

INNO-Policy TrendChart –  
Innovation Policy Progress Report

Lithuania

**2009**

## PREFACE

Innovation is a priority of all Member States and of the European Commission. Throughout Europe, hundreds of policy measures and support schemes aimed at innovation have been implemented or are under preparation. The diversity of these measures and schemes reflects the diversity of the framework conditions, cultural preferences and political priorities in the Member States.

**PRO INNO Europe®** is an initiative of the Directorate General for Enterprise and Industry (DG ENTR) which aims to become the focal point for innovation policy analysis, learning and development in Europe, with a view to learning from the best and contributing to the development of new and better innovation policies in Europe. Run by the Innovation Policy Directorate of DG ENTR, it pursues the collection, regular updating and analysis of information on innovation policies at national and European level.

**INNO-Policy TrendChart** serves the 'open method of coordination' approach laid down by the Lisbon Council in March 2000. It supports policymakers and innovation support measure managers in Europe by providing summarised and concise information and statistics on innovation policies, performances and trends. It is also a European forum for benchmarking and the exchange of good practices in the area of innovation policy.

### INNO-Policy TrendChart products

INNO-Policy TrendChart, previously the TrendChart on Innovation, has been running since January 2000. It currently tracks innovation policy developments in all 27 EU Member States, plus Brazil, Canada, China, Croatia, Iceland, India, Israel, Japan, Norway, Switzerland, Turkey and the US. The INNO-Policy TrendChart website (<sup>1</sup>) provides access to the following services and publications, as they become available:

- a database of innovation policy measures in the 39 countries;
- a news service and related innovation policy information database;
- annual policy monitoring reports for all countries covered;
- the European Innovation Progress Report, an annual synthesis report bringing together key points in the INNO-Policy TrendChart.

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<sup>1</sup> See <http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=52&parentID=52> online.

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## Executive Summary: public support for innovation – a snapshot

### 1. Main trends in the National Innovation System

At the end of 2007, the fast-growing Lithuanian economy started showing signs of deceleration. Lithuania has not escaped the global economic storm, and the flexibility of its economy is being put to the test. GDP grew by 3.1 % in 2008 but declined in the last quarter of 2008 by 2.0 % year-on-year. The gross domestic product (GDP) decline will accelerate in 2009 as shrinking internal and external demand limits consumption and exports. In 2009, downside pressure manifested mainly in domestically-oriented sectors such as construction, retail trade and transport. But export-led sectors are also being hurt by collapsing demand in major export markets, compounded by currency depreciation in Belarus, Poland, Russia and Ukraine. Lithuania faces a deep recession: GDP is expected to decline by 9.0 % in 2009 and 3.5 % in 2010. Internal demand has imploded since the start of 2009 due to a tax reform (a VAT increase from 18 % to 19 %, revocation of most VAT subsidies and higher excises on alcohol and fuel), sharply rising unemployment, tighter lending conditions and an increase in administratively established prices. Industrial production rose by 2.7 % in 2008, but declined by 5.0 %, the exception being refined oil products. In 2008 exports grew by 28.4 %, but in January they fell by 15 % year-on-year. Imports declined by a surprising 41 %, practically eliminating the foreign trade deficit. Since major exporters (such as producers of refined oil products and fertilisers) have a diversified client base, the decline in exports may be limited to 15 % to 20 % in 2009. In an effort to stimulate business, the government has prepared a spending plan totalling close to 5% of GDP, targeting the construction sector (energy saving measures in Soviet-era housing stock), exporters and small and medium-sized enterprises (SMEs). Funding is expected from a reallocation of EU Structural Funds (SF) and loans from the European Investment Bank (EIB) and commercial banks.

The relatively short period of economic growth did not also become a period of innovation growth, as neither was linked to the innovative growth sources, and it seems that Lithuania has lost its momentum in innovation. Thus, the consequences of the economic downturn will be especially earmarked by the bankruptcy of a large number of enterprises that do not correspond with the increasing competition pressure from international markets. The weak links between business and higher education and research and development (R&D) communities result not only in obsolete qualifications of the highly educated labour force, but also in low value added innovations, inability to develop new-to-market products and internal technological processes. Although the linking and technology transfer institutions are in place, they are not able to bring significant changes due to the lack of endogenous R&D capacities both in public and in business sector. In terms of National Innovation System (NIS) development. Lithuania is facing a major challenge in converting its innovation inputs into outputs (knowledge applications and intellectual property). As companies face competition pressure caused by increasing energy costs, growth of taxes and tightening international market space, we can expect a more active search for innovations as a source of cost efficiency and also innovation-based competitiveness, and consequently, an increase in shares of innovating enterprises, though the overall GDP production will shrink significantly.

### 2. Main developments in public support for innovation

The development of public support for innovation in Lithuania is associated with the implementation of the EU SF support programmes. The EU SF Implementation Strategy for the period from 2007 to 2013 continues the modified measures from the period of 2004 to 2006, and also a set of new measures for business R&D and innovation (RDI) have been launched in 2009. The Ministry of Economy continued the measures under the special programme to promote economy growth and competitiveness. Innovation financing remains an important issue, especially having in mind the absence of venture capital funds for innovation in Lithuania. New funding mechanisms and grant schemes for RDI were developed under the EU SF implementation programmes, such as guarantee funds for innovating enterprises, micro crediting, compensation of credit interests and other measures of financial engineering.

However, the implementation of the support measures until now was restricted by the complicated implementation procedures, which were expected to be simplified with the implementation of the Economy support plan, launched by the government in early 2009. The plan contains five important action lines: (a) the support for the improvement of energy efficiency of public and private buildings which directly targets the construction sector; (b) opening the credit resources for businesses at an affordable price (the establishment of Controlling fund, loan guarantees, etc.); (c) broadening of business financing opportunities and speeding up the implementation of EU SF programmes; (d) simplification of business regulations (Sunrise initiative); (e) export support (export credit insurance, marketing initiatives, etc.) and foreign direct investment (FDI) initiatives.

In the recent period, Lithuania has made tremendous progress in innovation policymaking and implementation, due to a major extent to the Lisbon process and implementation of the National Reform Programme (NRP). SF formed a real base for the implementation of a wide range of innovation support measures, both in the public and private sectors. Although the success of the measures is too early to apprise, and no new trends in the European Innovation Scoreboard (EIS) indicators appear, the current stage of play gives positive hope for the future.

### 3. Appraisal of national innovation policy

Innovation policy development in Lithuania has been slightly shifting from public innovation support infrastructure development towards the creation of large business and R&D partnership platforms, supported by the development of R&D projects and businesses and a systemic upgrade of the highest level qualifications for science and technology. The composition and funding levels of RTD and innovation policy clearly manifests the focus on the development of high technology areas, which are also at the core of a knowledge-based economy vision for Lithuania. The idea of technological specialisation of the country is embedded not only in the innovation policy documents, but also in the design of measures and funding priorities. The technology upgrade and development of entrepreneurial skills among the overall population of business enterprises was also addressed in the current policy implementation round, with the systematic focus on technology transfer facilitation, FDI, development of non R&D-based innovations, and development of skills for innovation by the working population.

However, the heavy reliance of innovation policy implementation on public funds and direct grants-based support schemes limits the policy impact to the selected entities, and does not allow freedom of experimentation for the larger numbers of businesses and individual entrepreneurs. The regulation-based improvements, facilitating innovation and entrepreneurship are to be more broadly exploited in the future. A proactive approach towards markets for innovation remains an unexploited innovation policy option as well. The government spending and investment programmes should be better linked to innovation and entrepreneurship, especially in such important sectors of the economy as energy and construction.

Not only direct grant, but also regulation-based support to producing and exporting enterprises is needed in order to improve their competitiveness in international markets, especially when national governments are reintroducing domestic producers support schemes and regulations in some of Lithuania's export markets.

Last, but certainly not the least important, is the need to address the innovation culture development broadly, without limiting it to science and technology (S&T) areas. The innovativeness and entrepreneurial behaviours in society are especially needed when employment is dropping, and new job creation is hardly feasible in the next five years by the existing enterprises as a result of the economic downturn. It is estimated that unemployment will reach 20 % of the working population by 2010 in Lithuania, which will not be overcome without the facilitation of innovative and entrepreneurial behaviours in the broad population.

## 1. Main trends and challenges in the National Innovation System

### 1.1 Recent economic trends and market developments

At the end of 2007, the fast-growing Lithuanian economy started showing signs of deceleration. Lithuania has not escaped the global economic storm, and the flexibility of its economy is being put to the test. GDP grew by 3.1 % in 2008, but declined in the last quarter of 2008 by 2.0 % year-on-year. The GDP decline will accelerate in 2009 as shrinking internal and external demand limits consumption and exports. On the positive side, a sharp fall in imports will significantly reduce the current account deficit. In 2009, downside pressure will be manifested mainly in domestically oriented sectors such as construction, retail trade and transport. But export-led sectors are also being hurt by collapsing demand in major export markets, compounded by currency depreciation in Belarus, Poland, Russia and Ukraine. Lithuania faces a deep recession: GDP will decline at least by 9.0 % in 2009 and 4.0 % in 2010. Since the decline in tax revenue and the slide of the economy into a recession have been quite abrupt, and since spending cuts and stimulus efforts will not have a quick enough impact, the need for an International Money Fund (IMF) / EU support package is increasing.

Tax reform (a VAT increase from 18 % to 19 %, with a further increase of up to 21 % in autumn 2009; revocation of most VAT subsidies and higher excises on alcohol and fuel), had little impact on domestic demand, as prices changed slightly in 2009. In November 2009 annual inflation was only 1.5 % when in November 2008 it was 9.1 %. In 2008 overall, retail trade registered 4.1 % growth, but the situation deteriorated in the last quarter when sales declined by 8.4 % year-on-year. A declining number of real estate deals and stagnating construction are leading to contraction in the production and sales of building materials, furniture and domestic appliances. Falling real estate prices are fuelling expectations for further declines. Industrial production rose by 2.7 % in 2008, but excluding refined oil products, it declined by 5.0 %. In 2008 exports grew by 28.4 %, but in January 2009 they fell by 15 % year-on-year. Imports declined by a surprising 41 %, practically eliminating the foreign trade deficit for the month. Since major exporters (such as producers of refined oil products and fertilisers) have a diversified client base, the decline in exports may be limited to 15 % to 20 % in 2009. Recent figures that confirm the flexibility of wage formation and the almost vanishing foreign trade deficit, along with the government's plans for further cuts in public sector pay and expenditures, also indicate that pressure on the currency will diminish. While households and businesses have adapted to fast-changing conditions, the new centre-right government of Prime Minister Andrius Kubilius that took office in December 2008, is constrained in its ability to respond in an appropriate manner. The new government swiftly pushed a tax reform package and a 2009 austerity budget through parliament. Hopes that increased indirect taxation would boost budget revenues, while reduced personal income taxes would help households and business to adapt were dashed by the first and second quarter tax collection figures. Tax revenue during these months missed the government's target by 13.8 %. In 2008 the government missed its revenue target by 3.6 %, and the fiscal deficit was estimated at 2.9 % of GDP. Falling internal demand and a sharp rise in unemployment (reaching 10.3 %, but reported 17 % increase on the monthly base, and nearing the 11.4 % level of 2004, the year of EU accession) are hampering VAT and fuel excise income. Company profits are also declining, and hikes in corporate tax (from 15 % to 20 %) and dividend tax (from 15 % to 26 %) immediately increased incentives to avoid paying these taxes, thereby further shrinking public sector revenue.

The government has prepared a new plan to curb budget expenditure by cutting investments and public sector pay by 10 % to 15 %. It also hopes to sell state assets, such as a 10 % stake in the Mazeikiu Nafta oil refinery. Nevertheless, the fiscal deficit forecast has risen to 4.5 % of GDP this year and 5.0 % in 2010. In an effort to stimulate business, the government has prepared a spending plan totalling close to 4 % of GDP, targeting the construction sector (energy saving measures in Soviet-era housing stock), exporters and SMEs. Funding is expected from a reallocation of EU SF and loans from the EIB and commercial banks.

Both nominal and real pay will decline in 2009. In the fourth quarter of 2008, average gross wage growth remained robust at 13 % year-on-year. In the private sector, the year-on-year increase was 8.2 %. Private sector wage formation in Lithuania is among the most flexible in the EU, according to the latest European Central Bank research. To reduce wage and salary pressure, the private sector is resorting to numerous strategies, such as cutting bonuses, reducing non-wage benefits, changing work practices, reducing promotion rates and replacing departing workers with lower paid ones. Lithuania's fragmented trade unions, except for those in the public sector, are not in a position to effectively resist these measures. The decision to reduce wages in the public sector by 10 % was taken in September 2009, while the business sector has already been cutting wages up to 25 % in the first quarter of the year. We thus expect nominal wages to decline by 8 % in 2009 and by an additional 4 % in 2010. Average harmonised index of consumer prices (HICP) inflation reached 11.1 % in 2008 but will decline to 5 % in 2009 and 2 % in 2010. Despite a decline in purchasing power during 2009, prices of consumer goods and services will rise due to tax increases and higher administratively established prices for energy.

New laws allow energy regulators to review prices more often. Energy prices may thus be lowered this coming autumn to reflect the international price decline. In 2010, after the closure of the Ignalina nuclear power plant, Lithuania will have to increase its energy imports (mainly from Russia), which will push up electricity prices by 10 % to 15 %. The increase will be more modest than previously estimated, due to declining natural gas prices and inflationary pressure, but it will still hurt the competitiveness of Lithuanian manufacturers.

## Exhibit 1: Comparable indicators of economic performance

Indicator	National performance		EU-27 average	
	2004	2007	2004	2007
GDP per capita in PPS (EU-27=100)	50.5	61	100*	100*
Real GDP growth rate (% change previous year)	7.4	8.9	2.5	2.9
Labour productivity per person employed (EU-27=100)	53.3	61.4	100*	100*
Total employment growth (quarterly % change) (1)	0.0	2.8	0.7	1.8
Inflation rate (average annual)	1.2	5.8	2.0	2.3
Unit labour costs (growth rate)	0.8	1.4	-1.4	-0.8
Public balance (net borrowing/lending) as a % of GDP	-1.5	-1.0	-2.9	-0.8
General government debt as a % of GDP	19.4	17.3	62.2	58.7
Unemployment rate (as a % of active population)	11.4	4.3	9.0	7.1
Foreign direct investment intensity	2.3	3.4	0.9	3.4
Business investment as a % of GDP	18.8	22.8	17.2	18.8

Source: Eurostat - Structural Indicators and Long-term Indicators (<http://epp.eurostat.ec.europa.eu>).

Key: (\*) EU-25 average, (^) or latest available year (for example: 2005); (:) not available.

Innovation performance has not changed significantly during the same period, although Lithuania already finalised the first EU SF implementation period of 2004 to 2006. Compared to the other European countries, Lithuania remains among the laggard countries with a Summary Innovation Index (SII) of 0.29, although slow improvement can be identified. The relatively short period of economic growth however was not a period of innovation growth as well; neither was linked to the innovation growth sources, and it seems that Lithuania has lost its momentum in innovation. Thus, the consequences of the economic downturn will mainly see the bankruptcy of a large number of enterprises that do not correspond with the international productivity and cost management-based competition. The weak links between business and higher education and R&D communities resulted not only in obsolete qualifications of the highly educated labour force in the private sector, but also in low value added innovations, developed without input from the R&D sector. Although the linking and technology transfer institutions are in place, due to the lack of endogenous R&D capacities in the business sector, they are not able to bring significant changes. In terms of NIS development, Lithuania is facing a major challenge in converting its innovation inputs into outputs (knowledge applications and intellectual property). The number of innovative enterprises, such as the Fourth Community Innovation Survey (CIS 4), remained low (18.4 %), but their turnover made up 52.3 % of the total turnover of Lithuanian enterprises. As companies face competition pressure caused by increasing energy costs, growth of taxes and international market space, we can expect a more active search for innovations

as a source of non cost-based competitiveness, and consequently, an increase of the share of innovating enterprises, though the overall GDP production will shrink significantly.

## 1.1.1 The credit crisis and its effect on innovation activity

The Lithuanian economy is among the countries that are facing the economic downturn and global financial crisis especially hard. First, the recession in high income countries, particularly in the EU, which comprises 64 % of the Lithuanian export market and especially in the largest Lithuanian export partner countries – Estonia, Germany, Latvia, Poland, Russia and Ukraine – has hurt the external demand for Lithuanian exports, and the global financial crisis has reduced capital inflows and thereby lowered domestic demand. These two shocks have led to a sharp economic downturn and steep rise in unemployment because of the countries' deep trade, capital and labour market integration with the EU and the world economy. More than 60 % of the unemployment rise, according to labour market information, is related to the bankruptcy or restructuring of enterprises. With the cuts foreseen in public spending in autumn 2009, the rise of unemployment will be further accelerated by the job cuts in the public sector.

