sectors, although incoming foreign and domestic investments are changing the situation.

The public administration sector is lagging behind the private sector in terms of ICT usage. Almost all national institutions have their websites (except for lower-tier local administration), although the services offered on websites are only of the first and second level. The integration of the state registers is one of the major preconditions for **eGovernment** services (and for eBusiness to some extent). Despite a rather good understanding of the problem and a rather good quality of the conceptual framework, the integration process is doomed to be slow and costly due to institutional interests, an unreformed public administration system and a tendency towards technical and administrative centralisation (instead of soft integration). Market forces, if allowed to enter the register-data distribution market, could create competition for the State Register Centre, offer new and more flexible services to consumers and thus accelerate the process.

It is often claimed that a lack of eSignature services precludes the development of eGovernment. However, after a law on eSignature was amended and a new Civil Code entered into force, legal preconditions for eSignature services were created and eSignature services, albeit not based on PKI, became available on the market. Admittedly, a lack of court practice in applying the new civil code in general and provisions on eIssues in particular has created legal uncertainty. eSignatures with qualified certificates are required due to security concerns, but they have not been feasible yet from the economic point of view. Financing of this service from public funds would be inefficient and socially unjustified and would impede the development of a competitive eSignature market.

Health care is one of the least influenced sectors in terms of the advancement of information society technologies. Due to low levels of funding and an ineffective system of health care provision, general working conditions in medical institutions have not improved significantly. Recognizing the need for education on IST-related matters, the educational sector is faced

with an absence of clear goals and concrete plans of IT implementation. The present infrastructure is sufficient to cope with computer illiteracy in schools, although computerization of schools is still recognized as an end in itself but not as a means for achieving broader goals, such as better quality of education. Wider outcomes of the process (such as influence on learning other subjects) are not analyzed and funding for these purposes is unstable and scant.

General ICT use will grow due to growing population income, further industrial modernisation, a growing number of public access Internet points, modernisation of some public institutions and falling prices of ICT products and services.

Presently the private sector is a leader of IS development in Lithuania. This is a very positive trend which can be interrupted if some politicians or institutions seek to demonstrate their ultimate leadership.

Digital divide is an issue in Lithuania. First of all, it is one aspect of general social divide in the society that is related to wide opportunity differences in rural and urban areas and for the educated and the non-educated (e.g., in 2001 disposable income in urban households was 1.5 times higher than in rural ones, while wage earnings were 2.9 times higher). Rural areas are disadvantaged in networking, as some kinds of networks (education, culture and telecommunication) are of lower density there. According to statistics, income of the rural population is 1.5 times lower than income of the urban population. This is an outcome of ineffective agricultural policy, which prevented agricultural workers from deciding on whether to stay in this sector and work for the market, to intentionally switch to other fields of activity or to rely on social support. As the country is small, urban settlements are evenly spread across the territory and the road access is good, all networks can be accessed within reasonable time and budget if necessary motivations are in place. Inertia and low income are the main limitations.

The creation of non-agricultural jobs in rural areas is slow. Some positive changes can be expected if infrastructural projects, foreseen in the Common Programming Document of Lithuania within a framework of the Structural funds, are reasonably implemented. The ICT infrastructure and education projects in rural areas are being carried out by Lithuanian NGOs (such as "Open Society Foundation," "Lithuanian Computer Society" and others), business, public private partnerships (such as an alliance "Window to the Future", established in 2001 by two biggest telecommunication companies as well as two biggest banks for achieving an average Internet penetration of the EU in Lithuania within three years), international organisations (such as the World Bank and UNDP) and separate individuals.

Bearing in mind increased competition in the telecommunication market, price decreases for voice as well as internet services can be forecasted.[16] In case of internet services, this will be felt first of all in cities, where cable TV is present. Therefore for a certain period of time price differences in different locations can even widen, but the general price level will be decreasing everywhere.[17] The introduction of universal services can be a new factor

[16] According to preliminary CRA's estimates, telecommunication prices (including the internet) fell by 40 percent during first half year of 2003.

[17] This process is already underway. "Lietuvos Telekomas" has reduced markedly tariffs for calls from fixed to mobile phones. Mobile operators have made their pricing system more transparent and have lowered a number of prices.

destabilizing the existing market. It can also harm the financial status of the operators appointed to provide universal services. As the World Bank indicates in its report, a universal service approach in a country with a fixed network density of 30 percent is risky. *(World Bank, March 2003).* A universal access approach would be more relevant and less harmful for the market.[18]

Information society in Lithuania is progressing rather fast. The private sector has been the driving force behind this process (both in terms of ideas and investments). In general Lithuania is not a risk-taking society, but it has deep-rooted traditions of industriousness. Moreover, cultural habits of the society are changing rapidly due to intense communication with other countries and a change of generations. People's strong aspirations for a better life and self-expression are reinforcing this process.

[18] This approach focuses on providing access to ICT services through public points (telecentres) in rural and low-income urban areas on a commercial basis with a one-time subsidy minimised by biding for a defined level of services for a defined geographic territory and period.

SCENARIOS

Information society is a natural trend in a market economy, as was industrialization a natural trend a couple of centuries ago: driven by competition, producers employ technologies to increase their productivity. As competition stiffens, the intensity and the scope of technology use increase too.[19]

External factors and public policies can accelerate or decelerate information society. For a small and open economy like Lithuania, economic development in its export/import markets (first of all in the EU and Russia) is an important external factor.[20] For a new EU member who lacks its own clear position on most issues as does Lithuania, common EU policies (such as CAP or external trade policy) are another strong external factor. However, external factors are uncontrollable in terms of Lithuanian policy. The internal factors are those that need to be investigated in this respect. Many of them have an influence on the choice of scenarios to be considered as plausible.

Major factors of continued growth are the following:

- General business conditions, including labour regulations, taxation, land acquisition, enter to/exit from the market and so on (the level of incentives for entrepreneurship);
- Macroeconomic background (the level of general economic risk);
- Political background (the level of political risk);
- Structural reforms (the burden of legacy);
- Social policy (the level of felicity);
- Transmission of EU policies (imitation versus application);
- Education (administration versus market);
- Level and targeting of specific regulation of telecommunications, IT, self-employment (security versus innovation);
- Interpretation of IS and IS policy (exclusion versus integration);
- Budget policy (institutional versus program financing);
- Space for private initiatives (political versus private champions);
- Efficiency of R&D activities;
- Public mentality (looser versus winner).

The base line scenario

Bearing in mind that moderate changes of the factors affecting the development of the information society are expected, the following scenario can be seen as the most likely for Lithuania: Information society will develop slowly but steadily, driven by private sector initiatives from inside and pulled by EU benchmarking from outside. The structure of the economy will not change dramatically; the quality of public administration will improve gradually; the funding of R&D will be more focused, but not reformed entirely; the funding of education will not be reshaped but will increase due to private funding and projects co-financed from Structural funds. Telecommunication and internet penetration and the use of

[19] For more theoretical argumentation see L. von Mises' *Human Action.*

[20] Lithuanian business people know and have faced a number of times Russia-related risks, both political and economic. These risks cannot be eliminated but they can and are being addressed to a certain extent.

ICT services will grow naturally. The growth will also be driven by subsidised services (universal services, public internet points, state/municipal/business/private support programs, including projects co-financed by the Structural funds). In the long term ICT manufacturing will grow but fluctuations are possible as new competition challenges surface in the export markets. eGovernment services will remain the weakest link of information society. The role of private companies, society and NGOs will continue to increase.[21] For estimation of the convergence level with the Lisbon criteria see the table below.

The progressive policy scenario

This scenario would allow Lithuania to rise to a new level of economic and social relations. The adoption of the below-mentioned policy recommendations could help implement it. A favourable investment climate (clear regulations, low taxes and efficient bureaucracy) would enhance entrepreneurship and consequently investments would grow and unemployment would shrink. A reform of education financing would improve the quality of education and eliminate the skill gap. All this together with other structural reforms would lower the demand for social allowances and improve the financial viability of social protection systems. This would have a positive effect on the macroeconomic situation and social stability. It would help to strengthen competition, to achieve an efficient allocation of resources, to increase the use of IC technology in both industry and households and to secure a better standard of living. If this scenario is pursued, Lithuania would achieve high competitiveness in the European Union. For estimation of the convergence level with the Lisbon criteria see the table below.

Taking into account needed political decisions and the chances for them to materialize, **recommendations** for this scenario are the following:

- to improve general business conditions by reducing and simplifying regulations, lowering taxes and spelling out laws;
- to maintain strict fiscal policy;
- to implement structural reforms in the promptest way possible;
- to target social policy at the improvement of labour supply rather than job creation;
- to have clear priorities, based on other recommendations presented herein, and to adjust the adoption of EU policies to local circumstances to the biggest extent possible;
- to increase the efficiency and quality of education both by administrative means and by lifting the numerous restrictions and bureaucracy inhibiting the potential of private education;
- to reduce the intrusiveness of specific regulations on telecommunications;
- to integrate IS policy into general public policy;
- to fully implement the principles of program budgeting;
- to allow and encourage private initiatives by non-monetary means;
- to implement project financing with competitive bidding for R&D activities. Without changing the financing principles to abstain from increasing public financing;
- to remove tax disadvantages for private R&D;
- to restrain from promising „a better future" and to inform people about the real state of affairs and planned reforms.

[21] Structural Indicators at: http://europa.eu.int/comm/eurostat/Public/datashop/print-product/EN?catalogue=Eurostat&product=1-structur-EN&isprintversion=1

Since the proposed policy recommendations are expected to be implemented only to a small degree, this scenario is rather implausible.

The sector-based policy implementation

This scenario would mean targeted state support for the selected economic sectors (e.g., ICT manufacturing, IT industry or some of the traditional sectors) such as export promotion, investments to R&D and the like as well as public investments into education. It would bring good results in these sectors and good scores in benchmarking in the short term, but the long term consequences would be an inefficient allocation of resources, distorted competition and consequently reduced welfare. If this scenario were pursued, state institutions together with the leading companies in the selected industries would lead the process, while the rest of the business community, NGOs and the society would remain in the background. This would discourage entrepreneurship in the rest of the economy and increase opportunities for corruption. The structure of the economy could alter as a result of overinvestment in the promoted sectors and a smaller diversification of industry. For estimation of the convergence level with the Lisbon criteria see the table below.

There is some likelihood for this scenario to be implemented because sector-based thinking is characteristic of many politicians and economists. In addition to that, interest groups are supportive. Extra budgetary expenditures are the main obstacle for the implementation of this scenario.

The technology promotion scenario

This policy would bet on the competitive advantages of ICT to boost the competitiveness and productivity and to transform Lithuanian industry from the prevailing low value added to high value added production. All Lithuanian industries would be motivated to invest more in technologies first of all by obtaining an extra favourable tax treatment of these investments. Deferred taxation, subsidised crediting, export schemes and publicly financed training programs would be used to support emergent sectors. This scenario would also embrace targeted state investments into ICT in public institutions, eGovernment, education and R&D in the field of technology.

Although some separate elements of this scenario are being implemented, its' complete implementation is unlikely for several reasons: (1) such policies require excessive financing; (2) given the difference in earnings in Lithuania and the European Union, priorities for public investments would be concentrated in other areas, such as agriculture, public administration and social benefits.

Table 1.: **Estimated level of convergence with the Lisbon criteria depending on the scenario,** grades 0-1-2 in the ascending order

	The base line	The progressive policy	The technology promotion policy	The sector-based policy
GDP growth in the long term	1	2	1	1
Productivity	1	2	2	1*
Employment rate (objective: 70%)	1	2	0	0
Employment rate of older (55-64) workers (objective: 50%)	0	1	0	0
Public expenditures on Education	1	0	1	1
R&D expenditure (objective: 3% of GDP)	0	1	2	1
R&D private investments (objective: 2/3)	0	2	2	1*
Entrepreneurship	0	2	0	1*
Long-term unemployment	1	2	0	0
Compliance with the Growth and Stability Pact	1	2	0	0
Viability of public social systems	0	1	0	0
Accessibility of Internet in public education (objective: all schools)	1	2	2	2
Regional cohesion	0	1	0	1*

*- in selected areas

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ANNEX - TABLE OF CONTENTS

A. NATIONAL AND REGIONAL ECONOMY: GROWTH-RELATED DATA, (UN) EMPLOYMENT AND TRENDS

Table A1 : Nominal GDP growth

	Nominal GDP level, current prices, € million	GDP at constant prices, 2000 base year, € million	Exchange rate*
1990	-	-	-
1991	-	-	-
1992	-	-	-
1993	2 479	8 360.4	4.6749
1994	3 585	7 479.1	4.7154
1995	4 787	7 043.5	5.1717
1996	6 289	7 608.2	5.0118
1997	8 537	9 012.9	4.5272
1998	9 692	9 746.7	4.4924
1999	10 001	10 064.6	4.2712
2000	12 138	12 083.8	3.6990
2001	13 267	13 281.0	3.5849
2002	14 648	14 681.4	3.4605**

