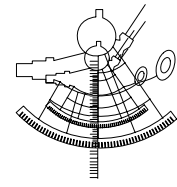


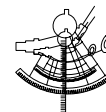
European Trend Chart on Innovation



Annual Innovation Policy Trends and Appraisal Report

Estonia

2006



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. The 'First Action Plan for Innovation in Europe', launched by the European Commission in 1996, provided for the first time a common analytical and political framework for innovation policy in Europe.

Building upon the Action Plan, the *Trend Chart on Innovation in Europe* is a practical tool for innovation organisation and scheme managers in Europe. Run by the Innovation Policy Directorate of DG Enterprise and Industry, it pursues the collection, regular updating and analysis of information on innovation policies at national and European level.

The Trend Chart serves the "open policy co-ordination approach" laid down by the Lisbon Council in March 2000. It supports organisation and scheme managers in Europe with summarised and concise information and statistics on innovation policies, performances and trends in the European Union (EU). It is also a European forum for benchmarking and the exchange of good practices in the area of innovation policy.

The Trend Chart products

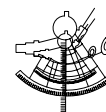
The Trend Chart on Innovation has been running since January 2000. It now tracks innovation policy developments in all 25 EU Member States, plus Bulgaria, Iceland, Israel, Liechtenstein, Norway, Romania, Switzerland and Turkey. It also provides a policy monitoring service for three other non-European zones: NAFTA/Brazil, Asia and the MEDA countries. The Trend Chart website (www.cordis.lu/trendchart) provides access to the following services and publications, as they become available:

- a database of innovation policy measures across 33 European countries;
- a news service and related innovation policy information database;
- a "who is who" of agencies and government departments involved in innovation;
- annual policy monitoring reports for all countries and zones covered;
- background material for four annual policy benchmarking workshops;
- the European Innovation Scoreboard and other statistical reports;
- an annual synthesis report bringing together key of the Trend Chart.

The present report was prepared by **Erik Terk** (erik@eti.ee) and **Andres Viia** (andres@eti.ee). The contents and views expressed in this report do not necessarily reflect the opinions or policies of the Member States or the European Commission.

This document has been prepared within the framework of an initiative of the European Commission's Enterprise and Industry Directorate-General, Innovation Policy Development Unit. Official responsible: Christophe Guichard (Christophe.guichard@cec.eu.int).

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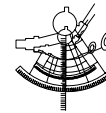


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Executive Summary

1. Innovation performance and policy objectives

The Estonian economy has experienced rapid economic growth for several years. While the average real GDP growth in the EU25 in the years 2000-2005 amounted to 2%, Estonia's corresponding figure was 7.7%¹.

The economic development of Estonia is characterised by balanced budgets, low government debt, rather low inflation (3.6% average increase in consumer prices per year 2000-2005) and a strong dependence on foreign direct investments and export. Unemployment has decreased in the recent years and was slightly below the EU25 average in 2005 (7.9% in Estonia, 8.7% in the EU25). At the same time labour productivity per person employed only amounts to slightly more than half of the EU25 average, although productivity is increasing gradually.

Estonia's innovation potential has suffered from several weaknesses since the 1990s (low number of patents, small number of S&E graduates, low business R&D expenditures), but as a whole Estonia has been considered one of the best performers out of the ten new EU member states, along with Slovenia.

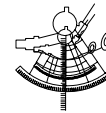
Estonia is in a mid-table position (13th out of 25 EU countries) in the summary innovation index (SII), which is based on the European Innovation Scoreboard (EIS 2005). However, trend indicators include Estonia in the group of poor performing laggard countries, which also includes Greece, Latvia, Poland and Portugal. The Ministry of Economic Affairs and Communication argues that the European Commission's rating is partly caused by a statistical anomaly (for details see Chapter 2.1.1).