Second, after years of high profitability, the soundness of the financial sector is threatened by the economic recession. Financial markets have re-priced country-specific risks, where Lithuania was given an especially unfavourable position, making borrowing especially costly and complicated. The job losses of Lithuanian migrants in the EU-15 countries add to labour market pressures in the home country. Higher joblessness is translated into lower household incomes, remittances and consumer demand with negative feedback loops to the financial sector, including rising non-performing loans. Even if growth rebounds by 2011, it could take years to reabsorb excess labour pools.

The economic recovery remains uncertain. The fast growth of the economy was based on the large capital inflows (borrowing), internal consumption, and growth of exports. However, as noted in the section above, the productivity of labour remained at only 61 % of the EU level, the shares of high tech exports, despite increasing, still remained moderate. Given the fact that the growth of exports was largely defined by the growth of prices of mineral products, but not by the deeper international trade integration, the recovery sources remain few, even if the EU-15 export markets would recover relatively fast.

The rapid growth of unemployment, also in industry, illustrates the rapid downturn of the economy and reduction of the workplaces that have been created in the past three years of economic growth. The levels of unemployment are nearing the period of 2000 to 2002, which is associated with the economic crises impacted by the Russian economy. Despite the fact that the Lithuanian economy in its 19 years of independent development is already experiencing its third crisis (the first in 1991, related to the shift from planned to market economy and restructuring of capital and markets, the second related to the Russian banking crisis in 2000 and reshifting of production markets), the ability to cope with the challenges is very limited. Unlikely to the reshifting of the economy towards a market one in 1991, or reorientation and diversification of the markets in 2002, entire challenges are related to the ability to innovate and compete on the international markets. The sources of cost-based competitiveness, such as a cheap labour or lower energy costs, have diminished in the growth and EU integration phases, however they were not replaced with the new innovation-based high value added production sources yet. The traditional structure of the economy which is dominated by the low and mid tech technologies and low value added activities, is not able to respond to the global economy challenges with innovation, and government measures are not sufficient to leverage the downturn of global and internal markets. The immediate response of the government to the crisis was an immediate tax rise, as the tax rate in Lithuania is one of the lowest in the EU. Nonetheless, the impact of the tax rise on the economy had an opposite effect to that which was expected. Tax collection due to the crisis shrank considerably, and the government faces difficulties in balancing budgets. EU SF support will be higher than VAT tax collection in 2010 for the first time in history. In response, the government is considering reducing the profit tax back to 15 %, where it stood until January 2009.

The Economy support plan (2009) followed a few months later. The plan contains five important action lines: (a) the support for the improvement of energy efficiency of public and private buildings which directly targets the construction sector; (b) opening the credit resources for businesses at an affordable price (the establishment of Controlling fund, loan guarantees, etc.); (c) broadening of business financing opportunities and speeding up the implementation of EU SF programmes; (d) simplification of business regulations (Sunrise initiative); (e) export support (export credit insurance, marketing initiatives, etc.) and FDI initiatives. The economic stimulus plan has given a positive impetus to the Lithuanian economy. All parts of the plan are being implemented. Within half a year period 0.7 billion Euro support was allocated to the market since the plan launch. EU structural support solutions were simplified. The absorption rate is approximately 8 times faster than the one of previous governments. Lithuania is the EU's leader in terms of structural support solutions. About 2000 companies made use of the means of Economic stimulus plan and 30 thousand jobs were saved. The exporting market received 29 million Euro support of EU structural funds assistance. The end of 2009 is showing the recovery of Lithuanian export. It is foreseen to allocate 0.3 billion Euro assistance to renovation of buildings until 2011. More than half of the foreseen funds are already allocated and 200 buildings are under renovation now.

## 1.2 Recent trends in the national innovation performance

Lithuania is among the grouping of Catching-up countries, with an innovation performance well below the EU-27 average. However, unlike most other countries in this grouping, its rate of improvement is below that of the EU-27. Relative strengths, compared to the country's average performance, are in Human resources, Finance and support and Linkages & entrepreneurship; relative weaknesses are in the Firm investments, Throughputs and Innovators categories.

Over the past five years, Finance and support, Human resources and Throughputs have been the main drivers of the improvement in Lithuanian innovation performance, specifically as a result of strong growth in S&E and SSH graduates (10.8 %), Private credit (27.9 %) and Community trademarks (19.4 %). Performance in Linkages & entrepreneurship and Innovators has worsened, due mainly to a decrease in Innovative SMEs collaborating with others (-8.7 %) and SMEs introducing product or process innovations (-6.1 %).

The investments in knowledge (education, R&D, innovation, training, etc.) and innovation infrastructure (innovation support infrastructure and broadband penetration), i.e. the factors under the Enablers category, form the relative strengths of Lithuanian innovation system.

Approximately 28.9 % of the Lithuanian population are holders of a higher education degree. Youth involvement in tertiary education reaches 89 %, and 18.9 % of university graduates are in the field of engineering and science (EIS, 2007). Still, the engineering profession is not taken up by all the graduates. The human resources for R&D in business were limited to 5.4 % of the total human resources for R&D in Lithuania. Approximately 1.7 % of all doctorate holders were employed in the business sector. The extremely low share of R&D personnel in the business sector hinders its absorptive capacity. Only few sectors of the economy have a higher employment of R&D personnel, namely machinery and equipment, optical and medical devices, chemicals (including pharmaceuticals) and R&D-intensive services and ICT. The sustainability of the positive trends in S&T human resources development will be tested in the next few years. The higher education sector reform has introduced a 'free market' ideology in its sector, where the number of students and the choice of studies is based on student preferences ('student basket'). The first year of reform has already shown that science and engineering disciplines are not in demand, and universities were not able to attract the expected numbers of students in S&T disciplines.

The maintenance of skills and qualifications by the working population is no less an important issue in a modern economy. In 2007, 5.3 % of the working population was involved in lifelong learning activities (a third of the EU average), which shows an absolute gap between the efforts given for youth education and tertiary education, and the efforts to maintain the acquired skills up to date. The participation in lifelong learning declined in 2007 by 2.6 %, partially as a consequence of the closing measures in the Lifelong learning area under the EU SF 2004 to 2006 period. The activities are to be

continued with the new measures planned for the period 2007 to 2013, with the actual implementation in 2008 to 2009.

The only sustainable trend in the finance and support category is demonstrated by public R&D expenditures at the level of 0.58 % of GDP. With R&D expenditures of EUR 231 million (2007), Lithuania ranks relatively higher than other small new EU Member States, contributing approximately 0.08 % of the total EU-27 R&D expenditures. At 0.82 % R&D expenditure as a % of GDP (in 2007), Lithuanian R&D intensity is significantly lower than the EU-27 average of 1.84 %. The annual growth rate of R&D expenditures (as % of GDP) in 2001 through 2007 was very low (starting with 0.67 % of GDP in 2001, and reaching 0.82 % of GDP in 2007), although the netto funds, allocated for research, increased because of the rapid GDP growth rates in the same period (on the average, 7 % to 8 % annually). In fact, public spending for R&D increased in 2007 by 33 % compared to 2005. On the other hand compared to the GDP, a slight decline in public spending was recorded for R&D due to the rapid growth of nominal GDP (in 2007 36 % increase compared to 2005.) Business R&D funds, although slightly increasing from 0.16 % of GDP in 2005 to 0.23 % of GDP in 2007, are not able to compensate for declining public R&D funding. The majority of government R&D appropriations (which comprise EUR 111 million, 48.1 % of total R&D funds) are spent on the research performed by the higher education sector (EUR 79 million, or 71.16 %), and by public research organisations (EUR 30 million, or 27.31 %). Only a small share of government budget appropriations is used for research in the business sector (EUR 2 million, or 1.5 %). The HERD funds, which comprise 7.5 % in total R&D funding, are used by higher education institutions entirely (100 % or EUR 17 million). The funds from abroad comprise an important share of 19.23 % (or EUR 45 million) in national R&D funding. In contrast to the government and business R&D appropriations, international R&D funds are absorbed equally by public research organisations (36 %), the higher education sector (36 %) and business enterprises (28 %). The share of gross expenditure on research and development (GERD) financed from abroad has been increasing rapidly since 2000 (reaching EUR 45 million in 2007 compared to EUR 4.9 million in 2000). This is related to the Lithuanian accession and the increasing participation in the European Research Area (ERA).

The broadband penetration rate and firms ICT expenditures are also moderately growing (by 1.5 %). The recent data from the Internet World Statistics show that the internet population penetration rate in Lithuania is at 59.2 %, while the EU average is at 50.1 %<sup>2</sup>. Private credit, which grew by 27.9 % in 2007, has actually dropped almost to zero as a consequence of the financial crises.

In the firms investments category, business R&D investments made were the main growth indicator. Business R&D investments in 2007 comprised EUR 57 million, and made up 24.6 % of total R&D funding. The majority of funds were intramural spending, EUR 52 million, or 91 % of total business expenditure on R&D (BERD) was used for research performed in-house. EUR 5 million was invested in R&D performed by the public sector and higher education institutions. Main R&D investing sectors were medium and high-tech industry and services. The year 2006 might have marked a shift when R&D investments in services overcame R&D investments in manufacturing in absolute and relative terms. In 2006, R&D spending in services almost tripled compared to 2005, and reached EUR 38.9 million, which made up 73 % of total BERD in 2006. In fact, the BERD growth in 2006 was achieved only because of the R&D spending growth in services, as the industrial R&D spending in the same year dropped by 25 % and reached EUR 13.03 million compared to EUR 17.4 million in 2005. The main R&D investors in the service sector were: (a) wholesale and retail trade (EUR 17.2 million or 32 % of total BERD); (b) financial intermediation (EUR 12.3 million or 23 % of total BERD); real estate, renting and business activities (EUR 4.2 million or 7.8 % of total BERD); (c) R&D (EUR 3.6 million or 6.8 % of total BERD). Industrial RDI, as noted above, dropped in absolute terms, and comprised 24.5 % of total BERD, compared to 54.4 % of total BERD in 2005. The significant drop occurred because of investment cuts from dominant traditional industries such as textile, food, wood and paper product industries, as well as manufacturing of radio, television and communication equipment and apparatus. Many of the other industry branches had slightly reduced R&D investments as well. The only two industry branches that have been demonstrating stable and even slightly increasing R&D investments are mainly the manufacture of chemicals and chemical products (EUR 4.4 million or 8.2 % of total BERD), and the manufacture of medical, precision and optical instruments (EUR 2 million or 3.7 % of total BERD). The two industrial sectors that kept investing in R&D are among the selected priority

<sup>2</sup> See <http://www.internetworldstats.com/stats4.htm#europe> online.

sectors of high technologies: biotechnologies, lasers, nanotechnologies and mechatronics ('High technology development' programme, 2005).

While business R&D investments increased slightly, non-R&D innovation expenditures have dropped by 15.4 %. During the same time, the number of innovating enterprises also declined. Other Linkages and Entrepreneurship indicators demonstrate the weakness of Lithuanian enterprises in innovation activities. Well below the EU average are the indicators innovation in-house (17.7 %) and public-private co-publications, and the innovation cooperation indicator is declining as well (10.3 %, or -8.7 % drop compared to 2004). According to the Community Innovation Survey (2006) (Statistics Lithuania, 2008), 43 % of innovative enterprises in Lithuania collaborate on innovation activities. Suppliers were the dominating partner in innovations for all sectors. More than a quarter of all innovations were also generated in collaboration with clients or customers. Higher education institutions were important innovation partners in wholesale and retail (33.7 %), supply of electricity, gas and water (27.8 %), but also in construction (20.8 %) and industry (19.8 %). Public R&D institutes were important innovation partners in mining and quarrying, but no more important than suppliers and customers. Despite relatively high cooperation rates in innovation activities with higher education and science institutions, it was not reported as being a valuable or important type of innovation cooperation. The most striking fact is that only 1 % of manufacturing enterprises reported the cooperation type with higher education institutions as a valuable one, although the intensity was rather high, as stated above. In other words, although enterprises are cooperating in the search for innovative opportunities, they do not result in technological innovation, neither in publications, as the indicators show.

The grouping of Throughput indicators shows that intellectual property development activities are relatively low in the Lithuanian economy, and the trend has remained the same for years. Lithuanian patenting rates were as low as 2.7 EPO patent per million inhabitants in 2004. The gap between the EU-15 (old Member States) with over 300 patents per million of labour force, and the New Member States (NMS) with over 17 patents per million of labour force, remains tremendous. The triad patents and community design indicators are at the same zero level. The only community trademarks were growing by 19.4 %, and reached 20.4 % of the EU average. The low levels of patenting are related to the sectoral structure of the Lithuanian economy, and also the prevailing supplier-driven innovation type in the innovation activities.

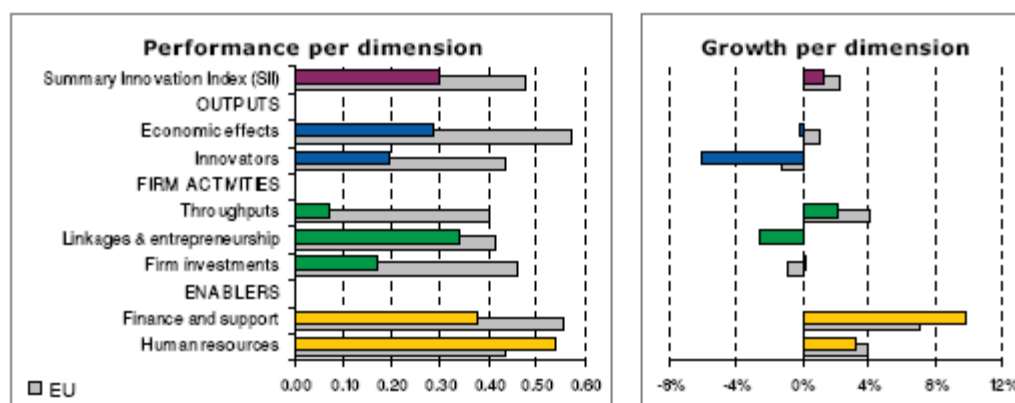
The alignment of the country's scientific and industrial specialisation (Erawatch, 2007) is also an unaddressed policy question. As the Lithuanian Country R&D Specialisation Report (Erawatch, 2007) shows, the highest numbers of publications (or scientific specialisation) was achieved in the fields of materials, engineering, computer science, chemistry, physics and mathematics, i.e. Lithuania exhibits strong specialisation in all fields of natural sciences, such as physics, mathematics, materials, engineering, computer sciences and chemistry. However, as we see from the analysis above, the scientific knowledge leads to the development of technological knowledge in very limited terms. Therefore, we come across a case of non-innovative (i.e. not related to entrepreneurship) scientific activity, where public R&D expenditures (dominating Lithuanian R&D funding) are not leading to the development of technological knowledge.