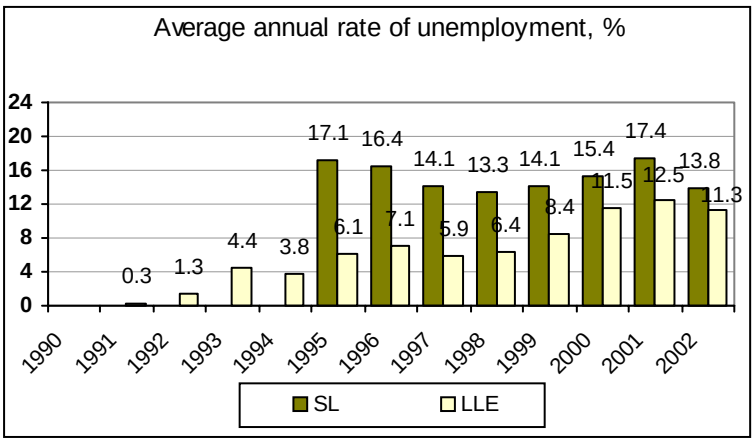
** From 1993 until 1998 LT/E.C.U. and from 1999 LT/€*
***As of February 2, 2002 litas is pegged to € at a fixed exchange rate of €1=LT 3.4528*
Reference: Bank of Lithuania, http://www.lb.lt/exchange/default.asp

Table A2.: Demand side of Growth: contribution (changes in C+I+G+Enet, % y-o-y)

	1996*	1997	1998	1999	2000	2001	2002
Final consumption expenditure	5.4	5.6	5.1	0.1	5.9	3.0	6.7
Households consumption expenditure	6.5	5.3	4.7	3.2	6.4	4.0	4.2
Government consumption expenditure	2.5	6.3	6.0	-8.1	3.9	0.3	4.3
Individual	2.5	-0.6	6.0	2.5	-3.7	0.9	8.0
Collective	2.5	14.7	6.0	-20.7	15.4	-0.3	-0.5
NPISH consumption expenditure	0.1	43.5	6.0	97.7	84.4	-10.1	0.1
Gross domestic investment	12.6	34.8	19.8	-2.1	-11.8	17.0	10.7
Export	13.9	18.7	4.6	-16.8	9.8	21.2	19.4
Import (minus)	23.3	25.0	6.2	-12.4	4.7	17.7	16.1

**from 1996 recalculated with 2000 as base year not available until 1996*
Reference: Statistics Lithuania, http://www.std.lt/web/main.php?parent=367&module=680&id=483

Graph A1.: Rate of unemployment, %



SL – Statistics Lithuania labour force survey data, LLE – Lithuanian Labour Exchange
Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 1997, p. 107, "Statistical Yearbook of Lithuania," 2002, p. 101; "Economic and Social Development in Lithuania," 2/200, p. 38
.

Table A3.: Share of different age groups among the unemployed

Unemployment by age groups*				
	<14	**15-24**	**25-60**	**60<**
1990	-	-	-	-
1991	-	-	-	-
1992	-	-	-	-
1993	-	23.3	76.5	0.2
1994	-	22.3	77.6	0.1
1995	-	18.8	81.1	0.1
1996	-	18.8	81.0	0.2
1997	-	25.5	74.5	0.0
1998	-	21.7	77.8	0.5
1999	-	23.3	76.3	0.4
2000	-	20.8	77.6	1.6
2001	-	17.7	80.8	1.5
2002	-	-	-	-

**Until 1996 labour exchange data, end of year; as of 1997 labour force survey data, annual average*
Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 1997 p. 119, "Statistical Yearbook of Lithuania," 2000 p. 109, "Statistical Yearbook of Lithuania," 2002 p. 104.

Table A4.: Employment by age groups, Part A

Age groups	**Employment rate**				
	1997	**1998**	**1999**	**2000**	**2001**
Total	52.8	53.5	53.2	51.2	48.9
15 – 19	13.9	12.9	11.2	7.2	4.6
20 – 24	55.4	55.1	51.7	47.0	42.6
25 – 29	75.5	76.9	77.7	76.8	72.8
30 – 34	76.0	76.6	78.8	73.2	74.9
35 – 39	81.1	81.1	81.5	77.9	77.1
40 – 44	81.3	83.7	81.3	78.4	75.8

Table A4.: Employment by age groups, Part B

Age groups	Employment rate				
	1997	1998	1999	2000	2001
45 – 49	80.7	81.8	82.3	76.9	73.1
50 – 54	73.5	76.8	78.8	72.2	69.5
55 – 59	52.8	55.4	56.9	54.7	55.2
60 – 64	25.0	23.5	25.4	25.2	23.0
65 +	9.2	6.4	5.6	7.7	5.6

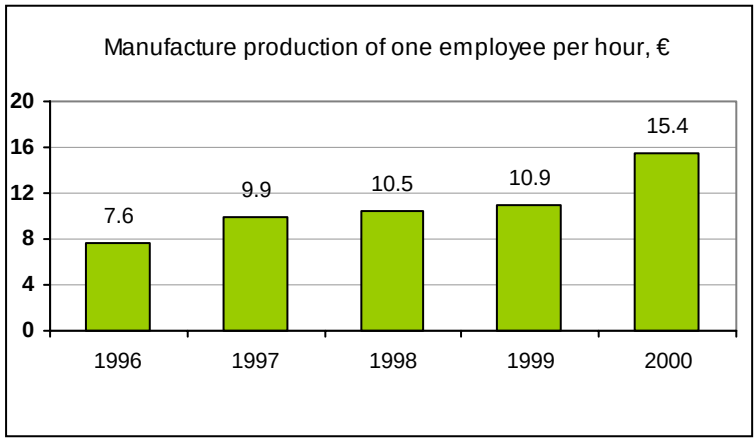
Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2000, pp. 110-111, "Statistical Yearbook of Lithuania," 2002, p. 105.

Table A5.: Unemployment by age groups

Age groups	Unemployment rate				
	1997	1998	1999	2000	2001
Total	14.1	13.3	14.1	15.4	17.0
15 - 19	34.9	27.4	30.9	43.0	45.9
20 - 24	21.8	20.6	25.2	26.4	27.8
25 - 29	14.1	13.7	13.3	13.1	16.2
30 - 34	12.9	15.4	15.0	17.0	15.6
35 - 39	11.4	12.2	13.0	12.1	16.0
40 - 44	14.1	11.2	14.5	14.1	16.6
45 - 49	13.4	12.4	10.4	13.7	16.5
50 - 54	12.4	11.2	12.6	17.0	16.4
55 - 59	10.1	8.6	9.2	13.0	14.4
60 - 64	0.2	2.5	2.3	6.6	8.7
65 +	-	0.3	-	2.9	1.4

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2000, p. 109, "Statistical Yearbook of Lithuania," 2002, p. 104.

Graph A2.: Changes in labour productivity in manufacture



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Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, p. 426.

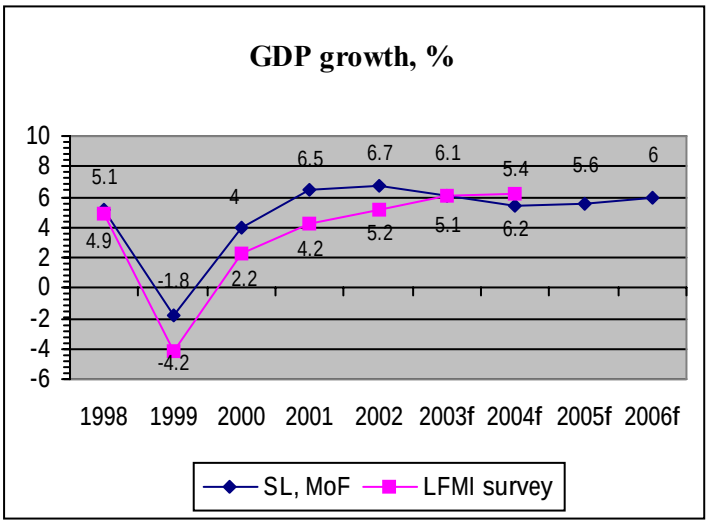
Data inconsistency

Macroeconomic data across different sources have largely indicated the same trends over the past years, although there have been significant differences in figures *per se*. A survey of market participants conducted by the Lithuanian Free Market Institute is a valuable source of alternative economic data across a set of economic variables.

The survey is based on opinion polls of market participants. The survey, launched in 1997, is carried out twice a year and presents *ex poste* estimates and ex ante forecasts of economic variables as reported by market participants. The LFMI survey is based on the expert consensus paradigm originating from the theory of rational expectations. The theory states that economic indicators can be related to certain processes in an economy, and market participants use all available information to make estimates and forecasts. Market participants tend to have the most information about an economy and it is their outlooks and expectations that determine their actions and hence the course of overall economic development.[1]

Market participants have invariably provided lower estimates of GDP growth than the official statistics, while the difference has averaged 2 percentage points and has narrowed in the past two years.

Graph A3.: GDP growth,%

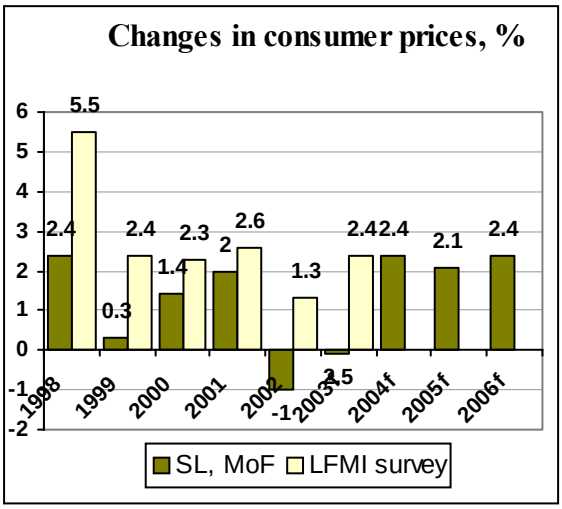


Reference: Lithuanian Free Market Institute, "A Survey of the Lithuanian Economy 2002/2003," p. 8, Lithuanian Free Market Institute, "A Survey of the Lithuanian Economy 2003/2004," http://www.lrinka.lt/Projektai/Tyrimas12.phtml. Ministry of Finance, Economic Development Outlook 2003–2006, http://www.finmin.lt/finmin/index.jsp

Differences in inflation estimates have been even bigger as market participants have consistently reported higher price increases than the official statistics. The difference has ranged between 3 and 0.5 percentage points. These differences can be explained by methodological peculiarities. LFMI survey participants evaluate changes in the average level of prices of *all* consumer goods and services, whereas the Department of Statistics measures changes in the average prices of a *basket* of consumer goods and services. It is important to note that for 2002 opposite trends were reported: the official statistics recorded a deflation of 1 percent in 2002, affected by falling food prices and an appreciating *litas*, while market participants estimated the annual price rise at 1.3 percent. Given that food products account for the largest portion (35 percent) of the official basket of consumer goods and services, a marked decline in prices thereof in 2002 had the biggest impact on the official consumer price index and hence on the difference between the official indicator and the estimate of market participants.

[1] The oldest and most famous survey of economists' expectations is the Livingston survey conducted in the United States since 1946.

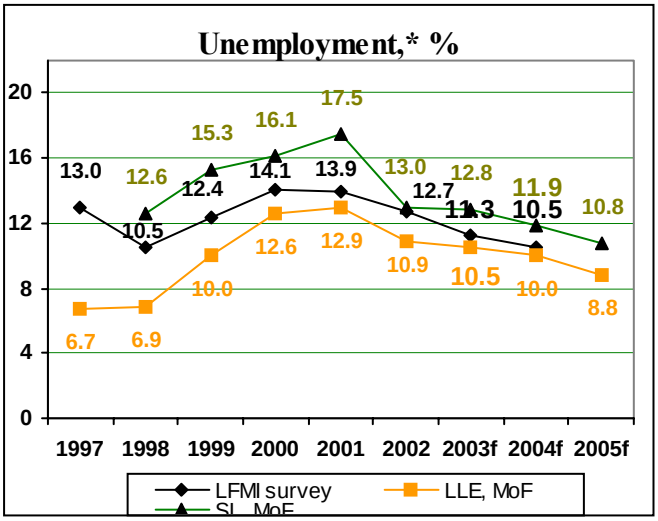
Graph A4.: Changes in consumer prices, %



Reference: Lithuanian Free market Institute, "A Survey of the Lithuanian Economy 2002/2003,"p.17, Lithuanian Free market Institute, "A Survey of the Lithuanian Economy 2003/2004," http://www.lrinka.lt/Projektai/Tyrimas12.phtml; Ministry of Finance, Economic Development Outlook 2003-2006, http://www.finmin.lt/finmin/index.jsp

Unemployment estimates have also differed quite markedly across sources. Labour force surveys have shown the highest rates of unemployment, while the Labour Exchange has recorded the lowest levels. The estimates of market participants have come in between (see diagram below). The trends have largely coincided, with an exception of the year 2001. The estimates of market participants and the Labour Exchange data differ because the Labour Exchange announces the number of registered jobless individuals, while the LFMI survey shows the ratio of all jobless individuals seeking jobs to the labour force. The difference between the Labour Exchange data and the labour force survey is largely indicative of the scope of hidden unemployment. It also shows that not all jobless individuals register with the labour exchange. As labour force surveys show, only about 63 percent of unemployed individuals apply to the labour exchange. Others usually look for jobs through media advertisements or with the help of acquaintances or apply directly to employers.