The latest results of the Community Innovation Survey (CIS4), which covers the period from 2002 to 2004, show that half (49%) of Estonia's enterprises have brought new or significantly improved products (goods/services) to the market or introduced new or significantly improved processes. Compared to the previous CIS3 (1998-2000) survey, the share of innovative enterprises has increased particularly strongly in the services sector. The share of innovative enterprises in the services sector is 51%, in industry it is 48%. However, most of the expenses on innovation are still used for the purchase of machines and equipment.

Estonia's has more or less kept its previous relatively high positions in a number of competitiveness ratings, compared to 2004. For example, Estonia was ranked in 26th place in the World Competitiveness Scoreboard in 2005 (28th in 2004), while the Global Competitiveness Report placed Estonia in 20th position in both 2004 and 2005. In this light, the current economic policy debate shows some concern about Estonia's ability to retain its long-term competitiveness and productivity growth rates in an environment of increasing costs (incl. e.g. on labour, energy, etc.).

Improving competitiveness remains a catch phrase, also in the Estonian national R&D strategy entitled "Knowledge based Estonia". The national **strategic objectives** in innovation

¹ Source: Eurostat



policy, as stated in the Estonian national R&D&I strategy for 2002-2006, are to ensure sustainable economic growth and to improve the standards of living and social welfare by:

- renewing the knowledge basis, including improvement of research quality;
- improving the competitiveness of firms, including both the stimulation of technology change in traditional industries and the creation of new high technology.

The new R&D&I strategy for 2007-2013 has been compiled and approved by the government on 1 June 2006.

2. Major innovation challenges and policy responses

Challenge 1: Renewal of the knowledge basis, including improvement of research quality

Estonia's knowledge base is uneven. It is strong in some spheres (e.g. science base in biotechnology), but in a number of areas (some of which are vital for economic development) it is either weak or in some other way not up to the requirements of the economy.

First, achieving good results requires sufficient numbers of motivated researchers and top specialists. Some areas (e.g. energy, building) face problems with the continuity of research staff and the average age of scientists is very high.

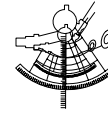
Secondly, in order to carry out contemporary research and to participate in international cooperation, a competitive R&D infrastructure is needed. However, Estonia has made rather modest investments in the modernisation of the research infrastructure and the development of new infrastructure in the past 15 years; therefore it is to a large extent outdated. A policy response exists nevertheless, for example in the shape of a development programme for research and development institutions infrastructure, financing for which has increased.

The pilot stage of the R&D institutions infrastructure development programme will be carried out in 2006-2008, but it will cover only a small share of the need for investments. In order to ensure internationally competitive research, the R&D infrastructure has to be modernised and new elements created.

The Centres of Excellence Development Programme, launched in 2005, also contributes to a better research quality. Its general objective is to increase the capability of research and development activities and innovation in Estonia, to improve the competitiveness of Estonia in the European research and innovation area, and to create and maintain top qualifications of research and development activities by developing a small number of centres of excellence in the areas that are considered a priority from the viewpoint of economic growth.

Challenge 2: Increase the competitiveness of traditional industries through technology change

The problem is in the increasing cost of economy, which reduces the international competitiveness of the traditional branches of industry. Thanks to the generally vigorous economic growth and its orientation towards the so-called scale economy, many traditional



branches manage for the time being, but this situation will not necessarily last for long. Some branches (especially textile production) already find themselves in a critical situation.

Estonia's economy has made rapid progress in recent years, supported by domestic demand, foreign direct investments and increasing export. In spite of this, Estonia's productivity and productivity per employee compared unfavourably to other EU countries. In 2004, Estonia ranked third from bottom with productivity rates of 50.6% of the EU average. In the current stage of economic development enterprises have been able to earn profit without particular investments in knowledge and skills; as a result, the competitive strategy of a large number of enterprises has been based on cost advantage and/or increase of domestic demand. The added value per employee and Estonia's long-term competitiveness are only high in a few sectors of the economy, e.g. telecommunications and financial mediation.

The development of products and services with a higher added value requires investments in equipment, staff qualification and development projects. Estonian business investments in research and development activities have been growing every year, but only amounted to 0.36% of GDP in 2004, compared to an EU average of 1.22%.