The innovation output category declined slightly, mainly due to the drops in numbers of product/process innovators (-6.1 %), employment in medium-high tech manufacturing (-5.3 %) and exports (-2.2 %), as well as knowledge-intensive services exports (-11.7 %). The weakness of market and organisational innovations in effect leads to the reduced numbers of innovative activities. According to the CIS, technology transfer activities remain the main type of innovation generation. However, technology transfer itself does not contain an innovative element if not combined with market development and organisational innovation activities. For example, the Lithuanian printing industry showed tremendous growth rates in last five years (up to 30 %), while the EU average growth rate of the printing industry was 1% to 2%. At the same time, the industry made large investments in the acquisition of new technologies. However, the industry today, affected by the growth of labour and energy costs and increasing international competition, faces the problem of ineffective use of production capacities and low productivity per hour worked because of the inability to develop markets in response to the increased production capabilities, i.e. modern production capacities remain

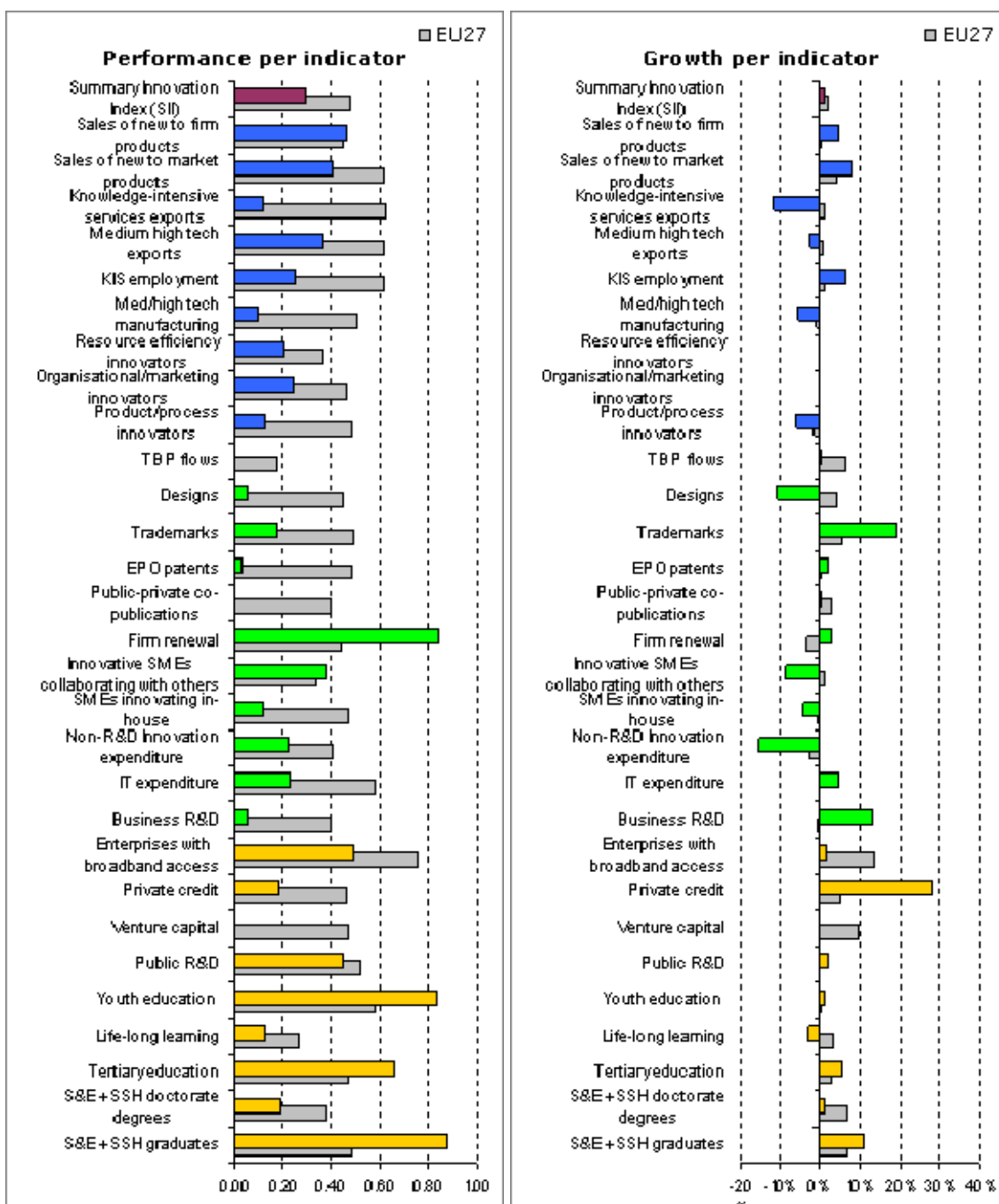
unexploited because of the lack of marketing and management capabilities <sup>(3)</sup>. A similar situation is also faced by many other traditional industries.

The Output indicators support the previous statements on the weakness of Lithuanian enterprises in generating innovations. Employment share in knowledge-intensive services reaches 8.19 %, and in mid high tech manufacturing – 2.44 % (37 % of the EU average). A positive shift is illustrated in the innovative output composition. In contrast to the 2004 data, the sales of new-to-market products (8.4 %) dominate the sales of new-to-firm products (4.7 %) according to the CIS results in 2006. The data prove that the Lithuanian economy is dominated by traditional industries, the competitiveness of which is still based on the productivity and costs management, but not innovative activities.

## Exhibit 2: European Innovation Scoreboard: country pages



<sup>3</sup> Jucevicius et al. 2008, Kriaucioniene et al. 2009.



	2001	2002	2003	2004	2005	2006	2007	2008	Growth
<b>SII</b>				<b>0.264</b>	<b>0.273</b>	<b>0.287</b>	<b>0.294</b>	<b>0.294</b>	<b>1.2%</b>
<b>ENABLERS</b>									<b>5.6%</b>
<b>Human resources</b>									<b>3.2%</b>
1.1.1 S&E and SSH graduates	38.1	40.1	47.0	53.4	58.2	60.3	--		10.8%
1.1.2 S&E and SSH doctorate graduates	0.46	0.58	0.39	0.53	0.54	0.61	--		1.1%
1.1.3 Tertiary education	22.4	21.9	23.2	24.2	26.3	26.8	28.9		5.6%
1.1.4 Life-long learning	--	--	--	5.9	6.0	4.9	5.3		-2.6%
1.1.5 Youth education	--	81.3	84.2	85.0	87.8	88.2	89.0		1.4%
<b>Finance and support</b>									<b>9.9%</b>
1.2.1 Public R&D expenditures	0.48	0.55	0.53	0.60	0.60	0.57	0.58		2.3%
1.2.2 Venture capital (3-year average)	--	--	--	--	--	--	--		--
1.2.3 Private credit	0.14	0.16	0.23	0.29	0.41	0.51	0.61		27.9%
1.2.4 Broadband access by firms	--	--	--	50.0	57.0	57.0	53.0		1.5%
<b>FIRM ACTIVITIES</b>									<b>-0.1%</b>
<b>Firm investments</b>									<b>0.1%</b>
2.1.1 Business R&D expenditures	0.20	0.11	0.14	0.16	0.15	0.22	0.23		13.2%
2.1.2 IT expenditures	--	--	--	1.5	1.7	1.8	--		4.7%
2.1.3 Non-R&D innovation expenditures	--	--	--	1.25	--	0.64	--		-15.4%
<b>Linkages &amp; entrepreneurship</b>									<b>-2.6%</b>
2.2.1 SMEs innovating in-house	--	--	--	21.0	--	17.7	--		-4.2%
2.2.2 Innovative SMEs collaborating with others	--	--	--	14.8	--	10.3	--		-8.7%
2.2.3 Firm renewal (SMEs entries + exits)	8.1	9.0	--	--	--	--	--		2.8%
2.2.4 Public-private co-publications (2-year avg.)	--	0.1	0.3	0.3	0.1	0.0	--		0.1%
<b>Throughputs</b>									<b>2.2%</b>
2.3.1 EPO patents	0.9	0.8	3.8	4.0	1.3	--	--		2.1%
2.3.2 Community trademarks	0.3	0.0	2.3	4.9	8.5	20.9	20.4		19.4%
2.3.3 Community designs	--	--	--	6.7	6.7	4.4	2.6		-10.9%
2.3.4 Technology Balance of Payments flows	--	0.08	0.10	0.08	0.09	0.08	--		0.4%
<b>OUTPUTS</b>									<b>-0.8%</b>
<b>Innovators</b>									<b>-6.1%</b>
3.1.1 Product/process innovators (SMEs)	--	--	--	25.3	--	19.7	--		-6.1%
3.1.2 Marketing/organisational innovators (SMEs)	--	--	--	28.6	--	28.5	--		--
3.1.3 Resource efficiency innovators									
3.1.3a Reduced labour costs	--	--	--	9.3	--	10.7	--		--
3.1.3b Reduced use of materials and energy	--	--	--	5.9	--	8.5	--		--
<b>Economic effects</b>									<b>-0.2%</b>
3.2.1 Employment in medium-high/high-tech manufacturing	3.10	2.64	3.03	2.80	2.57	2.48	2.44		-5.3%
3.2.2 Employment in knowledge-intensive services	5.64	6.18	6.42	6.42	6.88	7.94	8.19		6.3%
3.2.3 Medium/high-tech manufacturing exports	--	36.1	35.4	31.1	31.5	33.1	--		-2.2%
3.2.4 Knowledge-intensive services exports	--	22.7	18.8	16.4	15.8	13.8	--		-11.7%
3.2.5 New-to-market sales	--	--	--	4.4	--	6.0	--		8.4%
3.2.6 New-to-firm sales	--	--	--	5.3	--	6.4	--		4.7%

## 1.3 Identified challenges

### Challenge 1: Improving skills for innovation and entrepreneurial attitudes

One of the major strengths of Lithuania is the relatively high share of S&E graduates and the large share of the population with tertiary education, estimated at 19 % and 28.9 % respectively. However,

there remain concerns about skills shortages in certain fields. In this context, the challenges are actually twofold; first, it is necessary to continue improving skills levels and qualifications of human resources; second, the newly developed skills should be as relevant as possible to industry needs. The Ministry of Education and Science in September 2004 launched the scheme 'Improvement of the quality of human resources for R&D and innovation' within the framework of the Single Programming Document 2004 to 2006. The main aim of this measure was to improve the quality of highly skilled human resources in the priority areas of science and technology (biotechnology, agriculture, forestry, mechatronics, laser and optical technologies, and in horizontal themes such as innovation, entrepreneurship, languages). The measure focused on the Master's and PhD level qualification development in the selected fields. In addition, the Ministry of Social Security and Labour has launched a scheme for upgrading skills and competencies of occupied labour in order to increase its adaptability to changes and requirements of the modern economy (innovation, technology management, international communication, marketing, learning in knowledge economy and IT skills are among the core themes). Development of cross cutting competencies, and especially the ability to apply knowledge for the creation of business and innovations are of crucial importance, because as the EIS indicator analysis shows, the ability of Lithuanian enterprises to design innovations is rather low.

Entrepreneurial thinking, as a substantial part of the innovation process, is weakly developed in all sectors of the economy – business, the public sector, and government. In business, it manifests itself as the lack of new ideas, creativity, ability to see new opportunities and enter new markets. The EIS indicators of new-to-market products supports this statement. In addition, the development of new technology-based firms and their impact on the economy remains very limited – employment in high tech services and industries remains marginal. It is obvious that today it is not the knowledge-intensive sectors that drive the economy, although Lithuania has set the aim to proceed towards a knowledge economy and high value added economic activities, as stated in the NRP. In light of this, the development of new technology-based firms, and also knowledge-intensive firms in all sectors of the economy, becomes of crucial importance in order to achieve national development goals.

## **Challenge 2: Building R&D capabilities in firms and development of sound R&D base**

The Lithuanian business sector suffers from the relatively low R&D potential in business, first in terms of the number of researchers in the business sector, and in terms of R&D funding. Thus, firms are neither capable of performing internal R&D, nor integrating external R&D results into the business processes and innovation development. Business R&D expenditures have been growing rapidly from near zero in 1998, reached 0.24 % of GDP. In few cases where internal R&D is performed (large size enterprises in chemistry and pharmaceuticals, and SME's in lasers and biotechnologies), the companies find it difficult to establish productive cooperation with the public R&D sector (except in the case of biotechnology and laser companies, which are spin-offs of state R&D institutes). Until recently, the policy measures targeted R&D infrastructure development in both the public and business sector, namely establishing research excellence centres in priority areas – lasers, biotechnologies and mechatronics, and development of S&T parks for new technology-based businesses. EU SF in the period from 2004 to 2006 were used to support R&D projects in enterprises, which revealed the potential of businesses to absorb such funds being limited to companies clustered in a few sectors – optical and medical devices, biotechnologies, electronics, chemistry and ICT.

## **Challenge 3: Development of knowledge-intensive clusters across public knowledge poles**

While it is a prerequisite for Lithuania to invest more in R&D both in financial terms and in terms of human capital, it is also very important to devote more reflection on how to generate greater impact in terms of outputs of investment in R&D and commercialisation. For the time being, Lithuania suffers from extremely low levels of knowledge application. According to the EIS 2008, the patenting level is close to zero, and Lithuania is not doing much better in community trademarks (20 % of the EU level) and industrial design (2.6 % of the EU level). Employment in high tech sectors and knowledge-intensive services remains low, as well as new-to-market and new-to-firm product sales. Despite today's Lithuanian industrial structure reliance on traditional R&D solutions, technology transfer and application, the improvement of current technologies and methods via new knowledge-based solutions

is needed in order to ensure industrial upgrade towards higher productivity and value added. Thus, building up relationships between the business and R&D sector, development of knowledge-intensive clusters is a key challenge for sustainable business innovation.

The challenges identified are addressed by the set of measures implemented under EU SF implementation programmes for 2004 to 2006, which are being replaced by the new measures, relating to the period from 2007 to 2013. It is important to note that most of the measures were implemented in the last 24 months, therefore the impact based on indicators is far too early to apprise.

### Exhibit 3: Main innovation policy challenges

Description of challenge	Relevant indicators and trends
1. Improving skills for innovation and entrepreneurial attitudes	The challenge is based on a combination of high level of population with tertiary education and S&E graduates on one hand, and low application of the skills in the economy, initially resulting in a low level of new-to-market innovations, absence of organisational innovations, absence of new technology-based firms, low level of employment in high tech services and industries.
2. Building R&D capabilities in firms and development of sound R&D base	Business R&D remains among the lowest in the EU - 0.23 GDP, number of researchers in business sector per employee is low -but it is growing (4) -, weak position in development of any other type than supplier oriented innovations.
3. Development of knowledge intensive clusters across public knowledge poles	Cooperation in business innovation is one of the few positive EIS indicators, which offers opportunity to reinforce networking for innovation and clusterisation of knowledge-intensive activities.

The composition of challenges identified shows that the Lithuanian innovation system suffers from a lack of internal capabilities to transfer innovation inputs into outputs, i.e. lack of entrepreneurial skills in the economy. The first challenge for improving skills in innovation and entrepreneurial attitudes relates to the second challenge of building R&D capabilities in firms and development of a sound R&D base.

In order to develop other than supplier-driven innovations within firms (basically, in the form of acquisition of new technologies), the R&D capabilities of firms has to be strengthened. Given the current business R&D investment level and the composition of the labour force in industry, it is obvious that the Lithuanian business sector is not ready to initiate innovative processes, and imitates innovations developed elsewhere (with few exceptions). The partnership practices between the business and R&D sectors are weak and restricted by mutual distrust. As the Knowledge Economy Forum (2008) survey on business and R&D sector partnership opportunities show, businesses evaluate the existing supply of R&D knowledge at a below average level, criticise the public sector for the 'lack of reality' in the cooperation processes, while the science sector criticises the business sector for the inability to absorb original scientific solutions, lack of absorptive capacity and understanding on how to turn scientific results into innovations. The survey points to the need to develop links between R&D and the business sector, i.e. the third challenge: development of knowledge-intensive clusters across public knowledge poles.

In Lithuania's case, the R&D capabilities and resources (financial and human) are concentrated in the public sector. The cooperation between the sectors does actually happen, but is not quoted as an effective one by the business sector (see CIS IV result analysis in Section 1.2) because of the reasons identified in the description of the second challenge, but also because of the limited circulation of knowledge between the sectors.

<sup>4</sup> In 2007 compared to 2006 number of researchers in business sector increased by 48 per cent.