*Graph A5.: Unemployment, * %*



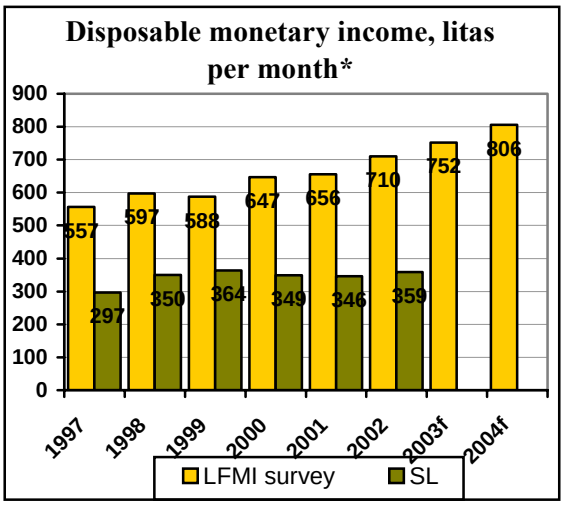
**end of year*
Reference: Lithuanian Free Market Institute, "A Survey of the Lithuanian Economy 2002/2003," p. 21, Lithuanian Free Market Institute, "A Survey of the Lithuanian Economy 2003/2004," http://www.lrinka.lt/Projektai/Tyrimas12.phtml; Lithuanian Labour Exchange; Ministry of Finance, Economic Development Outlook 2003–2006, http://www.finmin.lt/finmin/index.jsp

Admittedly, the difference between the estimate of market participants and the official labour force survey in 2002 contracted quite sizeably. This can be explained by the fact that the results of the 2002 labour force survey were recalculated based on the data from the 2001 population census which showed that the total population figure was actually smaller than had been estimated in the preceding labour force surveys.

Large discrepancies are observed in data regarding household income and earnings. Official statistics, based on quarterly household budget surveys conducted by the Department of Statistics, have been approximately twice lower than the estimates provided by market participants. Official statistics reported that in 2002 household income averaged EUR273 (or EUR104 per household member), while market participants put it at EUR539 (or EUR205 per household member). These differences can be explained by different samples used in the two surveys. The respondents in the official surveys are for the most part relatively poor households who participate in the surveys because of offered financial remuneration.[2] In addition to that, many households are unwilling to disclose their actual financial situation and therefore refuse to participate in official surveys.[3]

[2] A total of 36 percent of households in large cities, 20 percent of households in towns and 13 percent of rural households refused to participate in the 2001 household budget survey of the Department of Statistics.
[3] According to a household survey (2 998 households) conducted by LFMI in mid-2002 as part of a World Bank "Housing Programme," about 37 percent of the Lithuanian population is inclined to conceal their actual income levels.

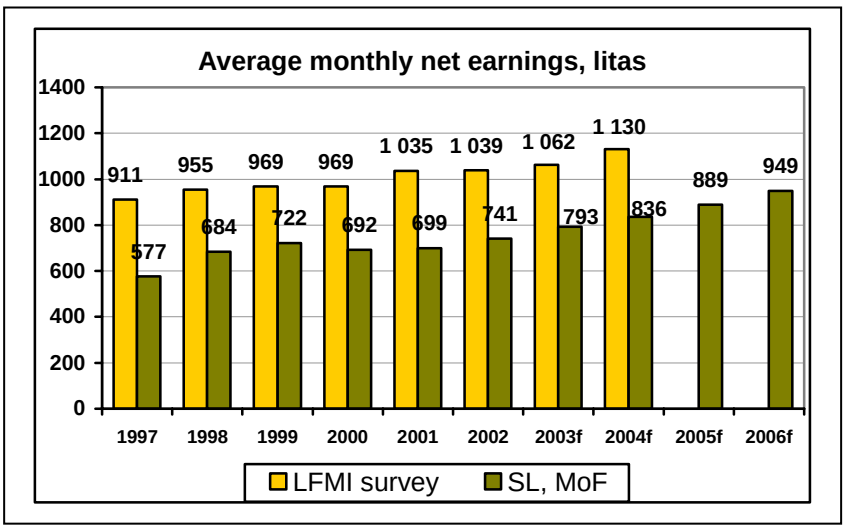
*Graph A6.: Disposable monetary income, litas per month**



**per household member*
Reference: Lithuanian Free Market Institute, "A Survey of the Lithuanian Economy 2002/2003," p. 27, Lithuanian Free Market Institute, "A Survey of the Lithuanian Economy 2003/2004," http://www.lrinka.lt/Projektai/Tyrimas12.phtml

The estimates of wage earnings show similar differences: the estimates of market participants are considerably higher than the official figures. According to the official statistics, in 2001 average monthly net earnings were EUR 202, while market participants estimated them at EUR 299. Again, this gap can be explained by methodological differences. The official statistics reflect only officially reported earnings, while the LFMI survey shows the average level of reported and unreported monetary labour earnings after tax. In addition to that, the official statistics do not measure earnings of sole proprietors but include them in the official earnings indicator after applying a certain ratio.

Graph A7.: Average monthly net earnings, litas



Reference: Lithuanian Free Market Institute, "A Survey of the Lithuanian Economy 2002/2003," p. 30; Lithuanian Free Market Institute, "A Survey of the Lithuanian Economy 2003/2004," http://www.lrinka.lt/Projektai/Tyrimas12.phtml; Ministry of Finance, Economic Development Outlook 2003–2006, http://www.finmin.lt/finmin/index.jsp

B. NATIONAL AND REGIONAL POLICIES

B1. Institutional setting

According to their respective regulations, there are the following institutions involved in IS policy matters in Lithuania in 2003:

Ministry of Interior (www.vrm.lt)
Department of Information Policy
The major goals among others:
- to participate in shaping the state information policy strategy and information infrastructure, and its implementation;
- to participate in coordination of information technology security provisions for the state institutions and implementation of automatic classified data processing policy.

Ministry of Communications (www.transp.lt)
Depatment of Information Technologies and Telecommunications
The major goals among others:
- to shape and to implement general state transport, post and communication strategy and policy;
- to set up major directions for Lithuanian transport, post and communication development;
- to coordinate interaction of transport, post and communications.

The Communications Regulatory Authority (www.rrt.lt)
It is a state institution, regulating communications activities in Lithuania. The tasks of the CRA are set out in the Law on Telecommunications to ensure:
fair and non-discriminatory conditions for operators, especially with regard to interconnection of networks; conformity of equipment with technical standards; equal non-discriminatory consumer access to public telecommunications networks and services; public operator and service provider compliance with national defence and security obligations; electromagnetic compatibility of equipment. The Director of the Authority and the members of the Council are appointed by the President of Lithuania.

Ministry of Economy (www.ekm.lt)
Department of Industry and Business, Innovation and Technology Division
The major goals among others:
With respect to EU support, to shape development policy and long-term strategy for Lithuanian economy, setting up sector-priorities for rapid growth;
To provide favourable conditions for business and to increase exports and employment with respect to globalisation and spread of information technologies;
To implement industry development policy: to create conditions for the growth of industry competitiveness, to certificate products, to increase exports of industry production and to improve foreign trade balance.

Science and Technology Commission
A counselling body to the Government on applied science, technology and innovation development issues to promote cooperation between science, industry and business, to shape and to implement policy and strategy. The Commission is chaired by the Prime Minister.

Ministry of Education (www.smm.lt)
Department of science and Studies, Division of Science and Division of Technologies
The major goals among others:
To shape and to implement national policy of scientific research, experimental development and studies (high education, training and retraining of researches);
- to coordinate activities of Lithuanian Science and Study Institutions;
- to organise state support and regulation in the field of intellectual creation in science and studies.

Information Society Development Committee at the Government of Lithuania (ISDC) (www.ivpk.lt)
The mission of the Committee is to design, arrange and co-ordinate processes aimed at the development of information society.
The key objectives of the Committee are the following:

- to participate in the process of shaping state policy for the development of ICT and coordinate its implementation; to coordinate planning, creation and development of the ICT infrastructure complying with the EU standards; to ensure equal access to ICT to all Lithuanian consumers, to promote competition between ICT service providers, and to expand communication between population and legal entities, on the one hand, and between state and municipal institutions, on the other; to coordinate the application of modern technologies; in collaboration with ministries and other governmental institutions and public authorities, to formulate innovative technological policies for the economic development, to organize the promotion and regulation of intellectual activities on the state level.

State Data Protection Inspectorate (www.ada.lt)
Aspiring to the compatibility of personal data protection in Lithuania to the requirements of the EU and for proper assurance in the environment of informational society, the State Data Protection Inspectorate develops data protection, supervises processing of personal data and contends with violence, strives to ensure protection of the rights of a data subject and form propitious conditions for individuals to appeal to Inspectorate, when he/she would like to complain about the actions of data controller or to consult on the rights of a data subject.

Information Society Development Commission
It is an interdepartmental commission, which discusses strategic issues on information society development in the country, provides the Government with proposals for the implementation of its programs in this field, coordinates activities of the ministries and other state institutions in integrating information systems, modernizing public administration, promoting technological innovations in society. The Commission is chaired by the Prime Minister.

Radio and Television Commission of Lithuanian (www.rtk.lt)
It is an independent institution with powers of regulation and supervision of activities of commercial radio and television broadcasters, which is accountable to the Parliament. Together with CRA, the Commission works out the strategy and the strategic plan of radio and television broadcasting. It announces tenders for the acquisition of broadcasting or re-broadcasting licenses. It issues licenses: establishes the tender conditions and the terms of licensing, as well as fixes the rate of a registration fee and licensing fee.

Knowledge Society Council
A Council established by the President's decree in 2001, consisting of the outstanding society members, active in the field of Information Society, and acts at the President's office. The mission of the Council is to identify, discuss and provide proposals on urgent issues of the knowledge society policy and its implementation and to facilitate the dialog between the society and public institutions in the knowledge society matters.

B2. Report on the Implementation of the Action Plan for the Information Society Development in Lithuania in 2002

It was presented by the Committee for Information Society Development in February 2003. The report was prepared according to the four priorities, set up in the framework.

(1) Competence of population in ICT use. Some of the work performed:

ICT in schools. Acquisition of PCs: target – one PC per ten pupils at the end of 2004, achieved – one PC per 31 pupils at the end of 2002 (both private and public funding); licensed SW; teaching applications in the Lithuanian language; training of teachers.

ICT in high schools. Acquisition of PCs: one PC per 21 students (both private and public funding); increased number of students in informatics and IT; further development of LITNET – Computer Network for Studies and Science in Lithuania.

ICT in libraries. Expansion of the Network of Lithuanian Academic Libraries; training of librarians.

New ITC learning facilities in labour exchange training centres.

Promotion of open code SW. A database of open code products established at the Committee web site. Through the efforts of private and public entities, CD of open code programmes adapted for local language produced.

Public internet access points. In 2002, 66 PIAPs (for LTL 1.2 million) were installed in 51 out of 60 existing municipalities trough a private initiative "Window to the Future" (see B35). This initiative was supported by other private as well as public partners with budgetary and PHARE funds to install additional 300 PIAPs and to start training programmes for their users in 2003.

(2) Public administration:

State registers. A conceptual framework for the creation of an Integral System of the State Registers was approved by the Government.

Identity cards. New, more secure identity cards for Lithuanian citizens were issued. The cards are supplied with bar codes (although creation of the system for electronic identification and social data of citizens was foreseen in the Plan).

Common requirements for ICT in public institutions. Draft legislation of common requirements for e-document management systems and internet sites of public administration institutions were created. A pilot project of switching to Ipv6 standard internet protocol was carried out.

Statistical reports. Three electronic forms of mandatory statistical reports are posted on the website of the Department of Statistics and they can be delivered by e-mail when filled up. The Department is planning to introduce some 5-6 e-forms more in 2003.

Integration of state communication and data transmission networks. Implementation of the project has been suspended.

Box B1. Integration of state communication and data transmission networks
The so-called "Telecom 2" project was aimed at constructing an alternative fixed telecommunication network using fragmented networks of state institutions or state owned companies (Electricity Transmission Company and Lithuanian Railway). The project foresees heavy budgetary investments into infrastructure and aims at creating competition to incumbent fixed telecommunication operator "Lietuvos Telekomas." It was strongly criticized by economic policy analysts (first of all by the Lithuanian Free Market Institute) and market participants for several reasons: (1) distortion of competition (2) direct involvement of the state in business, and (3) large budgetary expenditures. Their proposal was to let state-owned companies to develop these services and to cooperate (or not to) in the market, depending on their commercial interests instead. One year outcome - at the beginning of 2003 electricity transmission company "Lithuanian energy" earned LTL 16 million from wholesale of data transmission and was planning to increase this activity by 20 percent in 2003.

Health care improvement using ITC means. No progress has been recorded as yet, although the scope for efficient ICT application is wide. With the implementation of information systems in health care institutions, the present extensive bureaucracy could be sized down, financial accountability and planning could be improved and the level of health services could be increased.

(3) eBusiness:

eSignature. Secondary legislation for the implementation of qualified eSignature have been prepared, and a supervisory institution has been appointed. The establishment of the infrastructure for eSignature was foreseen in the Plan. This undertaking was estimated to be too costly for the taxpayers, so a cheaper solution was chosen. Amendments to the law on eSignature were adopted, providing technological neutrality and freedom to agree on the type of eSignature which will be treated equally with a written one by contract. This created a legal background for the use of cheaper and simpler authentification forms than PKI (e.g., those used in eBanking).