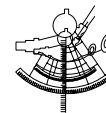
The awareness of entrepreneurs of innovation issues has been increased by the Innoawareness programme, the main goal of which is to raise the awareness of innovation and its role in the competitiveness of enterprises, and as a factor of economic growth and social welfare. The Innovation Audit Programme also contributes to the improvement of the economic indicators of Estonian companies. The programme is intended to support the training of entrepreneurs and employees so as to maintain and increase their competitiveness in the labour market, develop entrepreneurship, create the conditions for the emergence of new jobs and enhance the abilities of the people involved in R&D and technology development.

It is important to point out that the enterprises of the traditional industry sectors have also received support from the R&D financing programme. The incubation centres are also relatively active and expand their range of activities. It should be mentioned that two of the three incubation centres target the so-called "ordinary enterprises". Hopefully, some entrepreneurship policy measures would help to meet that challenge, e.g. training and counselling, which result in an increasingly close cooperation between entrepreneurial and innovation policies.

Challenge 3: Increase the creation of new high technology firms

Compared to other EU countries, the share of high-technology production is significantly lower. Approximately 6% of the output of Estonia's industry is high-tech. Estonia's high technology sector includes the production of communication equipment and, to a smaller degree, of computers and research equipment. Due to the relatively high labour intensity and smaller capital intensity, Estonia's high-tech production is characterised by a lower added value than its medium-high technology (source: CIS4). However, it can be argued that the capitalisation of the high technology sector and especially the electronics industry is increasing. A higher added value can therefore be expected.

Estonian high tech companies have serious difficulties in finding skilled labour. The reason is the education system, which only produces small amount of graduates with a technical education. On the other hand, a comparatively large number of researchers and engineers are



engaged in the higher education sector in Estonia, which explains why the majority of Estonia's R&D and innovation policy measures have so far mainly addressed the commercialisation of research results and knowledge of the research institutions. There are measures addressing high technology branches in Estonia (e.g. Spinno), but it seems that their overall effect has remained below expectations. But there is also the positive aspect of significant increases of grant projects awarded to enterprises. This is expected to have a beneficial impact on high technology and related sectors.

The three challenges are summarised in the table below, which also shows policy response rankings and evidence of impact indications based on the main findings of this report.

Summary table: innovation challenges, policy responses and impact

Challenge	Relevance of policy response	Evidence of impact
1 Renewal of the knowledge basis, including improvement of research quality	4	3
2 Increase the competitiveness of traditional industries through technology change	2	-
3 Increase the creation of new high tech firms	4	2

Policy response ranking scored from 1 to 5: 1 No specific measures addressing the challenge (possibly a debate but no evidence of any real policy development); 2 Policy development under way to respond to challenge (policy debate or design launched, e.g. announced in National Lisbon Reform Plan, etc.); 3 Specific measures existing for some time but insufficient to respond fully to challenge; 4 Existing measure plus one or more newly launched measures (during last 18 months) 5 A comprehensive set of measures which potentially responds fully to the challenge.

Evidence of impact scored from 1 to 5: 1 trend for indicators has worsened since measure(s) introduced, 2 no observable change in trend since measure(s) introduced, 3 too early to appraise (measures introduced in last 24 months), 4) trend for indicators has improved since measure(s) introduced, 5 Evaluation or study indicates measure(s) has clearly contributed to improving performance of country.

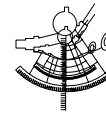
Note: since the number of measures in Estonia's innovation policy is not very large, the rating "4" has been used also in cases when no new measures have been implemented within 18 months, but the financing of the existing measure has been increased.

3. Innovation governance and policy trends

3.1 Innovation governance: key changes and issues

Education and science policies fall under the responsibility of the Ministry of Education and Research, while the Ministry of Economic Affairs and Communication is responsible for innovation and technology policy. The Research and Development Council (RDC) is the main strategic advisory body. The main national agency implementing innovation policy is the Enterprise Estonia Foundation (EAS).