## 2. Public support to innovation

### 2.1 Main objectives for innovation policy

**Exhibit 4: Main innovation policy documents**

Main innovation policy documents	Key objectives and targets
Lithuanian National Lisbon Strategy Implementation Programme for 2008-2010	<ul style="list-style-type: none"> <li>• increase of investments, primarily of private business, into scientific research and experimental development (R&amp;D) (Guideline No 7);</li> <li>• upbringing of innovation culture in business and the increase of innovative capabilities for companies (Guideline No 8);</li> <li>• creation of a supportive environment for small and medium enterprises, promotion of entrepreneurial culture (Guideline No 15).</li> </ul>
Innovation in Business Programme for 2009-2013	<p>Key objectives:</p> <ul style="list-style-type: none"> <li>• increase the share of innovative enterprises in industry and services;</li> <li>• increase the share of high and mid high technology enterprises in industry and services;</li> <li>• increase the share of exports of Lithuanian production (including EU exports).</li> </ul> <p>The objectives are to be achieved while implementing the following targets:</p> <ul style="list-style-type: none"> <li>• promote innovation in order to inform society about importance and possibilities of innovation in business – innovation friendly environment;</li> <li>• improve the efficiency of innovation support network and the skills of its human resources;</li> <li>• ensure access to finances for innovation and the variety of innovation funding sources;</li> <li>• support the creation and development of business and R&amp;D partnership networks.</li> </ul>
National general strategy: the Lithuanian Strategy for the use of European Union Structural Assistance for 2007-2013	By 2015 Lithuania to achieve the level of socioeconomic development of some of the old Member States.
Operational Programme for Economic Growth for 2007–2013	<ul style="list-style-type: none"> <li>• increase the share of high value added businesses;</li> <li>• increase business productivity especially by creating favourable environment for innovations and SME's;</li> <li>• increase efficiency of economic infrastructure.</li> </ul>
Operational Programme for the Development of Human Resources 2007-2013	<ul style="list-style-type: none"> <li>• increase the economic activity and employment of population, promote the creation of quality jobs and ensure equal opportunities for everyone to participate in the labour market and social life;</li> <li>• ensure better possibilities for the Lithuanian population to engage in lifelong learning activities by facilitating the dynamic development of knowledge-based society;</li> <li>• enhance the quality and quantity of human resources in the RTD area by fostering the capacity and potential of the Lithuanian RTD sector;</li> <li>• foster the administrative competences and increase the</li> </ul>

	<p>efficiency of public administration sector performance.</p>
<p>High technologies development programme for 2007-2013</p>	<p>Support R&amp;D activities in selected priority areas:</p> <ul style="list-style-type: none"> <li>• biotechnologies;</li> <li>• mechatronics;</li> <li>• light and laser technologies;</li> <li>• ICT;</li> <li>• Nanotechnologies;</li> <li>• electronics.</li> </ul>
<p>Priority trends of research and development for 2007-2010</p>	<p>Support research in selected priority areas:</p> <ul style="list-style-type: none"> <li>• research to ensure the quality of human life (genomics and biotechnology for health and agriculture, technology of high quality, safe and ecologically clean food, ecosystems, and climate changes);</li> <li>• research intended for the development of a knowledge-based society (information society technologies, citizens and governance for the knowledge society, preservation of national identity under conditions of globalisation);</li> <li>• research intended for the development of nanotechnologies (nanoscience, nanotechnology, creation of multifunctional nanostructural materials);</li> <li>• R&amp;D intended for the achievement of objectives related to nuclear safety when exploiting the Ignalina nuclear power plant and terminating its exploitation as well as when treating nuclear waste;</li> <li>• R&amp;D intended to increase the international competitiveness of Lithuanian industry (development of biotechnology, mechatronics, laser, information, and other high technologies).</li> </ul>
<p>Long term research and development strategy and Lithuanian White Paper on research and technologies statements implementation programme</p>	<p>The strategic objective is to:</p> <ul style="list-style-type: none"> <li>• strengthen scientific and technological potential of the country;</li> <li>• apply potential for the achievement of competitiveness and national development goals.</li> </ul> <p>The strategic targets, as set in 2003, are to:</p> <ul style="list-style-type: none"> <li>• become a knowledge society by 2015;</li> <li>• develop science and business links and implement the European innovation development practice in 2010;</li> <li>• achieve 3 % of GDP R&amp;D funding, 2 % of which should contribute to the business sector;</li> <li>• increase the share of high technology production up to 20 % by 2013;</li> <li>• increase the share of computer literacy up to 70 % of the population by 2009;</li> <li>• integrate Lithuanian R&amp;D system into the ERA;</li> <li>• set R&amp;D system development as a priority for EU SF use.</li> </ul>

The innovation policy documents in Lithuania were designed in response to the European policy coordination processes and the need to establish national innovation policy guidelines. The main document from which the innovation policy actions are being designed is the National Lisbon Reform programme, renewed for the period from 2008 to 2010. The programme for 2008 to 2010 sets the microeconomic priority to promote the competitiveness of Lithuanian companies. The competitiveness of Lithuanian industry depends on the capability of industry to produce and install new technologies, on the development of innovative activities, on sufficient qualified workforce and on finance and services resources. The renewed NRP sets the following objectives: (a) increase of investments,

primarily of private business, into scientific research and experimental development (R&D) (Guideline No 7); (b) upbringing of innovation culture in business and the increase of innovative capabilities for companies (Guideline No 8); creation of a supportive environment for small and medium enterprises, and promotion of entrepreneurial culture (Guideline No 15). The objectives stated in the NRP are linked to the EU SF implementation strategy for 2007 to 2013, which is implemented via several operational programmes (OP).

Nevertheless, the NRP is not the only document for the implementation for which EU SF are used. The other important documents that aim to link the national R&D and technology development strategies, and focus on the development of technological specialisation areas of the country are the 'High technologies development' programme for 2007 to 2013, 'Priority trends of research and development for 2007 to 2010' and the 'Long term research and development strategy and Lithuanian White Paper on research and technologies statements implementation' programme. Collectively they demonstrate an attempt to define the direction of technological development and focus on the R&D-intensive innovative activities. Thus, the 'High technologies development' programme for 2007 to 2013 sets the goal to develop existing R&D-intensive high tech industry areas that demonstrate the ability to produce internationally competitive products and technologies, namely biotechnologies, mechatronics, light and laser technologies, ICT, nanotechnologies and electronics. The programme supports R&D activities while providing small amounts of the national budget for the creation of new prototypes and marketable products in the selected technology areas.

The 'Priority trends of research and development' for 2007 to 2010 and the 'Long term research and development strategy and Lithuanian White Paper on research and technologies statements implementation' programme set the vision of the Lithuanian R&D sector development, whereas the sustainability and competitiveness of the research system is at the core. Newly designed competitive R&D funding instruments demonstrate an attempt to support research areas across thematic priorities, as defined in the Lithuanian thematic R&D priorities for 2007 to 2010:

- 1) research to ensure the quality of human life (genomics and biotechnology for health and agriculture, technology of high quality, safe, and ecologically clean food, ecosystems, and climate changes);
- 2) research intended for the development of a knowledge-based society (information society technologies, citizens and governance for the knowledge society, preservation of national identity under conditions of globalisation);
- 3) research intended for the development of nanotechnologies (nanoscience, nanotechnology, creation of multifunctional nanostructural materials);
- 4) R&D intended for the achievement of objectives related to nuclear safety when exploiting the Ignalina nuclear power plant and terminating its exploitation as well as when treating nuclear waste;
- 5) R&D intended to increase the international competitiveness of the Lithuanian industry (development of biotechnology, mechatronics, laser, information, and other high technologies).

In 2008 the budgetary expenditure dedicated for the implementation of the above listed national programmes was 12 million Euro while in 2009 it amounts 11 million Euro. Their implementation is mainly organised along the OP of EU SF implementation, designed under the 'National general strategy: the Lithuanian Strategy for the use of European Union Structural Assistance for 2007 to 2013', namely the 'Operational programme for economic growth' and the 'Operational programme for the development of human resources'. These programmes contain the sets measures for the implementation of R&D and Innovation policies listed above, including NRP targets.

Innovation-related measures in the 'Operational programme for economic growth' for 2007 to 2013 are designed under priority 1 'Research and development for competitiveness and growth of the economy', and priority 2 'Increasing business productivity and improving environment for business'.

Priority 1 specifically targets the lack of links between business and R&D sectors, and absence of high value added technological innovations. The objectives set under this priority are to:

- 1) reinforce public and private R&D facilities;
- 2) increase efficiency of R&D by the public sector as well as its accessibility to businesses;
- 3) intensify R&D by the private sector, and to improve the environment for the R&D dissemination.

The measures under this priority focus on the development R&D system (upgrade of R&D infrastructures, funding of targeted R&D programmes, as defined in the R&D priority trends and high technologies development programme) and R&D and business cooperation platforms (science and business valleys, technology parks).

Priority 2 'Increasing business productivity and improving environment for business' addresses the development of the environment favourable for innovations. The specific objectives set are the following:

- 1) increase business productivity;
- 2) increase viability of businesses and promote entrepreneurship;
- 3) improve access to financing sources for SMEs;
- 4) adapt public territories for investment attraction purposes.

The goals set within the 'Operational programme for the development of human resources' for 2007 to 2013 reflect the need to upgrade the qualifications of the labour force and set up a sustainable lifelong learning system which should ensure continued development of qualifications, and the development of innovation-oriented skills of the working population. It also specifically targets the development of highest qualifications while improving qualifications and competences of scientists, doctoral students and other researchers in vertical and horizontal areas, and promoting internal and international mobility of researchers and students as well as mobility between the public and private sector in the selected technology development areas.

The 'Innovation in business' programme for 2009 to 2013, which is a continuous programme that its predecessors were initiated in 2000, was approved within the framework of the Lisbon Strategy implementation programme. The purpose of the programme is to increase the productivity and value added in Lithuanian business to that of the EU average. In this way, the objectives of the programme are implemented under the same 'Operational programme for economic growth' discussed above.

The given mix of innovation policy defining documents and the objectives set by them reflects the dual approach towards innovation policy. First, it aims to promote innovations and entrepreneurial behaviour in the whole industry towards value added. Second, it aims to develop high tech industries for the competitiveness of the future, which are defined by the selected high technology areas. While the innovativeness of the whole economy is a vital goal, especially in the face of the economic downturn, its development is limited to the few policy actions targeting the technology transfer and development of export markets, while the development of priority high technology areas is much better structured and implemented via the variety of policy action lines systematically targeting the development of high technology-intensive businesses and adjusting the public R&D system. It is important to note that despite the large number of policy documents, their implementation is based on a single source – EU SF assistance and OP, with a small contribution from national budget funds.

## 2.2 Innovation governance system

### 2.2.1 Governmental bodies

The Lithuanian Innovation policy governance structure is based on the dual ministry model, with the Ministry of Economy responsible for innovation policymaking and implementation, and the Ministry of Education and Science responsible for higher education and R&D policy design and implementation. The Lithuanian government's Science, Technology and Innovation Commission (since 2005) chaired by the Prime Minister is responsible for the coordination of innovation policy design and implementation actions across the ministries, public organisations and industrial associations.

At the Ministry of Economy, the major focus is placed on promotion of innovations, improved administration of the EU SF and SME development. The Ministry of Economy is involved in shaping the overall property privatisation policy as well as improvement of the legal basis of domestic and foreign trade sectors. The Ministry of Economy is the principal institution coordinating the development of the Long-Term Development Strategy of the State which identifies measures aimed at accelerating economic growth, enhancement of economy competitiveness in addition to promotion of employment and investments to the human capital. In 2006, the Ministry structure was adjusted in order to meet the increasing importance of innovation policy for the national economy. The Investments and Innovation department was established, which integrated the division of Innovation and Technology, and the Division of Investments. In the middle of 2009 the decision was made to adjust a new structure of the Ministry and establish Innovation and knowledge society department commencing with October 1.

The major change in the Ministry of Economy in 2009 concerned its reorganisation into the Ministry of Economy and the Ministry of Energy. The Ministry of Energy was established on the basis of the existing department within the Ministry of Economy in order to implement the important tasks related to national energy sector reform, and ensure energy supply stability and safety after the closing of Ignalina nuclear power station on 1 January 2010.

The Ministry of Education and Science deals with research excellence in the public science sector and is responsible for the development of highly-skilled human resources for R&D and innovation. The Research and Higher Education Monitoring and Analysis Centre (established in 2007) is an analytic and advisory body to the Ministry on R&D policy development. Changes to the legal base in 2007 to 2008 gave the Lithuanian Science Council (to the Ministry of Education and Science) the status of a permanently functioning agency responsible for the competitive funding of research programmes. Nevertheless, the main responsibility for corporate R&D lies with the Lithuanian Ministry of Economy, as part of the Innovation and Competitiveness Programme.

Vocational training, upgrading of the working population qualifications, and lifelong learning initiatives are mainly the responsibility of the Ministry of Social Security and Labour. The inter-ministerial coordination of functions has been facilitated through the development and implementation of joint programmes such as the 'High technology development' programme (2007 to 2013, and others, and coordination of policy development processes at the strategic level (especially those related to the implementation of the Lisbon Strategy and EU SF allocation).

## **2.2.2 Main bodies managing implementation of policies**

Lithuanian innovation policy is implemented by the establishments of the Ministry of Economy. The Lithuanian Business Support Agency (since 2003) is responsible for the implementation of national and EU SF based business support programmes, including innovation and R&D in the business sector.

The Lithuanian Innovation Centre provides qualified support to Lithuanian business and research institutions, industry, and SMEs in the field of innovation and technology transfer. Since 2000, jointly with the science and technology parks, the centre has been implementing the European Commission long-term project 'Innovation relay centre in Lithuania'. It provides research institutions and enterprises with technical support for operation in the European technological market. In 2003 the centre expanded its activities by creating the Innovation Support Network, which has five representatives in the regions of Lithuania. The main aim of the network is to increase the international competitiveness of Lithuanian enterprises through the implementation of new technologies and absorption of EU SF.

Several science and technology parks and innovation centres have also been established under the auspices of the Ministry of the Economy. Most of them operate in conjunction with universities and public research institutions. They are also involved in technology business incubation and technology and innovation centres (some of which host branches of the Lithuanian Innovation Centre).

Lithuanian R&D policy is basically implemented by the decisions of the Lithuanian Science Council and other implementing institutions such as the Lithuanian Science and Studies Foundation, the Agency for International Science and Technology Development programmes, the Lithuanian Centre for Quality Assessment in Higher Education, and the Lithuanian Fund for Human Resources Development programmes.

The Lithuanian State Science and Studies Foundation is responsible for competitive research and experimental development and implementation of the public R&D programmes, including the programmes for 'High technology development' and 'Lithuanian research and experimental development priorities', as well as some small research programmes launched by the foundation. With the change of status of the Lithuanian Science Council, competitive research funding becomes its responsibility, while the Science and Studies Foundation will deal with the study loans, mobility schemes and similar human resources-oriented funding activities.

The Agency for International Science and Technology Development programme is responsible for the internationalisation of R&D activities and attraction of R&D funds from abroad (EU Framework Programmes, EURATOM, Security Research Programme, EUREKA, COST, as well as other programmes and activities related to international cooperation in R&D). The agency also participates in shaping R&D and innovation policy and plays an active role in submitting proposals to the Lithuanian legislature in order to facilitate and strengthen the participation of Lithuania in international R&D programmes. The agency promotes cooperation between academic and industrial communities and disseminates R&D activities to the general public.

The development of human resources falls under two agencies: the Lithuanian Centre for Quality Assessment in Higher Education and the Support Foundation European Social Fund Agency. The first deals with quality assurance and higher education standards while the second provides funds for the implementation of human resources development programmes on the competitive base. The Support Foundation European Social Fund Agency supports, coordinates and administers EU SF aid and implements measures assigned to the Ministry of Education and Science in the development of highly skilled human resources for science, technology and industry. It also implements lifelong learning and human resources in business sector-oriented measures, both the responsibility of the Ministry of Social Security and Labour.

The National Lisbon Strategy Implementation programme projects the establishment of the new agency Science, Technology and Innovation based on the TEKES (Finland) or Vinnova (Sweden) models, which should be responsible for the coordinated implementation of R&D and innovation policy actions. Discussion was renewed in spring 2009 and the Sunset Commission endorsed the establishment of the Science, Innovation and Technology Agency (MITA) in the middle of 2009.

## **2.3 Public funding to innovation**

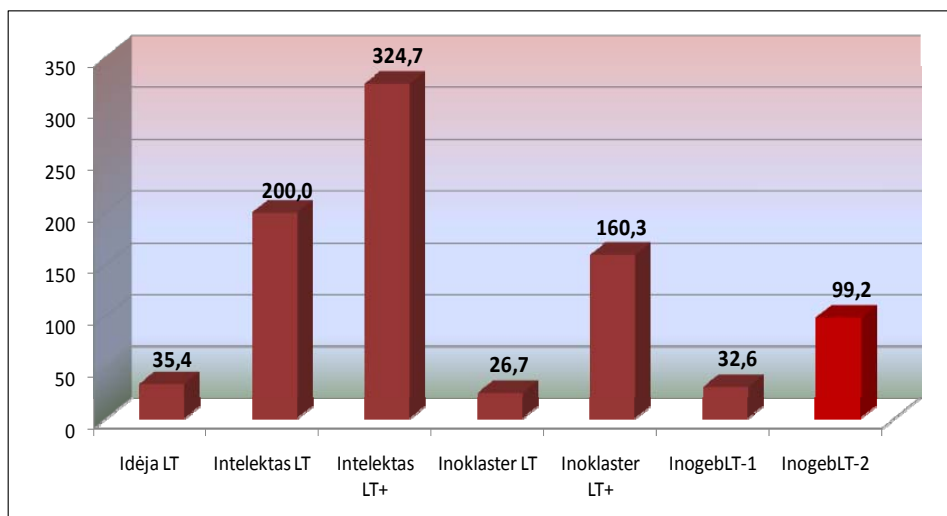
### **2.3.1 Review of the current range of support measures for innovation**

The innovation policy mix in Lithuania has been developing particularly rapidly since 2004 as a consequence of the implementation of the EU SF aid programmes. The new mix of measures for innovation and R&D development was designed for the new programming period from 2007 to 2013. However, the implementation of the majority of new measures was pending until 2009. The innovation support measures related to the innovation and R&D system development are grouped among the two large OP, namely 'Operational programme for economic growth' for 2007 to 2013 and 'Operational programme for the development of human resources' for 2007 to 2013.