ICT in the Customs Office. A progress in the project, that has started back in 1997, implementation has been reported, but the system is still not functioning as projected, although substantial budgetary resources are invested every year (e.g., EUR 4 million. In 2002 EUR 6 million. In 2003 Phare support of EUR 2.8 million) *("Verslo Zinios" daily, 22 July, 2003).*

ICT in tax administration. An integral tax administration information system was further developed in the Tax Board. The system is functioning and is being improved permanently at a modest pace. However, with the launch of income and property declaration and pension reform in 2004 (administration of social security contributions becomes the responsibility of the Tax Board), the demand for efficient tax administration

is escalating. The Tax Board is reluctant with regard to eServices to the taxpayers, despite the fact that demand for electronic financial accountability is one of the highest of eGovernment services. Forms for tax declarations are available on Internet, but the delivery must be manual. The State Social Security Fund Board provides a possibility for the payers of social security contribution to fill up and deliver declarations electronically with the help of free software. Despite that, manual supply of the forms is still requested.

ICT in Public Procurement Office. An information system for public procurement is created and operating.

Support of eBusiness. A model for relocating business into an electronic environment has been developed. Implementation plans of the model have been postponed until next year. SME support programmes have been amended with provisions to support eBusiness. [Comment: the latter items go beyond the competence of public administration and can be damaging for enterprises, especially bearing in mind a high level of risk for eBusiness.]

Competition in telecommunications and data transmission. Amendments to the law on telecommunication abolishing exceptional rights for "Lietuvos Telekomas" as a fixed line operator from 1 January, 2003 and incorporating the "old" EU regulatory framework were adopted. The same law was amended once again to comply with the decision of the Constitutional Court that obligations set up in the law for the telecommunications operators to collect and provide for law enforcement bodies information exceeding their economic needs contradicted the Lithuanian Constitution[4].

A conceptual framework for the law on electronic communications (according to the "new" regulatory package of the EU) was prepared and adopted.

The Plan foresees preparing and announcing conditions for issuing 3-G telecommunication licenses. The CRA prepared the Conceptual Framework for issuing UMTS licenses in 2001 which suggests that licenses shall be issued by action with low initial payment and later annual payments for the license depending on the turnover. The auction was scheduled for the second half of 2003. Besides, CRA notes the need not to hurry in this matter due to unclear outcomes of this business. The market opinion is to postpone introduction of UMTS in Lithuania due to low demand for these services.

(4) Lithuanian culture and language in electronic environment:

Localisation of the open code applications (Moozilla, OpenOffice) and a pilot project of its implementation in three public institutions.

Different types of work in the field of automatic language recognition and translation, dictionaries and databases carried out by the State Language Commission.

Collection and dissemination of information on Lithuanian cultural heritage values.

[4] This example shows a lack of perspective thinking of legislators when certain provisions promoted by interests groups in public administration are adopted despite their clear collision with the Constitution.

B3. Specific important actors

Open Society Foundation - a part of J. Soros network, is broadly involved in education and training activities, ICT among them, for a number of years.

InfoBalt – an Association of Information Technology, Telecommunications and Office Equipment companies of Lithuania, represents and defend the interests of the IST industry in Lithuania and abroad. Aiming to fulfil this mission, the IfoBalt pursues creation of optimally favourable conditions for the growth of the IST industry, which would be of benefit to the Lithuanian population, public sector and business world in the improvement of the quality of life. Association currently joins 137 major companies (and covers 90% of Lithuania ICT market)

InfoBalt Copyright Agency (www.infobalt.lt)
The Agency was established in September 1997 with the main goal to ensure copyright protection of computer programmes and data bases in accordance with the functioning laws and international treaties in Lithuania, which leads to the reduction of piracy rates. The Agency works in following directions: copyright protection (registration of computer SW, legal consultations, public awareness campaigns), enforcement (assistance to the enforcement structures, juridical and technical expertises; public relations, proposals for lawmakers on copyright legislation; research in ICT market.

Lithuanian Free Market Institute (www.FreeMa.org, www.Lrinka.lt). It is a private think-tank, established in 1990 to advance the ideas of individual freedom and responsibility, free market and limited government. The institute provides expertise and proposals for strategies, reforms and legislation to improve conditions for economic initiatives as well as carries out public education activities.

Knowledge Economy Forum – an association, promoting Knowledge Economy, consisting of 40 leading innovative private enterprises representing IT, biotechnologies, leaser technologies, and telecommunications actively started its activities in 2001.

The Alliance "Window to the future" (www.langasiateiti.lt), established in 2001 by two biggest telecommunication companies – "Lietuvos Telekomas" and mobile operator "Omnitel", as well as two biggest banks – "Hansa-LTB" and "Vilnius bankas" for achieving an average Internet penetration of the EU in Lithuania within three years. In pursuing this goal, the project has three phases: (1) establishment of PIAPs all over the country, (2) training of the Internet users and (3) development of eContent. Later this initiative was joined by state institutions – the Ministry of Interior (to establish additional set of PIAPs) and the Ministry of Education (training programs).

Lithuanian Computer Society is a public association of computer and software users, specialists and amateurs in informatics and computer science, stimulating progress of computerization and development of informatics as a perspective and important modern science and industry branch in Lithuania. The Society carries out educational and social activities for its members and the general public.

Agency of Lithuanian Copyright Protection Association **(LATGA-A)** (www.latga.lt).
LATGA-A was established in 1990 by Lithuanian creative unions representing a great circle of professional artists and by individual authors of different creative areas. The association based its activity on agreements concluded with authors and foreign authors' rights societies.

In 1992 LATGA-A joined the community of CISAC. The Association is a multirepertoire society administering the exploitation of musical, drama, dramatic-musical, visual and audiovisual works.

Agency of the Association for the Protection of Related Rights (AGATA) (www.agata.lt)
The Association was setup in 1999 on the initiative of performers and producers of phonograms. It performs collective administration of the related rights in Lithuania.

BSA Lithuania (www.bsa.lt)
Business Software Alliance associates software producers and distributors in Lithuania for developing information technology market, securing intellectual property rights and fair competition in IT sector.

C. INDUSTRIAL DEVELOPMENT AND COMPETITIVENESS, AND ITS GEOGRAPHY

Table C1.: Structure of industrial production, current prices, by sectors, EUR million, 1990-1996 Part A

	1990	1991	1992	1993	1994	1995	1996
Mining and quarrying	-	-	-	21.0	25.7	17.1	30.8
Manufacturing	-	-	-	2 237.7	2 553.3	915.5	1 124.4
Electricity, gas and water supply	-	-	-	529.7	597.6	238.6	282.0

Table C1: Structure of industrial production, current prices, by sectors, EUR million, 1997-2002 Part B

	1997	1998	1999	2000	2001	2002
Mining and quarrying	34.1	35.4	41.9	75.4	88.6	83.1
Manufacturing	1 473.7	1 626.1	1 635.4	2 157.8	2 445.7	2 562.2
Electricity, gas and water supply	331.6	364.9	388.7	416.6	498.2	552.2

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 1997, pp. 268-269, "Statistical Yearbook of Lithuania," 2002, pp. 416-417.

Table C2.: Structure of manufacture production by sectors, current prices, € million, Part A

	1993	1994	1995	1996	1997	1998	1999	2000
Total manufacture	**2 237.7**	**2 553.3**	**915.5**	**1 124.4**	**1 473.7**	**1 626.1**	**1 635.4**	**2 157.8**
Food products and beverages	724.677.3	733.900.2	813.471.8	1,023.978	1,940.508	1,290	1,177.6	1,338.8
Tobacco products	10.284.93	28.239.81	35.542.47	-	-	-	-	-
Textiles	176.077.1	180.187.3	192.352.8	230.537.3	289.774.5	320.156	282.602	337.349.8
Wearing apparel	72.947.44	83.585.7	127.320.6	190.306.5	304.318.6	360.382.6	463.592	549.891.9
Leather and leather products	34.861.07	37.138.31	34.880.41	51.798.16	79.665.8	57.674	52.875	64.720.74
Wood and wood products	64.813.15	93.673.28	117.831.7	113.314.8	199.318.3	240.817	244.747	314.887.8
Pulp, paper and paper products	18.882.12	30.370.7	43.570.2	44.397.02	63.547.23	54.594	58.379	69.621.25
Publishing, printing and reproduction of recorded media	10.404.93	30.774.48	38.739.29	69.531.9	101.625.3	114.390	162.941	187.616.9
Refined petroleum products	543.675.4	441.996.6	347.666.9	529.518.3	770.484	694.551	555.288	1,163.263

Table C2.: Structure of manufacture production by sectors, current prices, EUR million, PartB

	1993	1994	1995	1996	1997	1998	1999	2000
Chemicals and chemical products	82.675.35	115.252.8	198.061	254.174.9	269.911.9	293.525	276.971	332.716.7
Rubber and plastic products	6.066.868	107.58.79	16.206.86	32.725.57	55.124.58	76.024	127.887	147.894.8
Other non-metallic mineral products	84.902.78	103.563.4	104.369.4	116.442.8	141.335.7	187.842	150.071	169.617.5
Basic metals	8.513.551	9.230.394	10.732.45	12.890.18	15.000.22	16.593	24.687	30.224.66
Fabricated metal products	24.476.25	28.500.23	42.699.31	43.908.18	66.492.98	82.364	84.369	147.927.3
Machinery and equipment	113.570.8	113.139.7	110254.5	105.777.6	126.566.8	115.917	102.980	125.137.3
Office machinery and computers	2.950.865	3.295.373	3.080.418	3.967.836	1.992.843	3.962.915	6.612.896	10.117.06
Electrical equipment and apparatus	30.769.64	24.394.75	33.313.03	67.105.83	100.300.4	92.008.73	98.005.24	116.161.1
Radio, television and communication equipment and apparatus	104.384.7	74.624.42	86.507.34	99.938.35	111.767.3	117.798	129.280	203.832.7
Medical, precision and optical instruments	19.658.39	25.440.26	13.770.91	20.721.9	32.624.36	49.479	46.962	60.403.08
Motor-vehicles, trailers and semi-trailers	7.470.962	4.519.235	4.278.09	8.146.375	9.085.307	5.576.084	3.255.525	2.919.438
Other transport equipment	30.801.51	57.765.83	44.226.27	57.608.44	74.331.82	101.221.8	85.771.21	108.022.4
Furniture	60.561.3	57.303.52	58.230.18	80.201.92	112.832.9	122.769.3	127.958.4	168.787.5
Recycling of metal waste and scrap	4.227.684	10.113.46	21.618.23	8.460.034	10.914.91	8.820.452	10.404.57	33.226.55

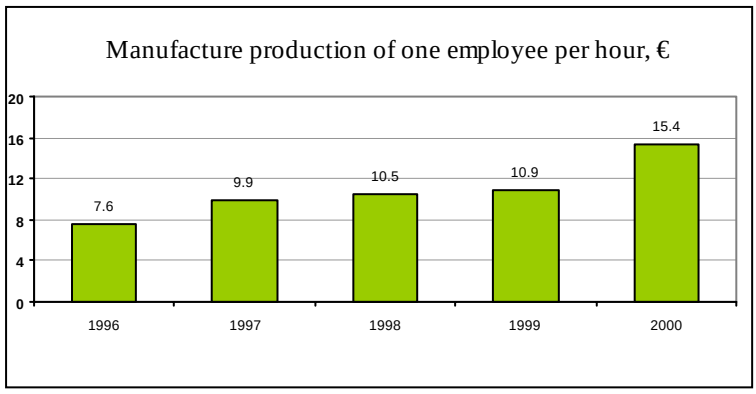
Reference: Ibid.

Table C3.: Volume indices with 2000 as base year

	1996*	1997	1998	1999	2000	2001	2002
Mining and quarrying	55.9	17.8	16.7	-11.4	18.9	30.6	-5.0
Manufacture	3.3	7.6	14.1	-5.4	9.8	13.1	5.5
Electricity, gas and water supply	6.7	-8.2	2.1	0.0	-14.2	15.1	5.4

Reference: Statistics Lithuania, http://www.std.lt/web/main.php?parent=367&module=680&id=483

Graph C1.: Value added per employee, EUR



Unavailable until 1996
Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, p. 426

Table C4.: Changes in the weight of services in GDP, %

Sectors	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Construction	10.0	5.5	4.1	5.1	7.2	7.6	7.1	7.8	8.6	7.8	6.0	6.1	6.5
Wholesale and retail trade	7.1	6.2	9.5	14.0	17.5	17.3	16.8	16.7	16.7	16.0	16.6	17.5	18.0
Hotels and restaurants	2.2	1.8	1.7	1.3	1.4	1.5	1.6	1.8	1.6	1.7	1.5	1.6	1.6
Transport and communications	7.9	8.4	9.9	9.8	10.1	9.1	9.6	9.9	9.8	10.6	12.5	12.5	13.7
Financial intermediation	5.6	3.5	8.5	7.3	5.0	2.4	2.5	2.0	2.2	2.3	2.2	2.3	2.3
Real estate, renting and business activity	6.8	4.1	5.5	4.2	6.8	7.2	7.4	7.5	7.4	8.4	8.5	8.3	8.1
Public administration and defence, compulsory social security	10.9	7.7	7.4	2.9	5.0	6.2	6.8	6.3	7.0	7.1	6.9	5.8	5.5
Education	27.1	0.0	0.0	2.8	4.2	4.7	4.8	5.4	6.2	7.0	6.5	6.4	6.2
Health and social work	0.0	0.0	0.1	1.8	2.6	2.7	2.9	3.9	3.9	4.1	3.6	3.4	3.4
Other community, social and personal service activities	4.2	3.3	3.6	2.4	2.6	2.9	2.8	2.9	2.9	3.3	3.2	3.3	3.2
Private households with employed persons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1

Reference: Statistics Lithuania, "Economic and Social Development in Lithuania," 1999/03, 2003/03 pp. 112-113.