The inadequacy of the coordination of innovation policy between the ministries and the small number of actively involved ministerial departments is an old problem. No particular



measures have been taken to counter it and are it is unlikely that they will be taken in the near future. The establishment of the Development Fund has been intended to solve the problems of the scarcity of technology foresights and the lack of venture capital. Some progress has already been made in this respect. The government submitted the bill establishing the Estonian Development Fund to parliament on 15 June 2006. The bill stipulates the mission of the fund, its tasks, basic operational aspects and administrative bodies. The main mission of the Development Fund is to improve the international competitiveness of Estonian start-up enterprises based on innovative ideas by providing capital and management know-how. The Fund's investment capital is expected to amount to 500 million kroons.

The Development Fund will also monitor development, thus studying key issues of Estonia's long-term economic development. It is hoped that this will contribute to the improvement of the quality of strategic decisions made at national level.

3.2 Trends in innovation policies

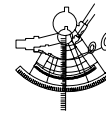
Significant efforts were made in the preparation of the new R&D&I strategy "Knowledge-based Estonia Eesti 2007–2013" and a draft version of the new strategy has been completed. Several discussions held in preparation of the strategy concluded that the new R&D&I strategy must find solutions to the financing problems of R&D and innovation, the issues related to the shortage of human capital, quality and implementation problems of research, as well as issues generally concerning key areas and focusing and problems of developing an attractive research space as a whole in Estonia. It was also considered important to determine the ideas and measures promoting a change in public opinion to broaden the general support for R&D and innovation. Yet several experts believe that the new R&D&I strategy has adopted rather too narrow an R&D focus, since the drafting of the strategy was coordinated by the Ministry of Education and Research. This is not necessarily a positive outcome.

With regard to policy measures, the year 2005 saw the launch of previously planned measures or the strengthening of policies, but it cannot be said that policy has been moved into new directions.

Several programmes, which had been planned for a long time, were launched at the beginning of 2005. The Innoawareness programme and the Innovation Audit programme both focus on increasing innovation awareness among a wider range of enterprises rather than only in high tech companies. The other focus of innovation policy is infrastructure development. The R&D infrastructure development programme (EE_25) was launched in 2005 with the first projects selected for funding in autumn 2005. There are also additional funds for the development of the physical environment of scientific centres of excellence.

4. Conclusion: future actions and opportunities for policy learning

The total volume Estonia's financing for R&D activities increased from 0.73% of GDP in 2001 to 0.91% of GDP in 2004. Yet Estonia lags far behind the corresponding average figure of the EU's 25 Member States (1.9% of GDP in 2004). The financing goals set in the strategy "Knowledge Based Estonia 2002-2006" have not been achieved (1.1% of GDP in 2004 and 1.5% of GDP in 2006). The EU has set the goal of increasing total R&D investments to 3% of GDP by 2010, a goal already exceeded in 2004 by Finland (3.51% of GDP) and Sweden (3.74% of GDP).



A positive trend is the faster growth of private sector R&D investments compared to the development of public sector R&D investments. While the private sector's investments in 1999 only amounted to 24.4% of total R&D spending, its share rose to 41% by 2004. The rapid growth was made possible by the low level of private sector R&D investments in 1999 and by government support for research and development projects carried out by enterprises. Yet the involvement of the private sector in research and development activities remains significantly lower than in highly developed economies (63.1% in the USA, 69.5% in Finland, 55.5% in the EU25 on average). This reflects the structure of Estonia's economy, which is dominated by low-technology small and medium-sized enterprises.

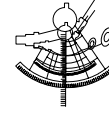
On the other hand, the strategy has failed to achieve the planned results on several key issues. For example, the national programmes in scientific key areas (user-friendly information technologies, biomedicine, materials technologies) have not been started and the volume of government-subsidised master and PhD studies has not increased. The organisation of R&D financing does not sufficiently favour applied studies and innovation support measures still fail to address the needs of traditional sectors sufficiently.