The largest part – 45.72 % – of the total EU SF resources will be allocated for the 'Operational programme for economic growth' for 2007 to 2013 (R&D). The new set of measures are designed with the aim to respond to the main innovation challenges, identified in the NRP (2005, 2008) and a

number of policy studies. The measures of priority 1 of the entire programme 'Research and development for competitiveness and growth of the economy' are directly designed to support the development of innovative capabilities in business and strengthen innovation infrastructures. EUR 677.3 million will be directed towards R&D for business competitiveness, of which EUR 386.4 million will directly target long-term investments in R&D: (a) EUR 74.3 million for R&D in research centres; (b) EUR 241.6 million for R&D infrastructure, including enterprises and technologies, computer networks between research centres, and technology competence centres; (c) EUR 70.5 million for business R&D support, including research performed at R&D centres. Research capabilities, absorptive capacities, and networks for innovation will be facilitated by the group of measures discussed in Section 2.3.2. The allocation of business R&D and technology transfer measures is represented in Exhibit 5 below.

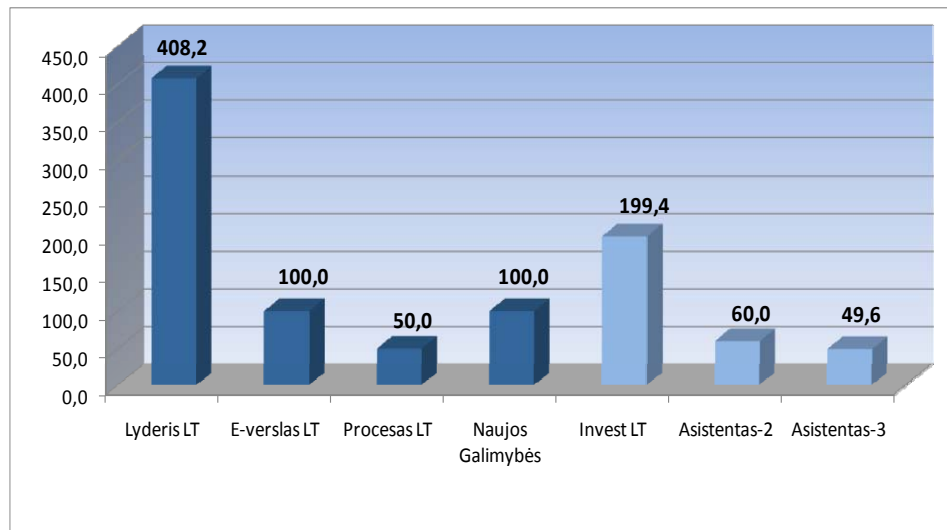
**Exhibit 5: Allocation of public support funds for R&D and technology transfer for business competitiveness for the period of 2007-2013, in national currency (million, LTL)**



Source: Lithuanian Ministry of Economy.

Non-R&D innovation is supported by the group of measures under the same programme for economic growth, 'Increase of business productivity and improvement of business conditions'. The largest amount of funds will be dedicated to technology upgrade projects under the measure Leader LT (EUR 118.3 million), industrial investment infrastructures (EUR 60 million), development of e-business solutions, new export markets and business support systems (approximately EUR 30 million each), and process innovations (EUR 14.5 million). The allocation of funds for innovation in business measures is represented in Exhibit 6 below.

**Exhibit 6: Allocation of public support funds for innovation in business for the period of 2007-2013, in national currency (million, LTL)**



Source: Lithuanian Ministry of Economy.

The 'Operational programme for the development of human resources' for 2007 to 2013 obtains a relatively smaller EU SF aid share (13.8 % of the total), but it is also defined by the intangible nature of the measures.

The distribution of measures among the major innovation support measures categories is as follows (see Annex 1):

1. governance & horizontal research and innovation policies are targeted by 51 % of measures;
2. research and technologies are targeted by 78 % of measures;
3. human resources (education and skills) are targeted by 24 % of measures;
4. promoting and sustaining the creation and growth of innovative enterprises is targeted by 69 % of measures;
5. markets and innovation culture are targeted by 18 % of measures.

Under the governance category, the most important groups of measures are the long-term research agendas, cluster framework policies, horizontal measures in support of financing and society-driven innovation policies, which encompass broad training programmes, including entrepreneurship and ICT skills, science and technology awareness schemes, and the like.

The policy focus on science and technology is reflected in the variety of measures, whereas the most important targets are the development of research infrastructures, direct support for business R&D, and R&D cooperation, as well as the policy measures concerning excellence, relevance and management of research at universities.

The development of human resources is focused on the stimulation of PhDs, job training of researchers and other personnel involved in innovation, mobility of researchers and research and technology organisations. These measures, coupled with the research and technology-oriented measures, indicate a significant attempt to improve the national R&D system by developing infrastructures, research programmes and human resources.

The promotion of innovative enterprises is associated with the support to innovation management and advisory services, support to innovative start-ups, but also to technology transfer between firms,

support to organisational and sectoral innovation, improvement of access to finances, including venture capital.

The weakest policy support is in the area of markets and innovation culture. The Ministry of Economy has provided measures to encourage inventors to protect their intellectual property rights in order to remove the Lithuanian weaknesses in this field. The Ministry of Economy provides financial support for legal entities and natural persons who aim to protect intellectual property rights (up to 100 per cent of costs can be covered). In February 2008 the Ministry introduced two new ways to support the acquisition of patents – prepayment and payment on accounts. Earlier, reimbursement was the sole way to acquire support of patent, therefore, only around 3 thousand Litas was allocated. After the introduction of prepayment and payment on accounts procedures, the numbers increased dramatically. As a result 41 patent applications were submitted in 2008, while 235 000 Euro were allocated in 2009.

The Ministry of Economy launched innovation awareness raising campaigns in 2008. The campaign included the following steps:

- Presentations given on mass media (TV, radio news, articles in national and regional newspapers;
- Video clip promoting innovations was shown on national TV channel;
- Newspaper “The Verslo Zinios” provided news on current situation on innovation in Lithuania;
- Survey was carried out by “Vilmorus” on October 13 – 22, 2008. 300 enterprises were questioned to find out how much attention business leaders in different fields pay to innovation;
- Seminar “Junior Achievement” targeted at young people was held on October 24, 2008;
- Conference “Innovations. What is Lithuania’s business like tomorrow?” was organized on November 7, 2008 at Litexpo;
- Special magazine “Inovacijos” published in December 2008 with a circulation of 5,000.

In terms of allocation of funds, the major share of R&D and innovation support funds (see Annex 1) are oriented towards the development of research infrastructures (24.5 %) and support to technology transfer between firms (18.6 % of total funds available). Strategic research policies (11.7 %) and R&D cooperation (10.1 %) are also important policy targets in terms of funds allocated. Other important policy targets are the cluster framework policies, horizontal measures in support of financing, job training of researchers and other S&T personnel, society-oriented innovation and other horizontal policies, with each receiving 5 % to 7 % of the total funds available.

Lithuanian innovation policy measures do not explicitly target certain fields of technologies, except for ICT which is directly linked to information society developments. Nevertheless, the major technology fields that benefit from R&D infrastructure developments are the ones defined in the 'High technology development' programme (biotechnologies, lasers, nanotechnologies and mechatronics).

The main funding source contributing to the implementation of 91 % of the measures are EU SF. A total of 45 % of those measures are co-financed by the business sector, according to the rules of state aid to the private sector. Direct support grants dominate other types of support funding (94 % of measures are applying grants schemes). A small amount of funds is allocated for subsidised loans, guarantees and venture capital.

The composition of support measures responds well with the challenges identified. The majority of measures target the development of R&D and business sector cooperation facilitation by development of R&D infrastructures, human resources and technology and innovation support systems (see Annex 1). In recent years, attention has been turned to innovation financing and support to technology-based entrepreneurship, areas that traditionally were weakly addressed by innovation policy. However, entire measures are very new, thus their impact is too premature to evaluate.

Consequently, the major policy priority focus in 2009 is the R&D and higher education sector reform and development of an internationally competitive R&D sector through the development of R&D infrastructures, business and R&D partnership platforms, technology transfer to firms, and development of clusters, where the participation of science and higher education institutions is a

prerogative for funding. The funding of lifelong education measures also continues from the previous programming period, although the budget allocations and number of measures are much lower than that of the R&D and R&D-based innovation support.

Lithuanian innovation policy traditionally (and differently from science policy does not target any technology in a particular manner, since the technology transfer activities dominate the types of innovative activity, regardless of the sector and technology. Even so, ICT is an absolute leader because of its wide impact on the economy and the variety of measures that support the development and implementation of ICT applications (not ICT themselves) in business.

As already described above, an absolute majority of innovation support measures are financed by EU SF. The direct support measures targeting the business sector are co-financed by the business sector as a rule of support provision. Public support infrastructure development measures are co-financed by the national budget, municipalities, or public non-profit organisations. However, the core funding source for all measures are EU SF. The implementation of the EU SF programmes actually is the core reason for increased funding for innovation and R&D, especially in the programming period from 2007 to 2013. There are very few measures where no direct funding is provided (the tax incentives for R&D and on the job training), and even less measures that are non-financial measures. However, none of them could be characterised as an important impact measure.

Nevertheless, the new measures were designed to increase innovation awareness and support the development of innovation culture, mainly concerning the encouragement of R&D-based innovations, and supported by EU SF programmes. Such measures are:

- LT 88 the creation of the National Open Source Scientific Communication Centre;
- LT 89 support to scientists and researchers' mobility and students' scientific work;
- LT 90 improvement of knowledge about science and technologies among pupils and youth and support to equal rights in science;
- LT 91 R&D quality and training of experts;
- LT 92 the creation of infrastructure aimed at the improvement and dissemination of knowledge about R&D, technologies and innovations.

All of the measures (see more detailed description in Section 2.3.2 below) target the public science and higher education sector, and might impact innovation development in the future. Their implementation started in early 2009, thus the actual impact is too premature to examine and evaluate.

### 2.3.2 New or modified support measures

The new measures launched in the reported period from 2008 to 2009 reflect the actual start of the implementation of the OP for the EU SF implementation cycle 2007 to 2013. With significant delays most of the measures were launched at the very end of 2008 or in the first two quarters of 2009. The measures listed below in Exhibit 7 are based on the 'Operational programme for economic growth' for 2007 to 2013 and the 'Operational programme for the development of human resources' 2007 to 2013 (please see broader description in Section 2.1). The measures are grouped among the priorities and targets of the OP, and certain groups of measures are complementary, as discussed in Section 2.3.3. The credit crunch crisis did not cause the introduction of any new innovation-related measures by the Lithuanian government, but actually speeded up the launch of previously designed measures.

**Exhibit 7: New Innovation Policy Support Measures (since the last report)**

IPM N°	Title	Innovation policy framework category	Organisation responsible
LT 68	Inocluster LT	1.3.1 Cluster framework policies 4.2.3 Support to technology transfer between firms 5.1.1 Support to the creation of favourable innovation climate	Lithuanian Ministry of Economy, Lithuanian Business Support Agency

		(e.g. roadshows, awareness campaigns)	
LT 69	Inocluster LT+	1.3.1 Cluster framework policies	Lithuanian Ministry of Economy, Lithuanian Business Support Agency
LT 70	E-business LT	4.2.2 Support to organisational innovation including e-business, new forms of work organisations, etc.	Lithuanian Ministry of Economy, Lithuanian Business Support Agency
LT 71	Process LT	4.2.1 Support to innovation management and advisory services 4.2.2 Support to organisational innovation including e-business, new forms of work organisations, etc.	Lithuanian Ministry of Economy, Lithuanian Business Support Agency
LT 72	Inogeb LT-1	1.3.3 Other horizontal policies (e.g. society-driven innovation) 4.2.1 Support to innovation management and advisory services 5.1.1 Support to the creation of favourable innovation climate (e.g. roadshows, awareness campaigns)	Lithuanian Ministry of Economy, Lithuanian Business Support Agency
LT 77	Assistant - 1	4.2.1 Support to innovation management and advisory services 4.3.1 Support to innovative start-ups including gazelles 5.1.1 Support to the creation of favourable innovation climate (e.g. roadshows, awareness campaigns)	Lithuanian Ministry of Economy, Lithuanian Business Support Agency
LT 78	Assistant - 2	4.2.1 Support to innovation management and advisory services 4.3.1 Support to innovative start-ups including gazelles 5.1.1 Support to the creation of favourable innovation climate (e.g. roadshows, awareness campaigns)	Lithuanian Ministry of Economy, Lithuanian Business Support Agency
LT 79	Assistant - 3	1.3.2 Horizontal measures in support of financing	Lithuanian Ministry of Economy, Lithuanian Business Support Agency
LT 81	Controlling fund	1.3.2 Horizontal measures in support of financing 4.3.1 Support to innovative start-ups including gazelles 4.3.2 Support to risk capital	Lithuanian Ministry of Economy, European Investment Fund, INVEGA
LT 82	Partial compensation of SMEs credit interests	1.3.2 Horizontal measures in support of financing 4.3.1 Support to innovative start-ups including gazelles 4.3.2 Support to risk capital	Lithuanian Ministry of Economy, European Investment Fund, INVEGA
LT 84	Invest LT	1.3.3 Other horizontal policies (e.g. society-driven innovation)	Lithuanian Ministry of Economy, Lithuanian Business Support Agency
LT 85	The preparation of R&D infrastructure development projects	2.1.2 Public research organisations 2.1.4 Research infrastructures	Lithuanian Ministry of Education and Science
LT 86	Strengthening of the general science and studies	2.1.1 Policy measures concerning excellence,	Lithuanian Ministry of Education and Science

	infrastructure	relevance and management of research in universities 2.1.2 Public research organisations 2.1.4 Research infrastructures	
LT 87	The development of the high level research centres and competence centres	2.1.1 Policy measures concerning excellence, relevance and management of research in universities 2.1.2 Public research organisations 2.1.4 Research infrastructures	Lithuanian Ministry of Education and Science
LT 88	The creation of National Open Source Scientific Communication Centre	2.1.2 Public research organisations 2.1.4 Research infrastructures 2.2.2 Knowledge transfer (contract research, licences, research and IPR issues in public/academic/non-profit institutes)	Lithuanian Ministry of Education and Science
LT 89	Support to scientists' and researchers' mobility and students' scientific work	3.1.1 Awareness creation and science education 3.1.3 Stimulation of PhDs 3.2.3 Mobility of researchers (e.g. brain-gain, transferability of rights)	Lithuanian Ministry of Education and Science
LT 90	Improvement of knowledge about science and technologies among pupils and youth and support to equal rights in science	3.1.1 Awareness creation and science education 3.1.2 Relation between teaching and research	Lithuanian Ministry of Education and Science
LT 91	R&D quality and training of experts	2.1.1 Policy measures concerning excellence, relevance and management of research in universities 2.2.1 Support infrastructure (transfer offices, training of support staff) 3.3.1 Job training (LLL) of researchers and other personnel involved in innovation	Lithuanian Ministry of Education and Science
LT 92	The creation of infrastructure, aimed at the improvement and dissemination of knowledge about R&D, technologies and innovations	2.1.4 Research infrastructures 2.2.2 Knowledge transfer (contract research, licences, research and IPR issues in public/academic/non-profit institutes) 3.1.1 Awareness creation and science education	Lithuanian Ministry of Education and Science
LT 97	Improvement of the qualifications and competencies of scientists and researchers (scientific databases, e-documents)	2.1.1 Policy measures concerning excellence, relevance and management of research in universities 2.1.2 Public research organisations 2.1.4 Research infrastructures	Lithuanian Ministry of Education and Science

The broad lines of measures target the business vitality, productivity and competitiveness, and encompass cluster initiatives, support for productivity improvement, entrepreneurship, business funding and the development of innovation and business support systems. Another important group of measures is focused on R&D infrastructures development, S&T and innovation culture, and development of high level human resources for S&T and innovation. Entire sets of measures are briefly presented below.

The development of knowledge-intensive clusters across public knowledge poles became a central activity in order to support creation and rise of innovative companies. The new measures related to the development of innovative clusters with the original R&D and partnership infrastructures will be implemented in the programming period of 2007 to 2013 ('Inocluster LT' and 'Inocluster LT+'). Entire cluster support measures continue from the programming period 2004 to 2006, but are refined and better structured. Cluster is defined as the agglomeration of at least five private legal entities, connected in the value chain and sharing common economic interests, also involving an R&D institution. Investments will be earmarked for the support of activities related to the formation of clusters in the identified technological 'breakthrough' areas. 'Inocluster LT' (LT 68) aims to support the cluster coordination activities, whereas it is foreseen to support both management and development of clusters, with priority given to the internationalisation of clusters. Moreover, training of personnel of the businesses forming the cluster could be financed from European Social Fund. 'Inocluster LT+' (LT 69) will specifically support the cluster infrastructure development activities in order to ensure knowledge and technology transfer. It is being forecasted to support cluster coordinators investment into the cluster's training and research centre infrastructure, and cluster's joint (open source) R&D infrastructure (laboratories, testing labs, and the like).