Table C5.: Volume indices in services at constant prices, %

Economic activity	1996	1997	1998	1999	2000	2001	2002
Construction	102.7	107.3	116.9	87.7	81.8	107.4	112.8
Wholesale and retail trade	100.0	109.7	109.7	97.2	111.8	111.5	108.7
Hotels and restaurants	116.9	120.0	96.9	97.5	93.8	101.0	107.6
Transport, storage and communication	105.1	105.8	101.7	99.9	102.2	104.4	112.6
Financial intermediation	95.7	100.2	114.4	102.9	99.6	104.5	110.6
Real estate, renting and business activities	103.2	104.8	104.9	110.4	107.5	107.3	102.7
Public administration and defence	110.4	100.0	109.9	106.1	108.4	95.2	104.4
Education	103.2	105.0	107.6	108.8	106.4	102.0	100.3
Health and social work	103.3	126.0	106.0	107.0	97.7	99.2	102.9
Other community and service activities	98.9	116.2	105.4	108.0	99.6	101.0	102.9
Private households with employed persons	115.0	129.3	126.1	129.3	113.4	123.6	120.6
Gross domestic product at market prices	**104.7**	**107.0**	**107.3**	**98.2**	**104.0**	**106.5**	**106.7**

Reference: Statistics Lithuania, http://www.std.lt/web/main.php?parent=367&module=680&id=483

Table C6.: Gross domestic product by districts, Part A

Counties	Million Euro						
	1996	1997	1998	1999	2000	2001	2002
Total	6 298.9	8 468.9	9 569.5	9 986.6	12 205.4	13 378.3	14 668.4
Alytus	291.2	387.3	419.4	441.5	520.8	606.9	557.9
Kaunas	1 229.7	1 710.6	1 897.8	1 959.4	2 339.7	2 800.2	2 613.7
Klaipėda	781.3	1 006.4	1 155.1	1 231.9	1 511.2	1 768.5	1 623.5
Marijampolė	266.1	361.2	403.4	359.6	460.3	528.8	490.9
Panevėžys	557.0	742.0	786.3	735.9	920.3	1 080.8	981.9
Šiauliai	611.4	803.0	813.4	829.9	969.6	1 144.3	1 015.4
Tauragė	164.4	192.5	206.5	212.8	270.0	323.7	290.1

Table C6.: Gross domestic product by districts, Part B

Counties	Million Euro						
	1996	1997	1998	1999	2000	2001	2002
Telšiai	281.3	366.2	414.6	428.1	537.6	632.9	602.5
Utena	321.5	415.7	469.5	483.2	566.7	632.9	588.6
Vilnius	1 795.2	2 484.0	3 003.4	3 304.2	4 109.2	5 149.5	4 613.8

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, p. 645; Statistics Lithuania, http://www.std.lt/web/main.php?parent=367&module=680&id=733&PHPSESSID=0c32f703521d1b841145154a77511144; Statistics Lithuania, http://www.std.lt/web/main.php?parent=588&module=684&id=370&param=archive

Table C7.: Gross domestic product by districts

Counties	%						
	1996	1997	1998	1999	2000	2001	2002
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Alytus	4.6	4.6	4.4	4.4	4.3	4.2	4.1
Kaunas	19.5	20.2	19.8	19.6	19.2	19.5	19.1
Klaipėda	12.4	11.9	12.1	12.3	12.4	12.1	12.1
Marijampolė	4.2	4.3	4.2	3.6	3.8	3.7	3.6
Panevėžys	8.8	8.8	8.2	7.4	7.5	7.3	7.4
Šiauliai	9.7	9.5	8.5	8.3	7.9	7.6	7.8
Tauragė	2.6	2.3	2.2	2.1	2.2	2.2	2.2
Telšiai	4.5	4.3	4.3	4.3	4.4	4.5	4.3
Utena	5.1	4.9	4.9	4.8	4.6	4.4	4.3
Vilnius	28.5	29.3	31.4	33.1	33.7	34.5	35.1

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, p. 645; Statistics Lithuania, http://www.std.lt/web/main.php?parent=367&module=680&id=733&PHPSESSID=0c32f703521d1b841145154a77511144; Statistics Lithuania, http://www.std.lt/web/main.php?parent=588&module=684&id=370&param=archive

Table C8.: Changes in investment, volume indices, % change y-on-y

	1995	1996	1997	1998	1999	2000	2001	2002*
Total stock investment	14.3	17.9	14.6	20.5	-6.7	5.3	21.0	1.9
Industry	1.4	29.5	15.6	10.0	2.7	6.5	16.9	-1.9
Mining and quarrying	0.3	2.6 times	-5.8	-49.9	-12.1	2.8 times	69.6	-56.8
Manufacture	-7.8	23.0	18.6	1.7	11.2	24.1	7.4	-4.2
Electricity, gas and water supply	26.3	34.1	12.7	31.6	-9.3	-28.6	38.8	13.4

** preliminary data*

Reference: submitted by Statistics Lithuania upon LFMI's inquiry

D. PRESENCE OF MOST RELEVANT ECONOMIC ACTIVITIES FOR IST APPLICATIONS

Table D1.: Patent applications filed and patents granted during 2000

Applications for patents filed by			Grants of patents to		
residents	**non residents**	**Total**	**residents**	**non residents**	**Total**
66	112174	112240	84	714	798

Reference: WIPO Industrial Property Annual Statistics. Publication B,
http://www.wipo.int/ipstats/en/publications/b/2000/pdf/pattab1.pdf

Table D2.: Registered inventions and applications to register inventions at the State Patent Bureau

	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
Patent applications by Lithuanian applicants, total	106	100	125	134	86	66	68
Legal entities	50	61	66	73	55	31	40
Natural persons	56	39	59	61	31	35	28
Foreign applicants	27	78	77	71	71	60	55
Patents granted	294	535	543	165	160	148	128
Filed requests to extend European patent applications into the Republic of Lithuania	816	1 349	1 792	1 993	2 882	3 666	3 801

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002.

Number of patent applications has risen significantly for the first time in four years, but did not reach the level of 1998, when 134 applications were filed. In 2002, 9 international applications were filed with the State Patent Bureau as with the receiving office. In 2002, 35 international applications already reached a national phase including 33 applications having priority of earlier applications. 5 patent applications contained a request to grant convention priority. In 2002, 1 application for supplementary protection certificate was filed and 1 supplementary protection certificate was granted.

Table D3.: Breakdown of patent applications filed in 2002 in accordance with the International Patent Classification (IPC)

IPC sections		Lithuania (LT)	Foreign country (country code and number of applications)	Total
Human necessities	A	23	USA 5, D 4, ES 2, UA 2, IL 1, KR 1, LV 1, PL 1, SK 1	41
Performing operations; transporting	B	18	CH 7, RU 2, AU 1, CZ 1, D 1, FIN 1	31
Chemistry; metallurgy	C	19	USA 5, N 2, SK 2, CZ 1, D 1	30
Textiles; paper	D	1	USA 1	2
Fixed constructions	E	5	D 1	6
IPC sections		**Lithuania (LT)**	**Foreign country (country code and number of applications)**	**Total**
Mechanical engineering; lighting; heating; weapons; blasting	F	11	-	11
Physics	G	6	D 1, RU 1	8
Electricity	H	2	-	2
Total		85	46	131

Graph D1.: Filing and publishing of patent applications, granting of patents in 2001-2002

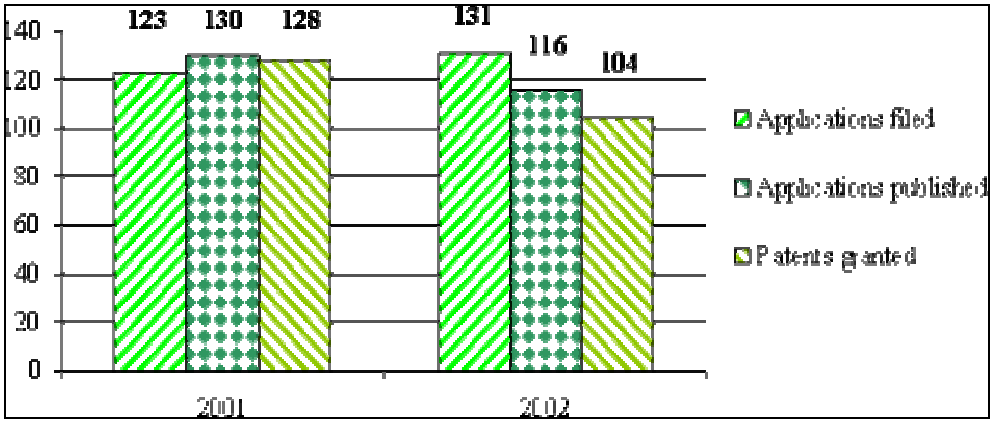


Table D4.: Breakdown of patents granted in 2002 in accordance with IPC

IPC sections		**Lithuania (LT)**	**Foreign country (country code and number of applications)**	**Total**
Human necessities	A	17	USA 12, D 2, F 2, UA 2, BG 1, LV 1, NZ 1, SK 1	39
Performing operations; transporting	B	5	D 1	6
Chemistry; metallurgy	C	7	USA 3, CZ 2, D 2, HU 2, ES 1, IL 1	18
Textiles; paper	D	-	-	-
Fixed constructions	E	9	D 3, RU 2, CA 1, CY 1	16
Mechanical engineering; lighting; heating; weapons; blasting	F	4	CZ 1, USA 1	6
Physics	G	7	KR 2, MC 2, AT 1, CA 1, D 1, F 1	15
Electricity	H	2	FIN 1, SI 1	4
IPC sections		**Lithuania (LT)**	**Foreign country (country code and number of applications)**	**Total**
Total		51	53	104

By 31 December, 2002, 2 644 patents had been entered into the Patent Register of the Republic of Lithuania.
By 31 December, 2002, 1 122 European patents had been included into the Register of European Patents extended into Lithuania.
Reference: State Patent Bureau. 2002 Annual Report, http://www.vpb.lt/ataskaitos/2002/en/inventions.html

Table D5.: Registered industrial designs and applications to register industrial designs at the State Patent Bureau

	1996	**1997**	**1998**	**1999**	**2000**	**2001**
Applications for registration of industrial design filed by Lithuanian applicants, total	102	146	196	105	79	59
Legal entities	54	104	159	67	47	43
Natural persons	48	42	37	38	32	16
Foreign applicants	28	37	28	40	27	26
Registrations	185	156	205	160	112	81

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002

Graph D2.: Industrial design applications and registrations (renewals included) 1997 – 2002

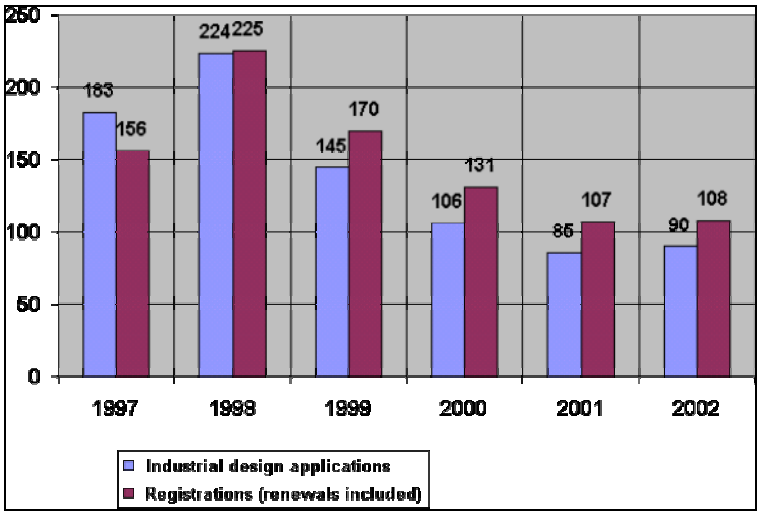


Table D6.: Industrial design applications by origin, Part A

Year	LT	D	DK	RU	EE	FIN	F	UK	I	NL	N	PL	S	USA	Other	Total
1997	146	8			2	5	2	5	1	1	2		4	4	3	183
1998	196	2	2		2	3		1	2	3	1		2	5	5	224
1999	105	4	4		1		2			1		16	6		6	145

Table D6.: Industrial design applications by origin, Part B

Year	LT	D	DK	RU	EE	FIN	F	UK	I	NL	N	PL	S	USA	Other	Total
2000	**79**	**3**		**1**	**3**	**3**	**2**	**1**	**2**	**1**	**1**	**2**	**1**	**2**	**6**	**106**
2001	**59**	**3**				**2**		**8**	**5**				**2**	**1**	**5**	**85**
2002	**39**	**14**		**11**		**4**		**2**		**2**	**2**	**3**	**4**	**3**	**6**	**90**

In 2002, 90 applications for registration of industrial designs were filed with the SPB, including:

- 39 (43 %) by Lithuanian applicants
- 51 (57 %) by foreign applicants.