On the one hand, these inadequacies are caused by the fact that public R&D&I investments have not increased at the planned rate, which has made it impossible to achieve the goals of the strategy. On the other hand, limited administrative capabilities and a dispersal of responsibilities between ministries and other partners (research and development institutions, enterprises) have obstructed the development of the R&D&I environment in Estonia. This is particularly true in the case of government programmes in scientific key areas, which presume a high degree of cooperation between ministries. Furthermore, ministries have been unwilling to take initiative in a situation, where the stable financing of multi-year programmes from the government budget could not be guaranteed.

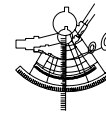
Based on analysis of the EIS indicators and the revealed trends, and with reference to existing Estonian policy strategic documents, the following general policy recommendations can be put forward. It is certainly necessary to increase public and private investments in R&D (e.g. broadening the funding possibilities to support a wider range of innovation activities including design, integration of new technologies and processes in less technologically advanced enterprises, recruitment of innovation specialists, etc; develop framework conditions conducive to higher private investment in R&D).

Furthermore, there is a need to improve the supply of S&E graduates (e.g. by implementing long term policies promoting S&E studies; supporting the adaptation of university curricula to market realities; encouraging mobility among researchers and engineers, including returning researchers or immigration to halt the brain drain, as well as schemes to encourage the recruitment of R&D personnel in industry). A better cooperation between universities and the private sector is also needed, for example by building on the experience of the existing Competence Centre programme to develop and sustain networks between the science sector and industry. Proof of concept type funding could be launched to boost the commercialisation of research carried out in academic or public research organisations.

The proper implementation of the Development Fund (venture capital + general innovation-related foresights) is an important forthcoming development in this context. Some future initiatives regarding clusters policy are also likely, possibly in the context of joining



international clusters (Nordic influence). Opportunities for supporting innovation in low-tech and medium-tech enterprises, as well as in the service sectors, are being discussed, but no detailed measures have yet been formulated.



1 The Innovation governance system

1.1 Overview of the innovation system

1.1.1 The national innovation system

The R&D and Innovation policy is mainly developed by special divisions in the Ministry of Economic Affairs and Communications and in the Ministry of Education and Research. The policies are directed and approved by the Government Research and Development Council (RDC). The policies are implemented through different programmes and financing grants and loans provided via Enterprise Estonia and the Estonian Science Foundation (see chapter 1.1.2.). Under Enterprise Estonia, the Regional Development Centres act as information providers about government support measures to enterprises.

As in other countries, the main elements of NIS in Estonia are enterprises, universities and research institutions, as well as various support structures for the promotion of innovation (the latter have so far predominantly been initiated by the public sector, with little private sector involvement). Because of the small size of Estonia, foreign partners (in research, product and technology development, and financing) are an inevitable element of NIS. The ties between the government structures and NIS are shown in exhibit 5 overleaf.

The policies and programmes implemented by the government are directed either at strengthening the elements of the NIS (universities and enterprises) or the links between the individual NIS actors. It is a peculiarity of the Estonian NIS that main emphasis is on strengthening of the links between the actors in the system. The Estonian NIS does not merely see the government as an investor, but also as a catalyst and a regulator. Several measures intend to strengthen the links between universities/research institutes and technology-based SMEs, either by improving the ability of the universities to produce spin-offs and to cooperate with enterprises, or by promoting long-term cooperation between research centres and enterprises (for details of the measures, see chapter 2).