The increase of productivity levels in business is addressed by two measures, namely 'E-business LT' (LT 70) and 'Process LT' (LT 71). The 'E-business LT' (LT 70) support initiative is aimed at the increase of Lithuanian business productivity via application of IT in business processes and their optimisation. The measure aims to support SMEs implementing ICT as a means of labour productivity improvement and export development. 'Process LT' (LT 71) aims to increase productivity in enterprises by implementing modern management methods and processes, except for personnel management systems (a separate measure devoted to the improvement of human resources in enterprises is designed, 'The development of human resources in enterprises', and introduced last year). Specifically, the measure aims to encourage SMEs to implement modern management methods and quality management systems, and so provide favourable conditions for productivity and exports growth.

The group of measures were introduced in order to support the development of the Lithuanian Innovation Support System. 'Inogeb LT- 1' (LT 72), to be followed by 'Inogeb LT-2', aims to strengthen the Lithuanian innovation system and develop an effective knowledge and technology transfer environment, which would in turn support innovation and R&D in business and facilitate business and science partnership in R&D activities. The promotion of modern technologies and innovation in society, and especially youth, development of creativity, innovation partnerships, increase in the demand for innovation services, and provision of innovation support services are the specific targets addressed by the measure. The measure 'Inogeb- 2' is aimed to provide support for the development of the innovation support infrastructure. Under this measure support is provided to various initiatives enforcing the Lithuanian innovation system and developing the infrastructure necessary for the efficient knowledge and technology distribution.

The set of measures supporting entrepreneurship were designed for the programming period of 2007 to 2013, including improvement of business support services, specifically 'Assistant 1', 'Assistant 2' and 'Assistant 3', which together contribute to the objective of the improvement of the vitality of the existing enterprises and support of entrepreneurship. 'Assistant - 1' (LT 77) aims to support public business support service providers in the improvement of the services and information quality and ensuring its relevance to business. 'Assistant - 2' (LT 78) aims to support the creation and development of new art and/or business incubators, and therefore to improve the conditions for start-up creation and development. 'Assistant - 3' (LT 79) aims to create preconditions for the improvement of the international competitiveness of Lithuanian enterprises and attract FDI in the areas of high technologies, knowledge-intensive services, and also to improve the image of Lithuania as a country that attracts business and investments.

The activities supported by the measure are: (a) support for FDI (analysis of potential regions, search for investors, consulting of investors, etc.); (b) the development of the Lithuanian economic image; (c) the development of the competitiveness monitoring and evaluation systems and other activities related to FDI and export promotion.

The set of measures aimed at the improvement of innovative business funding consist of a variety of tools. 'Controlling fund' (LT 81) aims to improve SME access to external funding sources, and thus facilitate the creation and growth of new businesses and contribute to the increase of productivity. The activities supported are: (a) the establishment of 'Controlling fund', micro crediting of very small enterprises (credits up to EUR 25 000); (b) venture capital fund investments in the early and/or fast growth stage SMEs; (c) guarantees for SME financial obligations to the crediting institutions or re-guarantees of the existing credit portfolios; (d) other refundable measures of the financial support which would reduce market failures of financial market (both supply- and demand- driven).

'Partial compensation of SME credit interests' (LT 82) aims to ease the burden of financial obligations by partially compensating investment credit interests for SMEs and support the development of enterprises. The activities supported by the measure are the guarantee of credit interest for those SMEs that already have a loan guarantee from the agency Investment and Business Guarantees (INVEGA), and will pay credit interests for the guaranteed loans in 2007 to 2015.

The large group of measures was designed to ensure the development of the Lithuanian R&D system, which should contribute to the high value added innovation in business and support the development of high technology sectors in the national economy. Although the measures do not address the innovation directly, they are seen as important instruments for the implementation of the overall vision of a knowledge society and high value added economy.

The specific group of measures is targeted at strengthening public and private R&D infrastructure: 'Preparation of R&D infrastructure development' projects (LT 85) aims to set up the implementation of the 'National complex' programmes and the 'Concept of integrated science, study and business valleys infrastructure' development projects (feasibility studies and technical documentation).

'Strengthening of the general science and studies infrastructure' (LT 86) aims to develop entire physical infrastructures needed for R&D project implementation in the 'Integrated science, study and business valleys' and implementation of the 'National complex' programmes. The activities supported are the development of R&D infrastructures required by the R&D-intensive economy sectors, and the development, renewal, optimisation and restructuring of general, technological and IT infrastructures for R&D activities. 'Development of the high level research centres and competence centres' (LT 87) aims to support the creation and development, and the research activities of the High Level Research and Competence Centres (R&D centres that are focused on internationally recognised high quality thematic research). The exception are centres that are directly related to the implementation of 'Concept of integrated science, study and business valleys infrastructure' development projects that are supported by LT 85 and LT 86. The activities supported under the measure are the development and/or renewal of R&D infrastructures and R&D activities.

'Information support for R&D activities' will be further strengthened. 'Creation of national open source scientific communication centre' (LT 88) aims to create information infrastructures for R&D in order to achieve accumulation of competencies across the country. 'Improvement of the qualifications and competencies of scientists and researchers (scientific databases, e-documents)' (LT 97) aims to improve the qualifications and competence of scientists according to the horizontal needs of the research field by ensuring access to the scientific information databases and the development of new databases.

The improvement of researchers' qualifications, competence, and mobility is targeted by a separate group of measures. 'Support of scientists and researchers mobility and students scientific work' (LT 89) aims to: (a) improve the qualifications and competence of scientists; (b) enhance the links of scientists from abroad with Lithuanian science institutions in order to build up R&D quality and the level of scientific research performed; (c) prepare the conditions for attracting high level scientists to Lithuania; (d) reintegrate Lithuanian scientists working abroad. The measure also aims to increase the interest of students in R&D work and facilitate participation of students in R&D activities. 'R&D quality and training of experts' (LT 91) aims to develop and implement internal R&D quality management systems, train experts and other staff.

The development of an STI culture is supported by two measures. 'Creation of infrastructure, aimed at the improvement and dissemination of knowledge about R&D, technologies and innovations' (LT 92)

aims to develop the infrastructure needed for the dissemination of knowledge about scientific research, technologies and innovations targeted at youth and pupils. 'Improvement of knowledge about science and technologies among pupils and youth and support to equal rights in science' (LT 90) aims to contribute to the task of increasing the number of researchers and decreasing their average in Lithuania, as forecasted in the 'Operational programme of human resources development' for 2007 to 2013. Specifically, the objective of the measure is to create and implement young researchers talent mapping system and implement the concept of equal rights in science. The specific activities supported are: (a) the initiation, creation and development of easily accessible information systems; (b) teacher – young researcher mentor support; (c) the initiation of national informal activities of young researchers; (d) support for talented pupils (informal education) in R&D activities integration; (e) support to equal rights in science.

### 2.3.3 Strengths and weaknesses in the innovation policy support system

Major strengths of the Lithuanian innovation policy support system reside in the increased amount of public spending on RDI thanks to EU SF support programmes. The main focus of interest is given to the improvement of the R&D system, upgrade of qualifications of S&T human resources, development of public and private R&D infrastructures, support to targeted R&D programmes in the public sector, and building of R&D capabilities in the selected high technology business areas. This also provides an opportunity for better integration of young S&T graduates in the national economy. At the same time, the innovation policy support measures encompass a variety of tools to improve innovation performance in existing businesses, with the provision of direct grants for the upgrade of technologies, development of new products and markets, implementation of innovative management and business organisation methods in enterprises. For the first time in innovation policymaking, venture capital formation for innovative businesses is being targeted. The designed policy mix encompasses broad innovation policy areas, and, as noted above, resides in the EU SF programmes, which remain the main source of funding.

The heavy reliance of the national innovation policy on EU SF funds also builds an imbalance between the public support (supply) and market formation (innovation-demand) policies. While strengthening the public sector and innovation support institutions, the government had paid little attention to the creation and facilitation of innovative markets, including those within existing governmental investment programmes that target energy, health care, and other important sectors. In the course of 2009 the Law on Public Procurement in Lithuania implemented provisions of EC Public Procurement directives allowing contracting authorities to procure innovative products, services or works through competitive dialogue procedure; to describe wanted product through functional specification, desired performance; to offer possibility of alternative proposals, preliminary contracts, thus, supporting innovation through public procurement. Furthermore, promoting innovations through public procurement is also one of the objectives of Innovation in business programme for 2009-2013. Improvement of public procurement system strategy for 2009-2013 is under way, with the primary tasks for 2009 being to collect, synthesize and spread information about innovative public procurement in Lithuania (including: regulations, realization and examples of good practice in other countries). Lithuania has a unique opportunity to form a pool of innovative enterprises while combining the energy sector investments following the shutting down of the Ignalina nuclear power plant in 2010 with the proactive market regulations. However, until now, the energy market remains monopolised, which significantly limits the distribution of energy from new sources. Thus, a large pool of opportunities run the risk of remaining unexploited, especially if the government does not drop the ambition of constructing a new nuclear power plant, and does not decide on energy market liberalisation.

To sum up, the strengths of the Lithuanian innovation policy are related to a supply-driven policy approach:

- increasing public spending for innovation and R&D;
- development of a public innovation support and technology transfer system;
- close attention to the R&D sector reform with respect to quality and R&D intensity;
- public support for RDI in the business sector;

# INNO-Policy TrendChart

- development of a large number of highly qualified human resources in science and engineering disciplines.
- an extensive number of triggers for innovation and R&D activities within the existing industries. There are seven measures implemented by the Ministry of Economy that support R&D&I through European Union Structural Assistance for 2007 – 2013 in line with Operational Programme for the Economic Growth.

The core weaknesses of the innovation support system are related to the lack of a market- and demand-driven policy approach, which manifests itself in:

- an absence of market incentives and public procurement for innovation in the strategically important economy sectors (e.g. energy, waste management, health care, etc.); It must be stated that in order to combat this weakness in the middle of 2009 the Law on Public Procurement in Lithuania implemented provisions of EC Public Procurement directives allowing contracting authorities to procure innovative products, services or works through competitive dialogue procedure; to describe wanted product through functional specification, desired performance; to offer possibility of alternative proposals, preliminary contracts, thus supporting innovation through public procurement.

## 3. Innovation policy and competitiveness: an appraisal

### 3.1 The ability of policy to address challenges

National innovation policies set priorities based on perceived challenges while are often motivated by international agreements and commitments, i.e. the Lisbon Agenda. Therefore national policies act and react in a complex set of overall policy priorities and commitments. Building on the analysis of the previous chapters, this section investigates how well national innovation policies identify and respond to systemic challenges, which may or may not be common in other EU Member States or even other countries outside the EU.

#### 3.1.1 How well does policy respond to innovation challenges?

The major challenge Lithuanian innovation policy faced over the past decade was the need to bring together the relatively divergent functioning of the science, studies and business sectors, i.e. establishing links within the national innovation system. Many important innovation policy steps were initiated over this time, including the establishment of a technology transfer system, encompassing the activities of innovation centres, science and technology parks, technology business incubators, and the like. However, innovation also requires entrepreneurial thinking to be rooted in the economy, and manifested as an ability to link knowledge with market opportunities. However, we can hardly think of the Lithuanian innovation policy today as business-centred, despite the progress made over the past decade. The reasons are discussed below.

In the past five years, important regulative efforts were made in order to improve business conditions and facilitate entrepreneurship. However, the economic crises and tax reform have brought new challenges for businesses and caused reductions in innovation investments, forcing the search for new ways of doing business. These include negative behaviours such as cutting investments, jobs and an increase in 'shadow' operations, but also positive behaviours such as the search for new export markets, value innovations and more efficient ways of operations in domestic and international markets. However, the positive behaviours require supportive business conditions (fast and cheap ways to establish and terminate a company, supportive tax schemes, facilitating labour market regulations, etc.), and availability of modern skills for innovation in business, including international business skills, marketing, e-business and ability to reinvent existing products and services. Thus, as stated above, the key challenge for innovation policy is to make possible entrepreneurial incentives and facilitate the rise of innovation in all sectors of the economy. The policy measures that rely on the use of public resources (EU SF) and follow the innovation supply ideology, basically focus on the training of entrepreneurial skills of the working population and businesses. However, the problem is that other steps in the entrepreneurial process are weakly supported by the innovation policy. Only within the programming period of 2007 to 2013 were new schemes introduced that support venture capital creation and the establishment of new technology-based firms and facilitate the development of export markets.

Most of the innovation support schemes are based on direct grant-based intervention logic. However, grants have proved to be insufficient when markets are weak and business regulations are unfavourable, and there is no proactive policy approach towards the formation of markets for innovation. Development of demand for innovation is a complex and risky task for the government, which is constrained by the need to balance the budget and focused on the collection of more taxes from the decreasing number of tax payers while the economy is facing increasing unemployment, reducing business profitability and high drops in internal consumption. The rise of taxes in all domains of the economy are in effect responsible for the negative impact, but the entire government does not seem able to make radical market and businesses liberalisation decisions. Thus, we cannot expect the rise of entrepreneurship and new job creation in the nearest midterm period if business regulation policy does not change radically.

In addition to the need to increase entrepreneurial behaviours, the need to proceed towards value added of existing and new businesses is vital for the sustainable development of the economy. The evolutionary persistent separation of business and R&D sector, weak business R&D capabilities cause the limitations in the development of high value added innovations in business. The response to the challenge of increasing business R&D capabilities faces two conflicting streams of policy thinking. One stream of thinking promoted by science sector institutions is based on the idea that the science sector should be strengthened and thus ensure R&D supply for business. However, a strong science sector is not necessarily linked to the national economy. The contradicting trend is based on the assumption that business R&D capabilities should be strengthened and business should formulate the demand for science sector institutions in Lithuania or elsewhere. Policy responses are targeting both sides, while strengthening the science sector and providing direct grants for the increase of business R&D capabilities and implementation of business R&D projects. Linking infrastructures are being established, such as the so-called science, study and business valleys, which should facilitate the linkages and rise of new technology-based entrepreneurial firms. In addition, new schemes for the human resources development and facilitation of researchers mobility are being launched, which all together should provide a sound base for business and R&D cooperation. Valley programmes are being implemented for some time now and some projects have already started. These programmes aim to develop whole new sectors of R&D-based businesses and industries, and requires a high level of policy consolidation which has not been approached yet. It basically represents the vision of a Lithuanian knowledge economy which is based on the development of selected high technology areas, and focuses on the strengthening of a few R&D production-based sectors. However, the Lithuanian economy today is not about high technologies, and will remain so for the next decade.

Thus, the facilitation of knowledge cluster creation across public knowledge poles has been identified as a third important challenge to which the government responds with the cluster policies. The challenge itself is a very complex task that encompasses changes in business behaviours, trust-building activities, and proceeds towards much higher levels of cooperation which are related to the need for coordination and changes in business models. The set of measures that aim to initiate cluster activities have been launched by the provision of grants. However, business participation in cluster measures in the 2004 to 2006 EU SF programming period was very weak, primarily due to the lack of a conscious need for cooperation. Cooperation with R&D establishments by most of the traditional sectors of the economy is valued as a useless activity (according to the CIS IV results), which restricts the interests of support schemes. On the other hand, science sector institutions are in the Lithuanian Science and Studies reform process, and are focused on restructuring, which again limits the ability to act as a cluster facilitator for businesses. In addition, the above-mentioned valleys project seems to be more attractive and better suited to the needs of science institutions, as it provides direct grants for infrastructures, R&D equipment, development of skills and study programmes, as well as for the performance of R&D projects. In this way, cluster initiatives risk remaining without clear ownership, as businesses are too weak to embrace them, and science establishments are focused on restructuring activities.

## 3.2 Effectiveness of policy design

### 3.2.1 Process of delivery

The innovation policy delivery process is based on EU SF implementation programmes for 2007 to 2013. As noted in the previous sections, the majority of the measures are funded by the EU SF, and in most of the cases in the form of grants with varying support intensity (up to 90 % for public projects, and 75 % for business projects). Direct grants, being a very attractive scheme for public institutions, do not always influence the business sector for innovation and R&D investments. The lack of other tax and market regulation-based measures restricts the policy impact to the narrow numbers of grants recipients, the selection of which is based on competitive project selection routines. Picking winners is unavoidable, but also necessary for the development of future new technology-based areas, as they require large public investments for infrastructures and the development of specialised R&D skills and competencies.