Reference: State Patent Bureau. 2002 Annual Report,
http://www.vpb.lt/ataskaitos/2002/en/industrial_designs.html

Table D7.: Capital investment in industry

	1995		1998		1999		2000	
	mill. ECU	% of all invest-ment in industry	mill. ECU	% of all invest-ment in industry	mill. euros	% of all invest-ment in industry	mill. euros	% of all invest-ment in industry
Manufacture of office machinery and computers	0.00	0.00	0.07	0.00	0.04	0.00	0.30	0.10
Manufacture of electrical machinery and apparatus	2.00	1.90	1.80	0.80	7.30	2.60	5.80	1.30
Manufacture of radio, television and communication equipment and apparatus	2.80	2.70	12.10	5.10	7.00	2.50	18.70	4.80
Manufacture of medical, precision and optical instruments, watches and clocks	0.60	0.60	4.20	1.70	3.40	1.20	6.10	1.60

Table D8.: Capital investment in transport, storage and telecommunications

1995		1998		1999		2000	
mill. ECU	% of total invest-ment	mill. ECU	% of total invest-ment	mill. euros	% of total invest-ment	mill. euros	% of total invest-ment
159.5	26.1	474.2	32.3	399.2	27.0	395.8	22.3

This data is on overall investment in sectors mentioned, not specifically on R&D.

Table D9.: Financial leasing (mill. ECU/euros)

	1997	1998	1999	2000
Total	67.9	98.8	66.0	152.9
Computers	1.5	1.3	2.6	5.0

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002

In 1999, ICT expenditures comprised 4,7 % in terms of GDP.

Reference: European Trend Chart in Innovation. Lithuania – Draft Trend Chart Country Report, October, 2002.
http://trendchart.cordis.lu/Reports/Documents/Lithuania_CR_Sept_02-rapid.doc

E. IST PENETRATION RATES – TIME SERIES ON INFRASTRUCTURES, EQUIPMENT, USAGE

Statistical data on both telecommunications and postal services sectors is available en masse.

Table E1.: Average number of PCs in enterprises

January 2001				January 2002			
Number of employees			Total	Number of employees			Total
1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
17.3	68.1	1151.2	144.9	20.5	73.5	1179.8	151.3

Table E2.: Percentage of enterprises using internet

January 2001				January 2002			
Number of employees			Total	Number of employees			Total
1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
93.6	100.0	100.0	96.0	93.6	100.0	100.0	96.0

Table E3.: Average number of PCs with access internet in enterprises

January 2001				January 2002			
Number of employees			Total	Number of employees			Total
1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
15.7	65.6	1045.0	137.5	19.1	71.1	1077.5	145.0

Reference for E1, E2, E3: Statistics Lithuania, "Informacines technologijos," 2002.

Table E4.: Average number of PCs in enterprises

January 2001				January 2002			
Number of employees			Total	Number of employees			Total
1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
4.4	8.1	94.3	7.9	4.8	9.2	117.1	8.9

Table E5.: Percentage of enterprises using internet

January 2001				January 2002			
Number of employees			Total	Number of employees			Total
1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
52.3	46.6	100.0	52.5	60.2	52.7	100.0	59.9

Table E6.: Average number of PCs with access internet in enterprises

January 2001				January 2002			
Number of employees			Total	Number of employees			Total
1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
3.6	8.3	52.4	6.3	4.1	9.3	66.0	7.2

Reference for E4, E5, E6: Statistics Lithuania, "Informacines technologijos," 2002.

Table E7.: Average number of PCs in enterprises

January 2001				January 2002			
Number of employees			Total	Number of employees			Total
1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
19.6	84.9	833.6	133.8	31.3	112.5	895.6	154.6

Table E8.: Percentage of enterprises using internet

January 2001				January 2002			
Number of employees			Total	Number of employees			Total
1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
98.0	100.0	100.0	98.6	98.0	100.0	100.0	98.6

Table E9.: Average number of PCs with access internet in enterprises

January 2001				January 2002			
Number of employees			Total	Number of employees			Total
1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
16.2	63.1	605.0	99.9	24.5	85.1	713.2	123.0

Reference for E7, E8, E9: Statistics Lithuania, "Informacines technologijos," 2002.

Table E10.: Average number of PCs in enterprises, Part A

Sector	January 2001				January 2002			
	Number of employees			Total	Number of employees			Total
	1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
Manufacture of food products and beverages	2.6	9.0	59.9	12.5	2.9	10.6	70.8	14.3
Manufacture of textiles, leather and their products	2.6	5.4	25.9	8.9	2.8	6.5	32.7	10.6
Manufacture of wood and wood products	2.0	5.7	19.8	3.9	2.2	7.4	25.2	4.6
Manufacture of pulp and paper products	6.3	34.8	85.0	16.5	7.8	39.4	97.1	19.4
Manufacture of rubber and plastic products	3.6	17.2	52.0	7.3	5.2	21.4	72.0	9.7
Manufacture of basic metals and metal products	3.3	9.4	19.0	5.3	4.3	10.9	20.3	6.5
Manufacture of electrical and optical equipment	10.4	17.6	135.4	31.8	13.1	20.6	154.0	37.0

Table E10.: Average number of PCs in enterprises, Part B

Sector	January 2001				January 2002			
	Number of employees			Total	Number of employees			Total
	1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
Manufacture of vehicles	2.5	15.6	70.8	18.8	3.2	15.5	81.3	20.4
Manufacture of furniture	3.5	11.6	28.4	9.0	3.6	13.9	32.9	9.9

Table E11.: Percentage of enterprises using internet

Sector	January 2001				January 2002			
	Number of employees			Total	Number of employees			Total
	1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
Manufacture of food products and beverages	28.3	62.3	97.3	49.1	30.1	71.0	97.3	53.5
Manufacture of textiles, leather and their products	23.3	66.7	93.9	52.6	31.0	73.8	95.9	59.2
Manufacture of wood and wood products	32.6	74.0	100.0	42.9	43.5	82.0	100.0	52.9
Manufacture of pulp and paper products	86.8	84.9	100.0	87.0	93.4	90.9	100.0	93.2
Manufacture of rubber and plastic products	64.7	100	100.0	72.7	73.5	100	100.0	79.6
Manufacture of basic metals and metal products	66.0	65.0	100.0	66.4	67.0	72.5	100.0	69.3
Manufacture of electrical and optical equipment	68.9	90.9	100.0	79.5	68.9	90.9	100.0	79.5
Manufacture of vehicles	71.4	38.5	100.0	61.3	71.4	61.5	100.0	71.0
Manufacture of furniture	42.5	82.9	100.0	59.0	52.1	97.1	100.0	69.2

Table E12.: Average number of PCs with access internet in enterprises, Part A

Sector	January 2001				January 2002			
	Number of employees			Total	Number of employees			Total
	1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
Manufacture of food products and beverages	1.6	4.4	27.3	8.4	2.1	6.4	37.1	11.1

Table E12.: Average number of PCs with access internet in enterprises, Part B

Sector	January 2001				January 2002			
	Number of employees			Total	Number of employees			Total
	1 – 49	50 – 249	Over 250		1 – 49	50 – 249	Over 250	
Manufacture of food products and beverages	1.6	4.4	27.3	8.4	2.1	6.4	37.1	11.1
Manufacture of textiles, leather and their products	3.3	3.9	13.0	6.4	3.1	4.7	19.0	8.1
Manufacture of wood and wood products	2.0	2.5	13.2	2.8	2.1	3.7	16.8	3.3
Manufacture of pulp and paper products	3.9	26.3	61.0	12	5.3	30.2	73.4	14.3
Manufacture of rubber and plastic products	2.7	14.0	19.0	6.3	2.8	18.3	41.0	7.6
Manufacture of basic metals and metal products	3.3	4.1	2.7	3.5	4.2	7.2	5.0	5.2
Manufacture of electrical and optical equipment	10.5	12.1	70.2	21.6	13.0	15.1	85.0	26.4
Manufacture of vehicles	2.1	15.6	17.8	8.9	2.5	13.1	26.8	10.8
Manufacture of furniture	3.5	8.3	11.0	6.5	3.3	9.0	17.1	7.2

Reference: Statistics Lithuania, "Informacines technologijos," 2002.

Table E13.: Percentage of households with a personal computer at home

	Total house-holds	Of which:		
		Larger cities	Other towns	Countryside
1996	1	2	1	0
1997	2	3	1	0
1998	2	4	1	0
1999	3	5	2	1
2000	5	10	4	1
2001	9	14	6	3
I half of 2002	12	19	11	5

Table E14.: Internet in households, %, Part A

	Total households	Of which:		
		Large cities	Other towns	Countryside
2000	2.3	4.8	1.2	0.3
2001	3.2	6.3	1.8	0.6
I half of 2002	5.9	10.2	4.4	1.7

Table E15.: Internet in households, %, Part B

	All households	Of which:		
		Large cities	Other towns	Countryside
Percentage of households with access to internet (in the homes with a computer)	43	49	33	20

Table E16.: Part of population using PCs and internet in household, I half of 2002

Usage of PC by population (at home), %	Usage of internet by population (at home), %
11.8	12

Reference: Information Technologies, Statistics Lithuania, 2002

Table E17.: Penetration rates for television, telephone and mobile phone

TV sets per 100 households	122
Telephones per 100 population	33
Mobile Cell Phone per 100 population	45

Reference: International Trade Centre UNCTAD/WTO, Information and Communications Technology, Country Profile: Lithuania, Geneva, 7 October 2002 (Draft Version) – Part I
http://www.infobalt.lt/docs/WTO_ITT_PROFILE__LIETUVA__galutinis_darbinis1.doc)

G. EDUCATIONAL SECTOR (SECONDARY AND TERTIARY), LABOUR FORCE SUPPLY, TRAINING IN IST RELATED SUBJECTS

Table G1.: Number of students in vocational schools by area of training, thousand

	2000	2001
Arts	1.0	1.1
Business and Administration	7.5	8.8
Engineering	12.7	12.0
Manufacturing	9.1	6.8
Architecture and building	3.6	5.1
Agriculture, forestry, fishery	1.8	1.4
Health	0.3	0.04
Social services	0.1	0.5
Personal services	1.0	8.4
Transport	0.6	0.7
Security services	0.1	0.2
Total	47.0	45.1

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, pp. 234-237.

Table G2.: Number of graduates from tertiary education by fields, thousand*

	2000	2001
Teacher training	3.8	4.5
Arts	1.0	0.8
Humanities	1.3	1.3
Social and behavioral science	0.6	0.8
Journalism and information	0.3	0.3
Business and administration	5.2	6.2
Law	1.2	1.6
Life science	0.1	0.2
Physical science	0.2	0.3
Mathematics and statistics	0.1	0.2
Computing	0.7	0.6
Engineering and engineering trades	2.9	3.3
Manufacturing and processing	0.9	0.8
Architecture and building	1.5	1.4
Agriculture, forestry and fishery	0.8	0.5
Veterinary	0.1	0.1
Health	2.3	2.2
Social services	0.4	0.5
Personal services	0.5	0.5
Transport services	0.4	0.4
Environmental protection	0.2	0.3
Security services	0.3	0.2
Total	24.8	27.2

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, pp. 234-237.
** Tertiary education – Universities, colleges and professional colleges.*
Data on period prior to 2000 is not available

Table G3.: Number of students in life-long training by area of training, thousand*

	2000	2001
Teacher training	1.3	0.1
Arts	0.1	0.3
Social and behavioral science	3.9	3.7
Mathematics and statistics		0.1
Computing	1.3	3.1
Engineering and engineering trades	6.2	9.3
Manufacturing and processing	11.0	6.8
Architecture and building	2.5	4.1
Agriculture, forestry and fishery	1.1	1.4
Health	26.7	20.6
Social services	0.8	0.4
Personal services	4.9	5.1
Transport services	35.9	10.2
Environmental protection	0.02	0.05
Security services	15.5	14.5
Total	111.4	80

Reference: Statistics Lithuania, "Svietimas Education," 2002, p. 39
** The data includes all courses registered in the Ministry of Education. The courses are mainly organized by educational institutions and by the Labour Exchange Training centre. Education within the enterprises – excluded.*
Data on period prior to 2000 is not available.

Table G4.: Course hours per 1000 working hours in all enterprises by economic activity, 1999

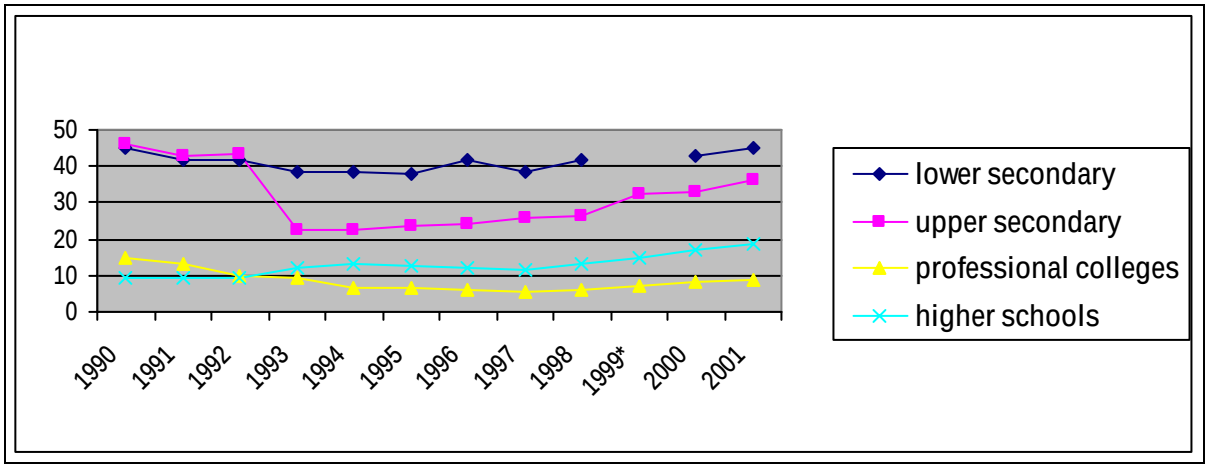
NACE D	NACE G	NACE J	NACE K	NACE O	Other
2	1	5	3	1	3

Table G5.: Course hours per participant by economic activity, 1999

NACE D	NACE G	NACE J	NACE K	NACE O	Other
39	45	29	48	19	45

Reference: Eurostat, Statistics in focus. Theme 3-1/2003. Working time spent on continuing vocational training in enterprises in Europe.
NACE: G- wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods, J – financial intermediation, real estate, renting and business activities, O – other community, social and personal service activities.