However, the selection of traditional industrial enterprises for technology upgrade project implementation, organisational innovation projects, market development initiatives and other non-R&D-related innovative activities is a complex process for governmental coordination, which, if limited to the grant provision for selected enterprises, will have no impact on the larger economy. The application and selection procedures are relatively long, and the project administration is resource consuming and costly. Therefore, many of the enterprises choose not to apply for direct grant support. Other easy to absorb policy measures such as tax-based regulation, market facilitation, demand articulation for innovative products and services are not present, and thus restrict innovation support availability to a very limited number of enterprises, i.e. grant recipients. This is also supported by the fact that innovation support absorption rates in Lithuania are relatively lower compared to other European countries.

The innovation support delivery process was somewhat complicated because of the high level of bureaucracy and administration requirements; however, the Economy recovery plan encompasses certain measures to relieve administrative burden. This requires developing or outsourcing specific skills within enterprises, which is costly in both cases, especially for SMEs. Therefore, public innovation support is used by a limited number of enterprises. The complicity of procedures was an important limiting factor not only for enterprises, but also for the administering institutions. The absorption of EU SF for innovation dedicated for the period of 2007 to 2013 reach less than 10 %, although we are at the end of 2009, and these are the only funds available for economy development, especially while facing economic crises.

The increasingly harsh economic climate, the depth of the economic downturn, and the credit crunch increase the risk for the implementation of designed support measures because of the unavailability of co-funding, especially for business enterprises. The government has set the absorption of EU SF as a main priority, and is borrowing to ensure national contribution. In addition, it has introduced measures of financial engineering under the same EU SF implementation programmes, which should also ensure the availability of co-funding for innovation measures. However, the uncertainty of markets, and lack of proactive demand articulation restricts businesses from taking innovation-related risks.

The public support for innovation delivery process is coordinated by the Ministry of Economy, and its Innovation support institutions – the Business Support Agency, INVEGA business guarantee foundation, the Lithuanian Innovation Centre, business incubators and S&T parks. The administrative staff is limited throughout the whole country, but in fact only those that are employed at S&T parks and the Lithuanian Innovation Centre are directly addressing the needs of innovative enterprises. In addition, the employees of regional development agencies could be added to this category, and this accounts for an extra 20 employees. It is quite obvious that universities and public R&D institutes have immense human resources potential compared to innovation support institutions, and even their small contribution to regional innovation development would have an important impact compared to continued efforts of effective yet small institutions. Business information centres, business incubators and business associations today are not to be assigned to innovation support institutions, as they perform other than innovation support services. Although there is quite a clear institutional and governance distinction between innovation support and higher education and science institutions, when it comes down to innovation development in enterprises, those two types of institutions perform complementary functions. Higher education and R&D institutions are considered as important knowledge and competence providers for innovation in business. Existing innovation liaison centres are expected to perform a bridging function between knowledge development in academia and business enterprise needs. However, the innovation support function is not explicitly assigned to the higher education and R&D sector, neither promoted by special policy measures, and depends on the bottom-up initiatives of single institutions. Public R&D and higher education resources are concentrated in Lithuania's two largest cities – Vilnius and Kaunas (each houses seven universities and several R&D establishments). Kaunas and Vilnius are the largest producers of S&T graduates in the country, as well as the only productive R&D producers that demonstrate the highest capabilities for integration into national and international knowledge flows. The other regions are not capable of catching up with the R&D and innovation policy developments unless special measures will be designed. No less of an important role here plays the lack of competence by local authorities in innovation policy management.

The quality of innovation policy delivery process was evaluated within the framework of the Regional Innovation Strategies development projects. As a key obstacle to the efficient use of public resources for innovation support services, the support institutions reported complicity of procedures, too long periods to acquire financial resources. Only few organisations reported lack of knowledge and skills, lack of ideas and lack of appropriate partners. In this way, simplification of public grant delivery procedures resources and shortening of application evaluation procedures is crucial in order to achieve a higher efficiency of public resources for innovation. The survey of enterprises also revealed the lack of complex services of technology search, innovative product markets development, R&D project management and access to external funding for innovation, and other market development and funding-related support services. However, today there hardly exists an innovation support organisation that offers such types and level of public services that companies demand. In the same time it is worth mentioning that besides LIC and S&T parks, Lithuania is implementing the EU's Enterprise Europe Network (EEN) project within the Competitiveness and Innovation Framework Programme 2007 – 2013 (CIP). The consortium (network organisations in Lithuania) is formed by 4 partners: Vilnius Chamber of Commerce, Industry and Crafts (Vilnius CCIC), Kaunas Chamber of Commerce, Industry and Crafts (Kaunas CCIC), Klaipeda Chamber of Commerce, Industry and Crafts (Klaipeda CCIC), Lithuanian Innovation Centre (LIC). Moreover, the activities of EEN are partly co- financed by the Ministry of Economy.

### 3.3 Impact of public support for innovation

The important changes in the variety of measures and volumes of funding for Lithuanian innovation policy implementation are associated with EU SF implementation programmes for the periods 2004 to 2006, and 2007 to 2013. However, the implementation of the programmes has only just started, thus impact evaluation is not possible. The innovation policy measures represent an attempt to implement structural changes in the economy and design a well functioning RTD and innovation system which would facilitate higher productivity levels and innovation-based economic development. The innovation policy intervention logic focuses on the development of innovation capabilities and absorptive capacity, facilitation of interactive learning processes between and within science and business sectors, and also the development of technological specialisation. The impact scheme is presented in the figure below, which links innovation policy impact areas with the expected changes in the national innovation performance. The science sector-specific activities and measures are not covered in the scheme, as they target competitiveness and excellence of the science sector, which does not necessarily lead to innovation development. The links of innovation policy measures and the expected impacts are briefly discussed below.

In order to strengthen business R&D, and also adjust public sector performed R&D, the measures cover the two steps of R&D activities - feasibility studies on R&D projects with the aim to reduce risks related to R&D development ('Idea LT') and actual implementation of R&D projects and development of research infrastructures ('Intellect LT' and 'Intellect LT+' ((for large R&D projects and developments))).

In order to ensure the development of supporting structure for the new and existing innovation activities, the existing business and science sectors partnership and cooperation infrastructures such as technology parks, technology platforms, technological business incubators and intermediary institutions are strengthened by the implementation of 'InogebLT-1' and 'Inogeb LT-2'. The measures are specifically aimed at the strengthening ('InogebLT-1') of these structures, and their internationalisation ('Inogeb LT-2').

New market-related opportunities will be opened with 'Invest LT' and 'New opportunities'. 'Invest LT' aims to create industrial investment zones in order to attract FDI to Lithuania, and specifically knowledge-intensive industries. On the other hand, new opportunities for the internationalisation of Lithuanian enterprises will be developed via the support for the search of new markets. Most of the Lithuanian enterprises, regardless of their position in the economy and technology sophistication, are still domestic market-oriented, or, if exporting, rather as a second option if the domestic market fails. There are only a few internationally-minded and global practising enterprises. However, small markets

especially declining during the period of recession, force companies either to reduce production capacities (shut down), or to improve products and quality and search for new markets. 'New opportunities' aims at international market research and design of the programmes for the internationalisation of the markets of Lithuanian enterprises.

Novel financial mechanisms to promote new ventures and reduce risks of business innovation-related activities were designed under the 'Operational programme for economic growth' for 2007 to 2013 (Financial engineering and related measures). The 'Controlling fund' will be established in order to provide micro credits for SMEs, support new ventures, particularly new technology-based firms through the provision of venture capital funds. Interests of guaranteed business loans will be partially covered under the same measure as a tool to promote further business investments and development. The interest rates of sustainability projects will be covered as well in order to support business investment in environmental technologies and sustainable development. These are the projects that do not directly contribute to the productivity of business, but are aimed at sustainable development.

The *ex ante* evaluation of the Lithuanian SF programmes for the period from 2007 to 2013 was carried out between May 2006 and February 2007 by the Centre for Strategy and Evaluation Services (CSES) and UAB Ekonomines konsultacijos ir tyrimai (EKT). The evaluation provides an general overview of the possible impacts of innovation policy for economy development, and also points to the important policy issues that need to be stronger addressed. The economic growth of Lithuania has been attained not only by cheap resources and the rescheduling of markets. After managing the macroeconomic situation, economic growth was strongly influenced by high domestic consumption and borrowing rates. It is important to pay attention to the fact that in addition to the dominance of low technologies in Lithuania and the dire situation with RDI, the so-called traditional sectors of industry (timber and food industry) lag far behind other EU countries with respect to labour productivity. If there is an objective to increase the labour productivity indicators and to attain the level of some of the EU-15, Lithuania has to improve the productivity in those sectors of industry that have a big influence on the GDP structure. Furthermore, Lithuania is losing the competition for foreign and national capital investments also as Lithuanian industrialists choose other EU countries, including neighbouring countries and the new EU Member States to invest and reinvest, instead of opting for Lithuania. Therefore, the need to reshuffle priorities was indicated:

- bring business productivity objectives which would help to improve the indicators of labour productivity in the short-term as the first economic growth priority;
- stress R&D and business orientation to the high-technology sector that would help to improve productivity indicators in the long-term.

Following the recommendations, the policy priorities were not reshuffled but the problem of low business productivity was sufficiently emphasised and the incentive to increase this productivity was foreseen. In allocating direct assistance to businesses, it was recommended to link this assistance to the capacities of the firms designed for export markets, thus avoiding possible competitive distortions in the internal market. At the same time it would help to improve the Lithuanian export indicators, which are too low at present for Lithuania's relative size.

Innovation in business facilitation in policymaking, and in the *ex ante* evaluation is seen as a function of R&D infrastructure development and investments. United/Joint science searching centres where specialised training of experts could be organised, studies of investigative engineering done and results of which could be used for development of at least several business sectors, would be more effective and at the same time would continue in the long-term after the end of EU assistance.

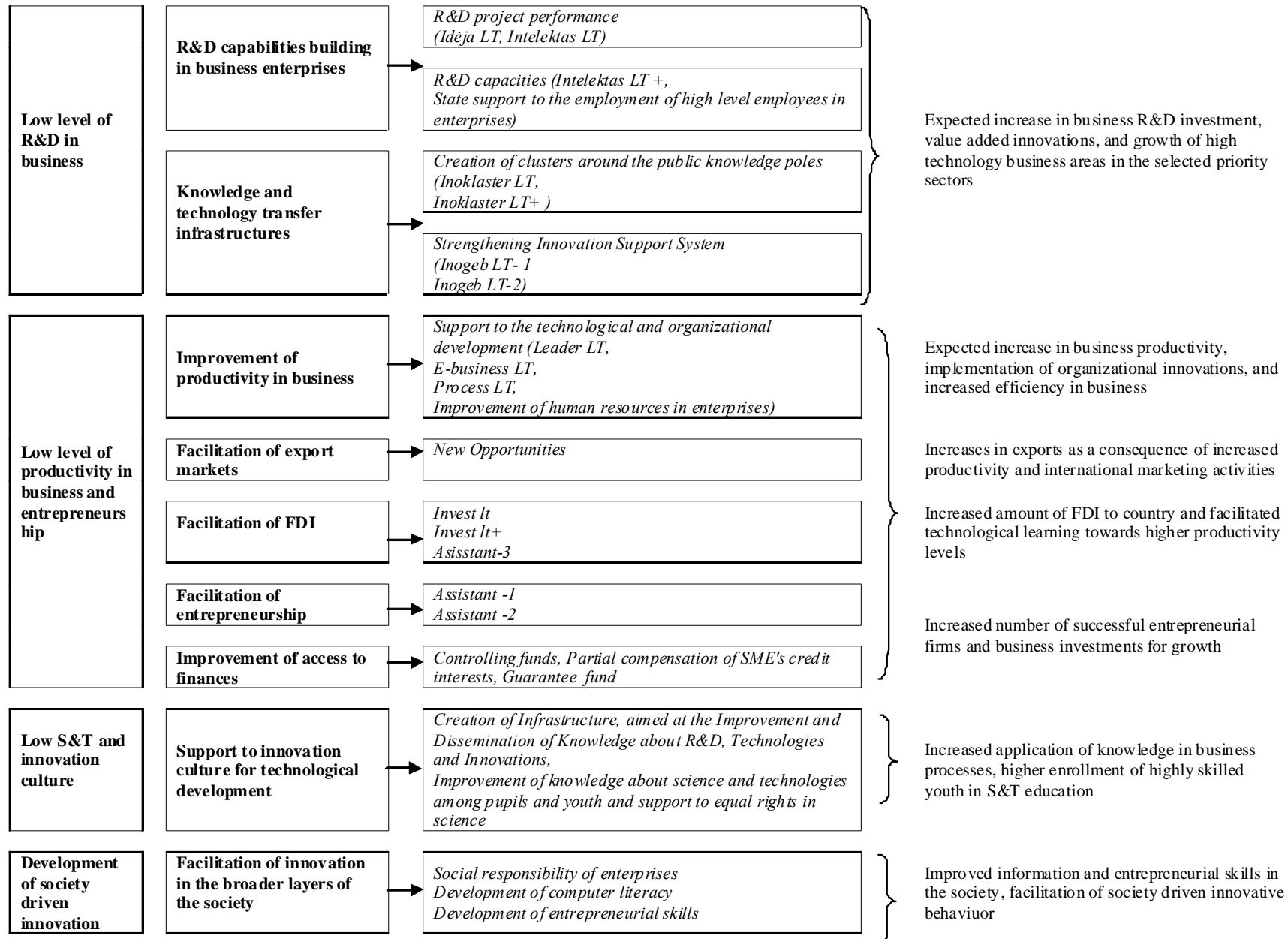
The need in paying particular attention to the increased risk of absorption of funds was also indicated. Currently, R&D activity is not sufficiently developed particularly in the private sector with respect to a very limited number of firms investing in R&D and main priority sectors such as biotechnology and laser and comparatively limited number of firms specialising in these spheres throughout the country.

Moreover, the priorities of the country's investments in R&D are not defined yet, notwithstanding some preparatory work for designing R&D programmes already done in the country. The most important indicators from a strategic context were stressed in the evaluation: (a) export; (b) labour productivity;

(c) investments; (d) level of public electronic services; (e) total R&D expenditure; (f) amount of research in business.

# INNO-Policy TrendChart

Exhibit 8: Innovation policy impact areas



### 3.3.1 Conclusions: possible future actions and opportunities for innovation policy

In the recent period, Lithuania has made tremendous progress in innovation policymaking and implementation, due to a major extent to the Lisbon process and implementation of NRP. Structural funds provided the country with the base to implement and sustain a wide range of innovation support measures, both in the public and private sector. Although the success and impact rates of the measures are too early to apprise, and nor do new trends in EIS indicators appear, the current state of play gives positive hope for the future.

Innovation policy development in Lithuania has been slightly shifting from the public innovation support infrastructure development to the creation of large business and R&D partnership platforms supported by the development of R&D projects and businesses and systemic upgrade of the highest level qualifications for S&T. The composition and funding levels of RTDI policy are clearly manifested through the focus on the development of high technology areas, which are also at the core of the knowledge-based economy vision for Lithuania. The idea of the technological specialisation of the country is rooted not only in the innovation policy documents, but also in the design of measures and funding priorities.

The technology upgrade and development of entrepreneurial skills among the overall population of business enterprises was also addressed in the current policy implementation round, with a systematic focus on technology transfer facilitation, FDI, development of non-R&D-based innovations, and development of skills for innovation by the working population.

As the implementation of these measures has only been launched recently, and Lithuania has only absorbed less than 10 % of EU SF dedicated for 2007 to 2013, the course of innovation policy implementation will remain the same for the following years. However, as noted in previous sections of the report, the heavy reliance of innovation policy implementation on public funds and direct grants-based support schemes limits the policy impact to the selected entities, and does not allow freedom of experimentation for the larger numbers of businesses and individual entrepreneurs. The regulation-based improvements and facilitating innovation and entrepreneurship should be more widely exploited in the future. A proactive approach towards markets for innovation remains an unexploited innovation policy option as well. The government spending and investment programmes should be better linked to innovation and entrepreneurship, especially in such important sectors of the economy as energy and construction.

Not only direct grants, but also regulation-based support to producing and exporting enterprises is needed in order to improve their competitiveness in international markets, especially when national governments are reintroducing to domestic producers support schemes and regulations in some of Lithuania's export markets.