Graph G1.: Number of graduated in secondary and tertiary education, thousand



Reference: Statistics Lithuania, "Svietimas,"2002, p. 26; "Statistical Yearbook of Lithuania," 2002, p. 236., "Statistical Yearbook of Lithuania," 1997, p. 521.
Lower secondary education (or basic school): 1990-1999 nine years, from 2000 – ten years.
Upper secondary education: up to 1999 – basic school plus three years, after 1999 - plus two years.
** - in 1999 the shift to ten-year basic school took place*
Tertiary education: professional colleges (3-4 years), colleges (3-4 years) and universities. First graduates of colleges were in 2001 (30 students in total).

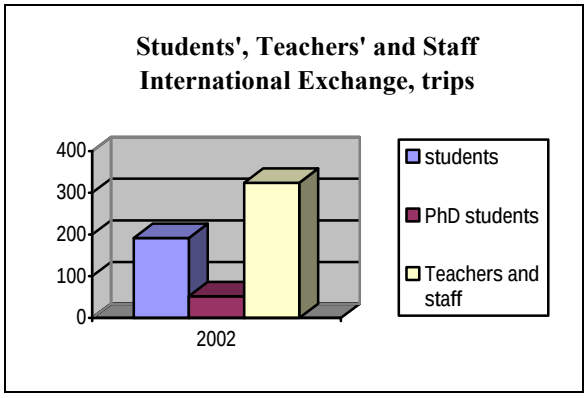
Note: **Number of college and university applications** is not collected as one person can submit several different applications.

Table G6.: Distance learning in Lithuanian Universities in 2001-2002

	Colleges	Universities
Number of schools with centres of distance learning	3	8
Number of classes for distance learning	3	18
Students studying full program	-	206
Students studying modules of study programs	22	1430
Studies for lecturers	27	190
Studies for society	307	952

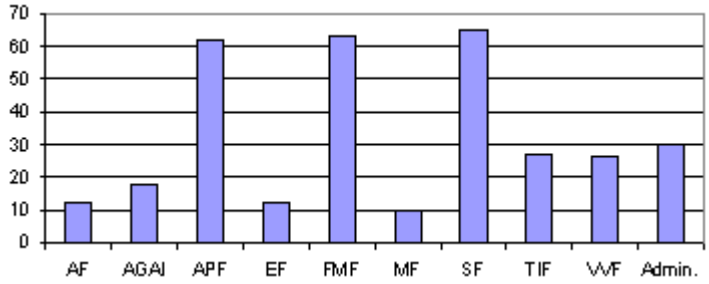
Reference: Statistics Lithuania, 2003

Graph G2.: Data of Vilnius Gediminas Technical University on its international exchange, 2002



Note: *National statistics on domestic and international mobility of scientific and technical personnel is not available (info of the Statistics Lithuania).*

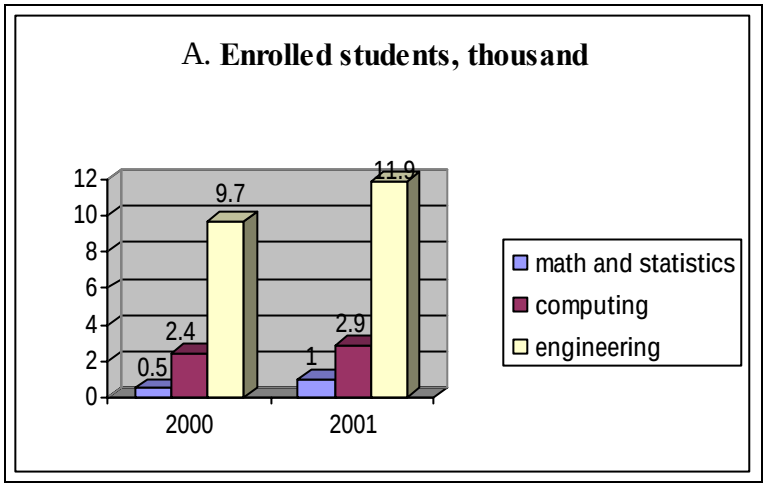
Graph G3.: Teachers' and Staff International Exchange by Faculties, trips



Faculties: AF- Architecture, AGAI – Institute of Aviation, APF – environmental engineering, EF - Electronics, FMF – Fundamental sciences, MF - Mechanics, SF – Civil engineering, TIF – Transport Engineering, VVF – Business Management, Admin. – Administration
Reference: Vilnius Gediminas Technical University, http://www.vgtu.lt/urd/index.html

According to the vice Minister of Education (R. Vaitkus, "Academic mobility", presented at the conference "EU challenges for the higher education", Vilnius, 8 May, 2003), academic society most actively participate in Erasmus program. In the year 2000/2001, 300 teachers from universities participated, in 2002/2003 – 450 teachers. Most active in all exchange programs are representatives of the physical sciences.

Graph G4.: Enrolment in ICT-realted education



Reference: Statistics Lithuania, "Svietimas," 2002, p. 105

ICT related education is described as university level mathematics and statistics, computing and engineering. Although, not all engineering students are related to ICT as well as other specialties, for ex., physics, in Lithuania is ICT related.

Table G7.: Tertiary level Students in "Science, Mathematics and Computing" and "Engineering, Manufacturing and Construction" as a proportion of all tertiary level students, 1999/2000, thousand

Total Science and Technology		33.4
Science		6.1
	Life science	0.7
	Physical science	1.6
	Mathematics and statistics	0.6
	Computing	3.2
Engineering, manufacturing and construction		27.3
	Engineering and engineering trades	15.9
	Manufacturing and processing	3.2
	Architecture and building	8.1

Reference: Eurostat, Key Data on Education in Europe, 2002, Figure F10

Budget of these institutions

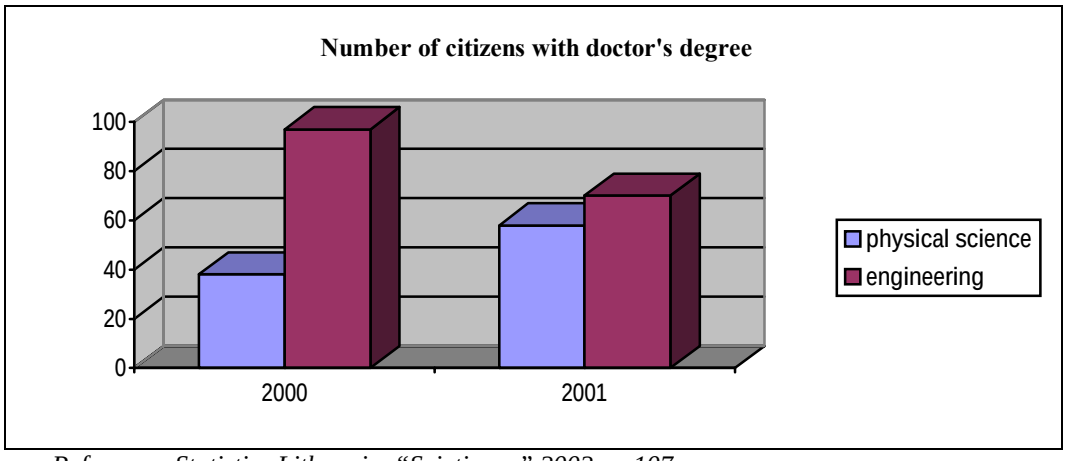
As ICT–related education is provided by different departments of different universities, the budget for ICT education is not explicit.

Table G8.: Budget of three major universities with ICT-related education for 2003, thousand, euro

University	ICT related education among other	State budget allocations
Vilnius University	Mathematics, physics, communication, statistics, computer science	26 131
Kaunas Technological University	Technology science, computer science, telecommunications, engineering	24 492
Vilnius technical university	Engineering	14 930

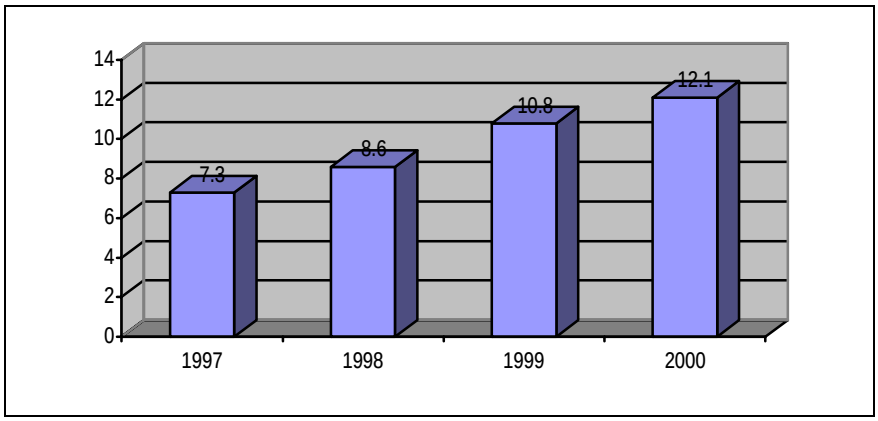
Reference: Ministry of Finance, www.finmin.lt

Graph G5.: ICT –related education: output



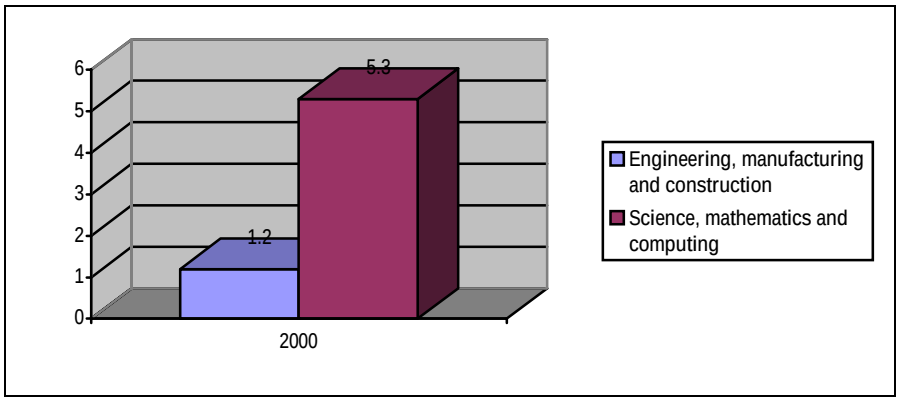
Reference: Statistics Lithuania, "Svietimas," 2002, p. 107.

Graph G6.: Number of Tertiary Level Graduates in Science and Technology per 1000 inhabitants aged 20-29.



Reference: Eurostat, Key Data on Education in Europe, 2002, Figure F17.

Graph G7.: Number of Tertiary Level Graduates per Field per 1000 inhabitants, 2000



Reference : Eurostat, Key Data on Education in Europe, 2002, Figures F14, F15, F16.

Tables G8.: Number of ICT students in six biggest Lithuanian universities, 2002

Vilnius University

Study program	Financed studies			Partly financed studies	Total	Not financed studies			Total	Grand Total
	D*	E*	C*	D		D	E	C		
	Bachelor degree									
Mathematics	66	0	0	44	110	0	0	0	0	110
Statistics	96	0	0	57	153	0	0	0	0	153
Computing	315	0	0	203	518	0	0	0	0	518
Electronics engineering	17	0	0	12	29	0	0	0	0	29
	Master degree									
Mathematics	24	0	0	-	24	11	0	0	11	35
Statistics	10	0	0	-	10	8	0	0	8	18
Computing	66	0	0	-	66	23	0	0	23	89
Electronics engineering	6	0	0	-	6	0	0	0	0	6

D- day studies*
E- evening studies*
C- correspondence studies*

Vilnius Gediminas Technical University, Bachelor degree

Study program	Financed studies			Partly financed studies	Total	Not financed studies			Total	Total
	D	E	C	D		D	E	C		
	Bachelor degree									
Transport engineering	140	0	25	70	235	0	0	50	50	285
Mechanics engineering	130	0	0	67	197	0	0	0	0	197
Computing	150	0	0	75	225	0	0	0	0	225
Electricity engineering	56	0	0	29	85	0	0	0	0	85
Electronics engineering	159	0	0	80	239	0	0	0	0	239
Economic engineering	46	0	0	24	70	0	0	0	0	70

Vilnius Gediminas Technical University, Master degree

Study program	Financed studies			Partly financed studies	Total	Not financed studies			Total	Total
	D	E	C	D		D	E	C		
	Master degree									
Statistics	12	0	0	-	12	2	0	0	2	14
Transport engineering	42	0	0	-	42	10	0	0	10	52
Computing	38	11	0	-	49	1	1	0	2	51
Electricity engineering	15	0	0	-	15	3	0	0	3	18
Electronic engineering	36	10	0	-	46	6	0	0	6	52
Mechanics engineering	44	0	0	-	44	4	0	0	4	48
Economics engineering	17	0	0	-	17	9	0	0	9	26