Last but not least important is the need to address innovation culture development broadly, without limiting it to S&T areas. The innovativeness and entrepreneurial behaviours in society are especially needed when employment is dropping, and new job creation is hardly feasible in the next five years by the existing enterprises as a result of the economic downturn. It is estimated that unemployment will reach 20 % of the working population by 2010 in Lithuania, which will not to be overcome without the facilitation of innovative and entrepreneurial behaviours in the broad population.

## Annexes

### Annex 1: Country pages – Innovation Policy Support factsheet

Source: TrendChart-ERAWATCH database of support measures (data downloaded on 5 June 2009); analysis Technopolis Group.

**Figure 1. Main priorities addressed by the support measures in LITHUANIA in a comparative perspective**

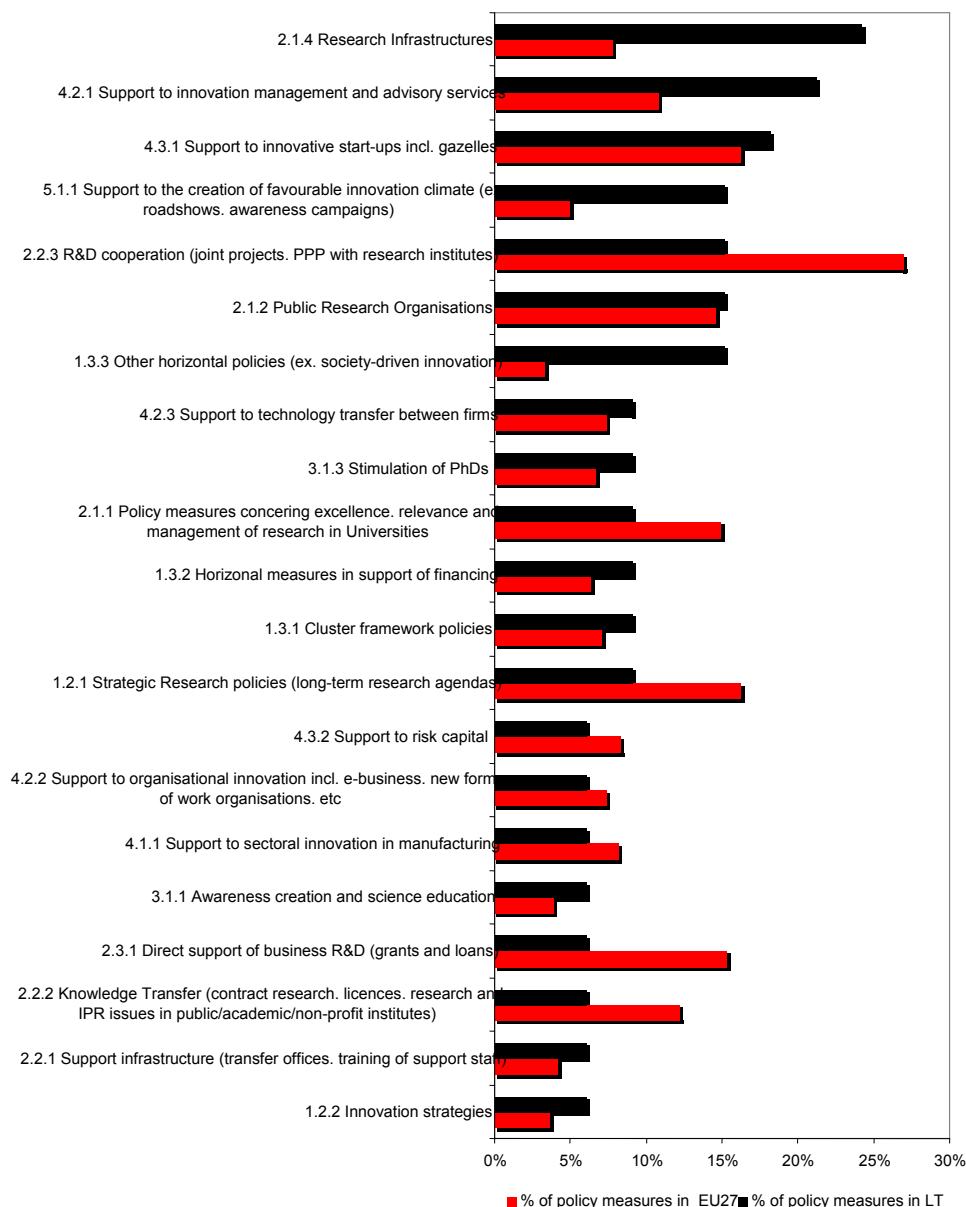
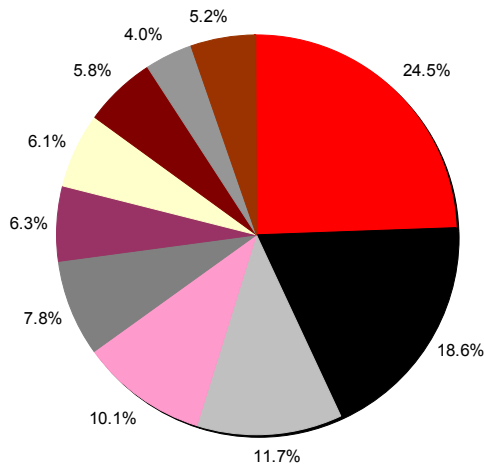
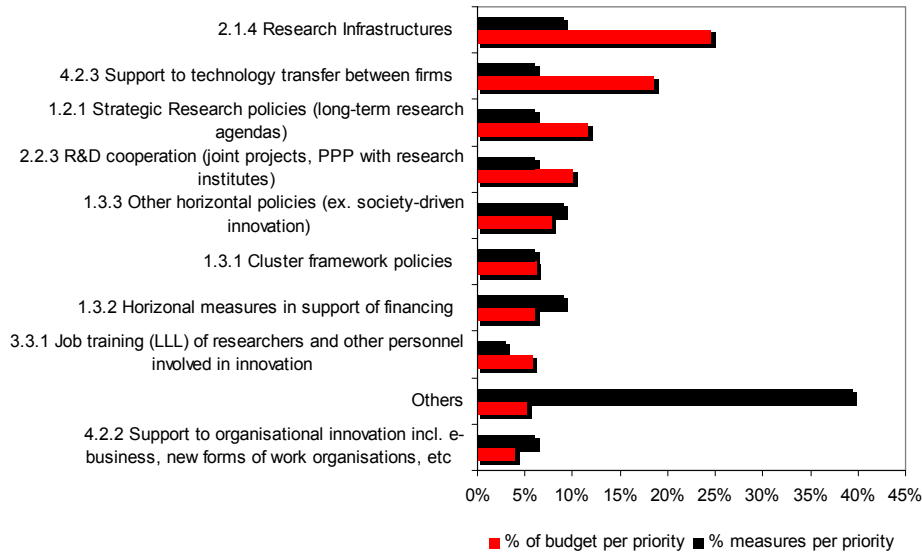


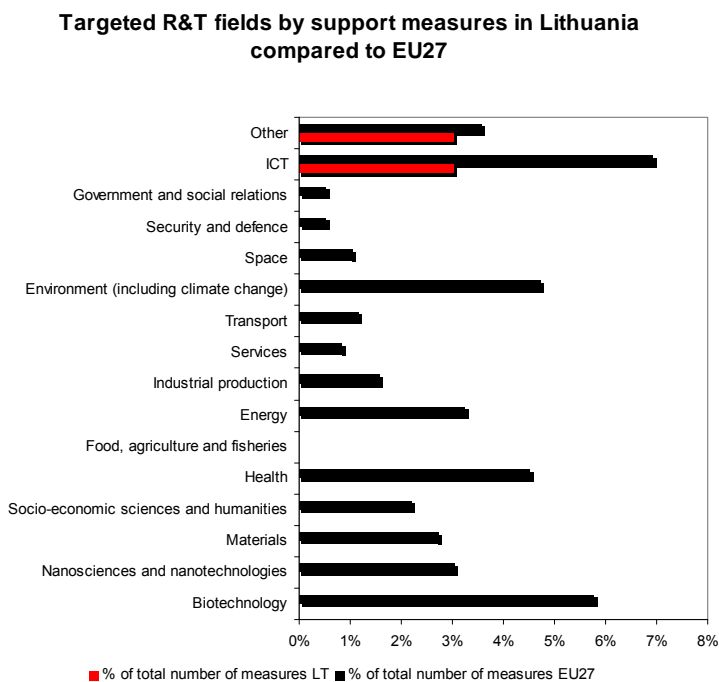
Figure 2. Estimated annual budget allocations per policy priority in Lithuania.

### Estimated annual budget spent on policy priority and number of support measures in Lithuania

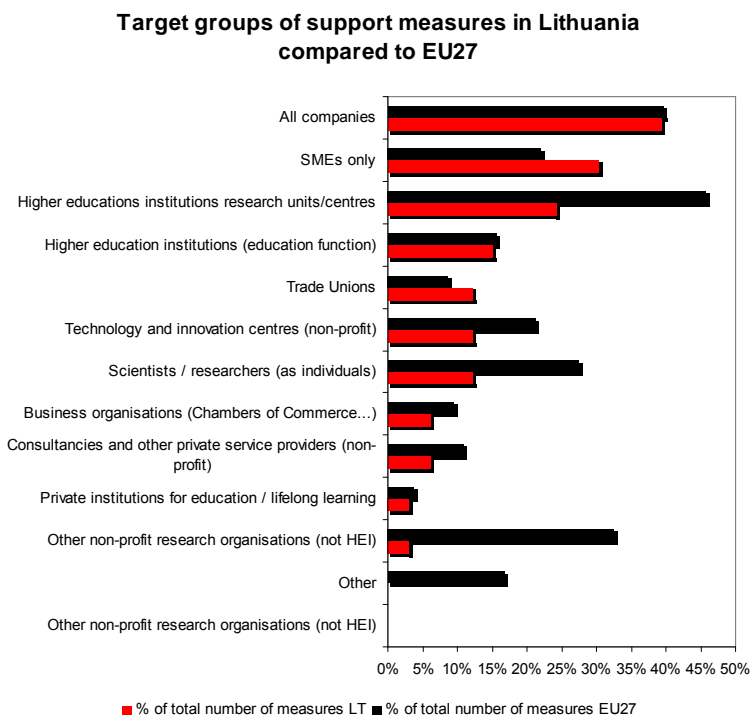


- 2.1.4 Research Infrastructures
- 4.2.3 Support to technology transfer between firms
- 1.2.1 Strategic Research policies (long-term research agendas)
- 2.2.3 R&D cooperation (joint projects, PPP with research institutes)
- 1.3.3 Other horizontal policies (ex. society-driven innovation)
- 1.3.1 Cluster framework policies
- 1.3.2 Horizontal measures in support of financing
- 3.3.1 Job training (LLL) of researchers and other personnel involved in innovation
- 4.2.2 Support to organisational innovation incl. e-business, new forms of work organisations, etc
- Other

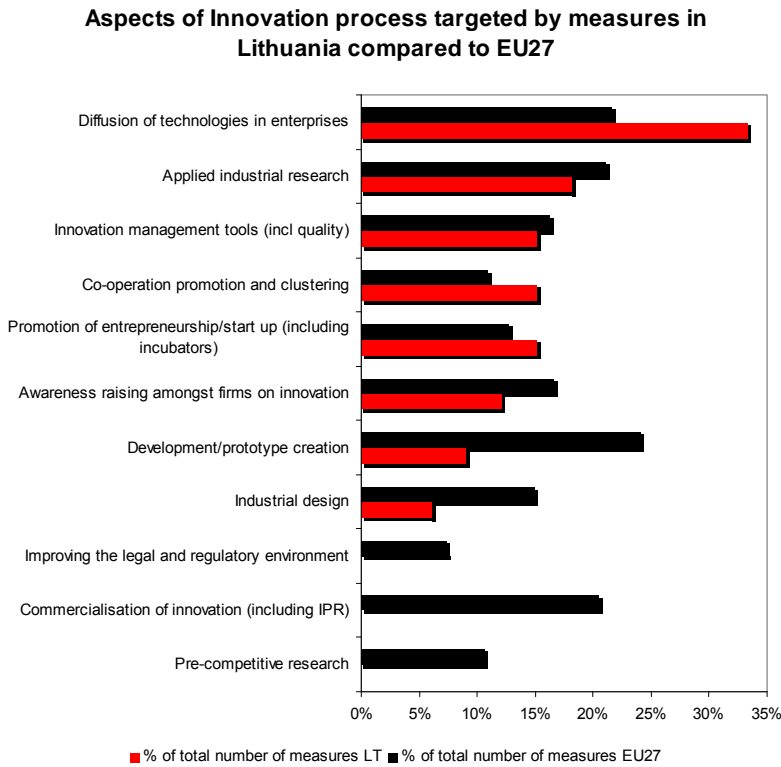
**Figure 3. Targeted research and technology fields**



**Figure 4. Target groups of support measures**



**Figure 5. Aspects of innovation process targeted by measures**



**Figure 6. Sources of co-financing of support measures**

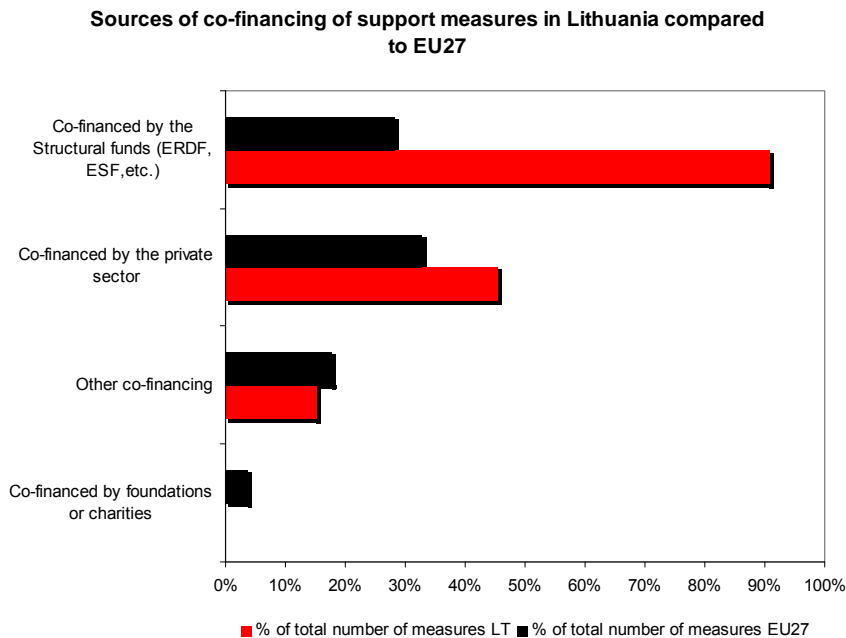
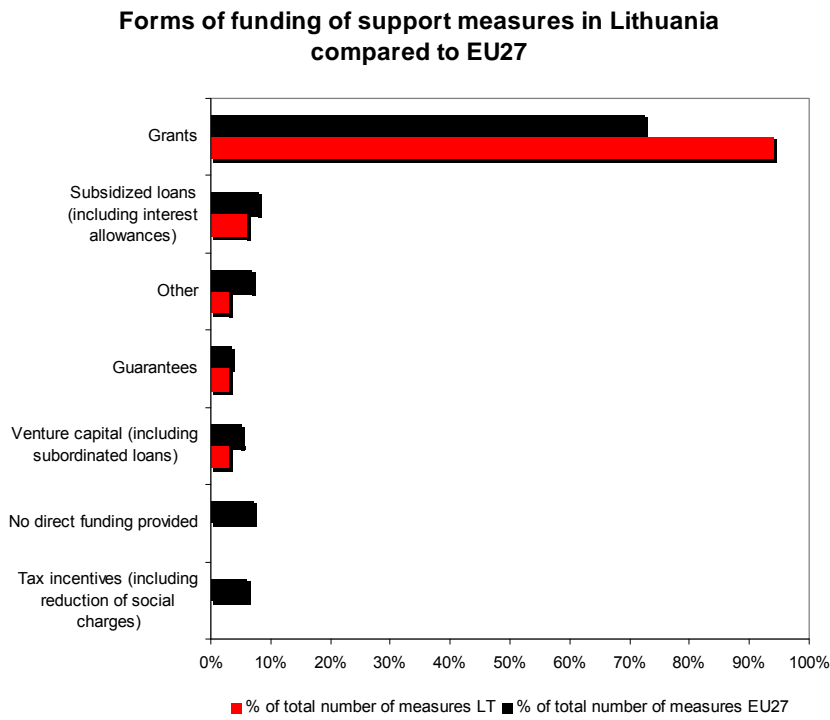


Figure 7. Forms of funding of support measures



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