Kaunas University of Technology, Bachelor degree

Study program	Financed studies			Partly financed studies	Total	Not financed studies			Total	Total
	D	E	C	D		D	E	C		
	Bachelor degree									
Transport engineering	40	10	0	20	70	0	15	15	30	100
Mechanics engineering	221	0	30	113	364	0	5	25	30	394
Computing	191	0	0	100	291	0	0	0	0	291
Electricity engineering	158	10	40	82	290	0	7	125	132	422
Electronics engineering	153	0	25	77	255	0	0	100	100	355
Chemical engineering	92	0	15	48	155	0	0	55	55	210
Mathematics	60	0	0	30	90	0	0	0	0	90

Kaunas University of Technology, Master degree

Study program	Financed studies			Partly financed studies	Total	Not financed studies			Total	Total
	D	E	C	D		D	E	C		
	Master degree									
Economic engineering	15	0	0	-	15	6	0	0	6	21
Transport engineering	14	0	0	-	14	13	0	0	13	27
Computing	41	0	0	-	41	11	0	0	11	52
Electricity engineering	60	10	0	-	70	48	3	0	51	121
Electronics engineering	53	7	0	-	60	59	11	0	70	130
Mechanics engineering	46	10	0	-	56	5	1	0	6	62
Chemical engineering	65	0	0	-	65	13	0	0	13	78
Mathematics	16	0	0	-	16	5	0	0	5	21

Kaunas Vytautas Didysis University

Study program	Financed studies			Partly financed studies	Total	Not financed studies			Total	Total
	D	E	C	D		D	E	C		
	Bachelor degree									
Mathematics	16	0	0	8	24	0	0	0	0	24
Computing	106	0	0	60	166	0	0	58	58	224
	Master degree									
Mathematics	8	0	0	-	8	1	0	0	1	9
Computing	28	0	0	-	28	5	0	0	5	33

Siauliai University

Study program	Financed studies			Partly financed studies	Total	Not financed studies			Total	Total
	D	E	C	D		D	E	C		
	Bachelor degree									
Mathematics	33	0	0	17	50	0	0	0	0	50
Computing	52	10	0	25	87	0	20	45	65	152
Electricity engineering	17	0	0	8	25	0	22	0	22	47
Electronics engineering	22	0	0	11	33	0	14	0	14	47
Mechanics engineering	20	0	0	10	30	0	17	0	17	47
	Master degree									
Electronics engineering	5	0	0	-	5	5	0	0	5	10
Computing	0	0	0	-	0	0	0	14	14	14
Mechanics engineering	8	0	0	-	8	7	0	0	7	15

Klaipeda University

Study program	Financed studies			Partly financed studies	Total	Not financed studies			Total	Total
	D	E	C	D		D	E	C		
	Bachelor degree									
Mathematics	16	0	0	9	25	0	0	0	0	25
Computing	40	10	0	26	76	0	25	0	25	101
Electricity engineering	13	0	0	7	20	0	0	0	0	20
Transport engineering	54	0	0	30	84	0	0	20	20	104
Mechanics engineering	13	0	0	8	21	0	0	20	20	41
Chemical engineering	10	0	0	6	16	0	0	0	0	16
	Master degree									
Mathematics	0	4	0	-	4	0	3	0	3	7
Computing	10	0	0	-	10	3	15	0	18	28
Electricity engineering	5	0	0	-	5	3	0	0	3	8
Transport engineering	12	4	0	-	16	6	5	0	11	27
Chemical engineering	5	0	0	-	5	4	0	0	4	9
Mechanics engineering	5	0	0	-	5	4	5	0	9	14

Reference: Ministry of Education and Science, 2002

Table G9.: Unemployment rate by level of education and age, %

		1997	1998	1999	2000	2001
Total		14.1	13.3	14.1	15.4	17.0
	Tertiary	12.7	8.7	9.4	10.2	10.6
	Upper secondary	16.0	16.0	17.1	17.9	21.9
	Lower secondary and primary	12.9	17.7	18.8	22.3	23.5
15-24 years		25.2	22.1	26.5	29.0	30.2
	Tertiary	18.7	13.2	23.4	25.4	22.5
	Upper secondary	32.2	21.3	25.2	24.6	31.0
	Lower secondary and primary	20.8	26.8	28.4	34.6	33.8
25-49 years		13.2	13.0	13.4	14.0	16.1
	Tertiary	12.8	8.8	9.1	9.7	10.2
	Upper secondary	13.8	15.8	16.3	16.5	20.8
	Lower secondary and primary	12.0	21.4	21.8	23.1	26.8
50-64	**Tertiary**	9.9	9.1	9.9	14.0	14.6
	Tertiary	7.7	7.4	7.9	8.6	10.3
	Upper secondary	10.1	11.3	14.0	20.7	20.8
	Lower secondary and primary	16.7	9.5	9.5	16.2	15.6

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, p. 119

Table G10.:Unemployment and Employment by Education Level, 2000, %

Level of Education	Unemployment rate	Share in Unemployment	Share in Employment
University	5.9	7.2	20.9
College	13.6	21.7	25.0
Upper secondary general	17.3	23.1	20.0
Upper secondary vocational	18.6	22.2	17.7
Lower secondary general	26.2	14.9	7.6
Lower secondary vocational	24.0	8.7	5.0
Primary or less	9.3	2.1	3.8
	15.4	100.0	100.0

Reference: World Bank „ "Lithuania. Aiming for a Knowledge Economy", March, 2003, p. 40

Mobility of recently trained

Specific information on this issue is not available. It is only known from the sociological surveys, that most mobile part of the population (especially in terms of emigration abroad) are young, well-educated single persons.

H. NATIONAL AND REGIONAL DEMOGRAPHIC DATA AND PROSPECTIVE

Table H1.: Age distribution, %

Year	Ratio to total population, %		
	Under working age	Working age*	Over working age
1990	24.0	56.8	19.1
1991	24.0	56.6	19.4
1992	23.9	56.8	19.3
1993	23.8	56.6	19.6
1994	23.6	56.5	19.9
1995	23.3	56.5	20.2
1996	23.0	56.9	20.1
1997	22.7	57.2	20.1
1998	22.2	57.7	20.1
1999	21.8	58.1	20.1
2000	21.3	58.5	20.2
2001**	19.5	60.3	20.2
2002***	20.6	59.5	19.8

** Up to 1995 population of working age was 16-54 years for women and 16-59 years for men. From 1995 until 2000 the pension age was increased for men 2 months per year and for women 4 months per year.*
*** Population census data*
****As of January 1*
Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, p. 62

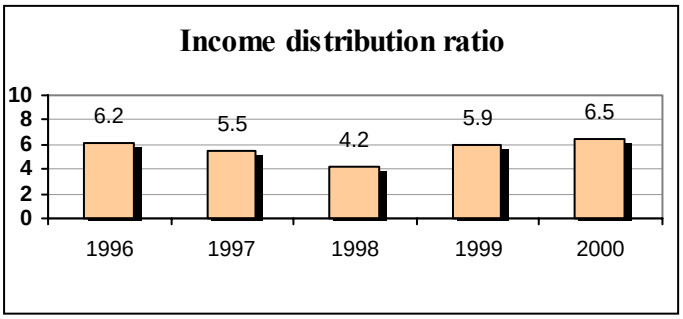
I. CULTURAL AND SOCIOLOGICAL DATA

Table I1.: International migration

	International Migration		
Year	**Total**		
	Immigration	**Emigration**	**Balance**
1990	14 744	23 592	-8 848
1991	11 828	22 703	-8 875
1992	6 640	31 172	-22 215
1993	2 850	26 840	-13 140
1994	1 664	25 859	-2 582
1995	2 020	25 688	-1 753
1996	3 025	26 394	-915
1997	2 536	24 957	79
1998	2 706	24 828	576
1999	2 679	23 418	1 310
2000	1 510	21 816	-1 106
2001	4 694	7 253	-2 559

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 2002, p. 77.

Graph I1.: Income distribution of 20% of the richest and 20% of the poorest households



Reference: United Nations, Common Country Assessment for Lithuanian, December, 2002; Dobravolskas A., "Poverty and Social Separation in Lithuania," Conference „Explaining and Reducing Poverty in Lithuania: Prospects and Reality," Vilnius, May 30, 2002, http://www.lrinka.lt/Renginia/Skurdas.phtml

Table I2.: Changes in consumption patterns: Structure of Total Average Consumption Expenditure, Part A

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Average total consumption expenditure, %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
A. Food and non alcoholic beverages	33.9	38.3	59.4	61.7	57.0	56.6	55.2	52.2	48.1	45.7	44.4	42.4	40.7
B. Alcoholic beverages and tobacco					2.5	2.5	3.7	3.7	4.0	4.2	3.9	3.7	3.7
C. Clothing and footwear					10.3	8.1	7.8	7.7	8.0	7.7	6.8	6.5	6.5

Table I2.: Changes in consumption patterns: Structure of Total Average Consumption Expenditure, Part B

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
D. Housing, water, electricity, gas and other fuel					13	14.8	11.8	12.3	12.3	12.9	13.5	13.6	14.0
E. Furnishings, household equipment and maintenance					2.9	3.0	3.6	3.9	4.8	4.7	4.2	5.1	4.9
F. Health care					1.7	2.0	2.6	3.1	3.5	3.6	4.4	4.5	4.8
G. Transport					6.4*	6.8*	5.2	6.6	6.7	7.6	7.6	7.3	6.9
H. Communication							-	1.0	1.9	2.3	3.6	4.5	5.2
I. Recreation and culture					3.0**	2.6**	2.5	2.8	3.5	3.6	3.8	4.0	4.3
J. Education							0.9	0.4	0.3	0.6	0.6	0.7	0.6
K. Hotels, restaurants, cafes, canteens							3.4	3.7	3.8	4.1	4.2	4.2	4.6
L. Miscellaneous goods and servines					3.2	3.2	3.2	2.6	2.9	3.0	3.0	3.5	3.8

**G+H*
*** I+J*

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 1996 pp. 212-213; "Statistical Yearbook of Lithuania," 1997, pp. 209-210; "Statistical Yearbook of Lithuania," 2000, p. 199; "Statistical Yearbook of Lithuania," 2002, p. 179.

Table I3: Changes in consumption patterns: Structure of Average Consumption Expenditure in Cash, Part A

	1996	1997	1998	1999	2000	2001	2002
Average consumption expenditure in cash, %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
A. Food and non alcoholic beverages	46.7	44.5	41.1	39.3	37.7	35.8	34.1
B. Alcoholic beverages and tobacco	4.5	4.4	4.6	4.7	4.5	4.2	4.2
C. Clothing and footwear	9.0	8.7	9.0	8.5	7.5	7.1	7.0
D. Housing, water, electricity, gas and other fuel	14.6	14.7	14.5	15.0	15.6	15.8	16.2
E. Furnishings, household equipment and maintenance	4.0	4.2	5.2	5.0	4.5	5.5	5.2
F. Health care	2.9	3.4	3.8	3.9	4.8	5.0	5.4
G. Transport	6.4	7.9	7.8	8.8	8.7	8.2	7.8
H. Communication	-	1.3	2.2	2.7	4.2	5.2	6.0
I. Recreation and culture	2.8	3.1	3.7	3.8	4.1	4.4	4.6

Table I3: Changes in consumption patterns: Structure of Average Consumption Expenditure in Cash, Part B

	1996	1997	1998	1999	2000	2001	2002
J. Education	1.1	0.5	0.4	0.7	0.7	0.8	0.7
K. Hotels, restaurants, cafes, canteens	4.2	4.5	4.2	4.5	4.5	4.3	4.8
L. Miscellaneous goods and services	3.7	2.8	3.1	3.3	3.2	3.7	4.0

Reference: Statistics Lithuania, "Statistical Yearbook of Lithuania," 1997 pp. 209-210; "Statistical Yearbook of Lithuania," 2000, p. 199; "Statistical Yearbook of Lithuania," 2002, p. 179

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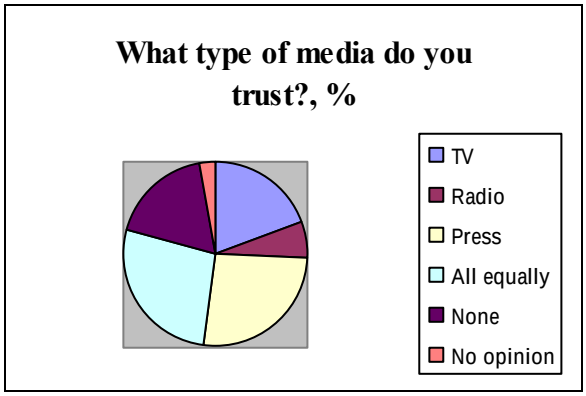
Graph I2.: Cultural patterns



Reference: "Veidas," 7 June, 2001

Table I4.: Number of devices according to the social level for 100 households

	1998					2000				
	lower	**transitional**	**medium**	**upper**	**total**	**lower**	**transitional**	**medium**	**upper**	**total**
Colour -TV	53	80	101	116	85	70	93	110	126	95
Black and white TV	42	37	37	37	38	33	26	25	26	27
Radio	70	75	76	72	74	63	66	64	64	65

Reference: Darbo ir socialiniu tyrimu institutas, Gyventoju pajamu, islaidu ir apmokestinimo tyrimas socialines stratifikacijos poziuriu (Institute for Labour and Social Research, Survey of household income, expenditure and taxation in terms of social stratification), 2001).

Table I5.: Evolution of access to basic infrastructure and services

Electricity	99.7	99.6
Water supply	-	81.3
Sewerage	79.3	78.8
Hot water	-	73
Electricity	100	100

Reference: Ibid.