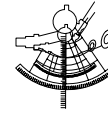
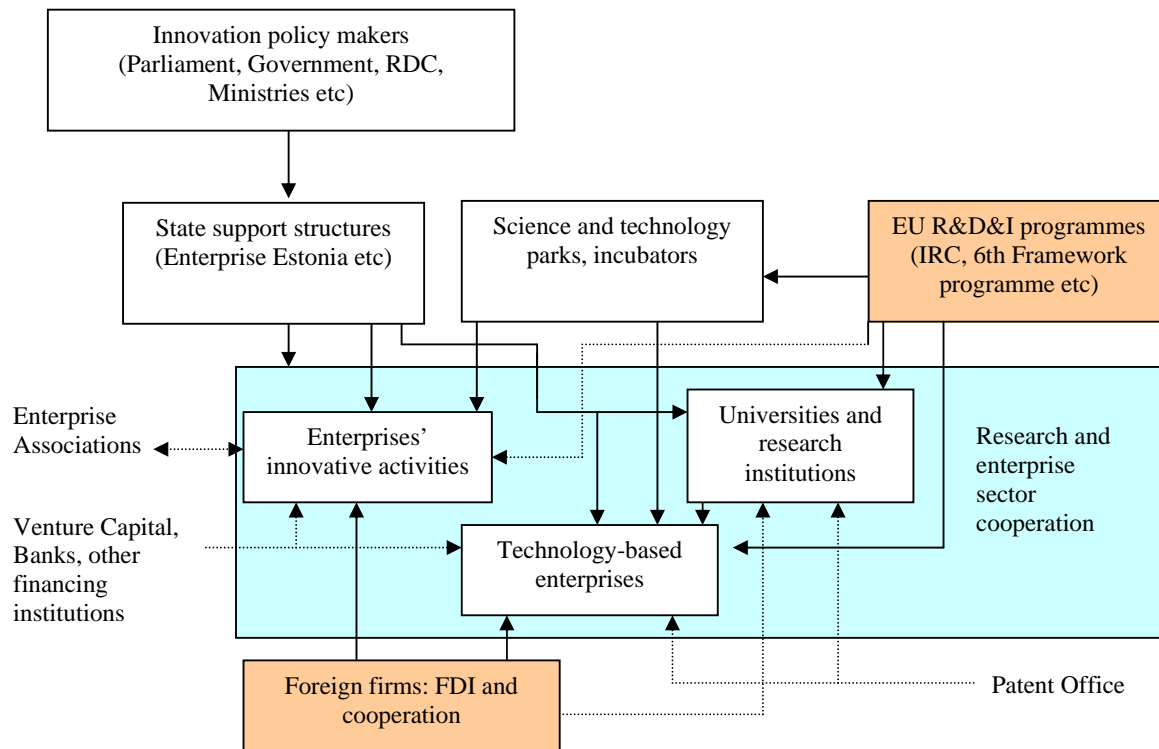


Exhibit 1: Main links in Estonian NIS²



The main innovators, enterprises and universities, have a central place in the scheme (this is shown by the level of R&D expenditures by institutional sector, see exhibit 3). Enterprises mainly concentrate on applied research and product development, while universities and other research institutions are more active in basic and applied research area. Their innovation activities are financed via grants and loans; universities also get baseline financing and competitive financing for R&D. As the links between enterprises and the research sector are rather weak, several government co-financed programmes promote this cooperation (SPINNO, Competence Centres). It has never been stipulated to what extent the NIS should be oriented towards technology-based SMEs or towards ‘ordinary’ enterprises.

Enterprise associations deal with vocational education (human resources development in a broader sense), development and entrepreneurship and export promotion. Their influence on the government’s innovation policy can be considered as limited right now. It is usually presumed that the Patent Office should be an important player in innovation system. But as patenting activity in Estonia is rather low, its role is not that outstanding. The Office also gives seminars and lectures about IPR issues to different actors in innovation system.

Innovation infrastructure is provided by research institutions (laboratories, testing centres etc) and technology parks and incubation centres. The latter are relatively active and are currently expanding their range of activities (the number of incubators is rising steadily). Exhibit 2 shows the number of jobs created in the Tallinn Technology Park and the Tartu Science Park.

² For better clarity, the figure does not include the links between groups of various types of enterprises, for example between technology-based enterprises or between these and other companies. These links are, however, important and Estonia’s innovation policy pays attention to them.

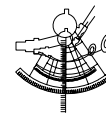
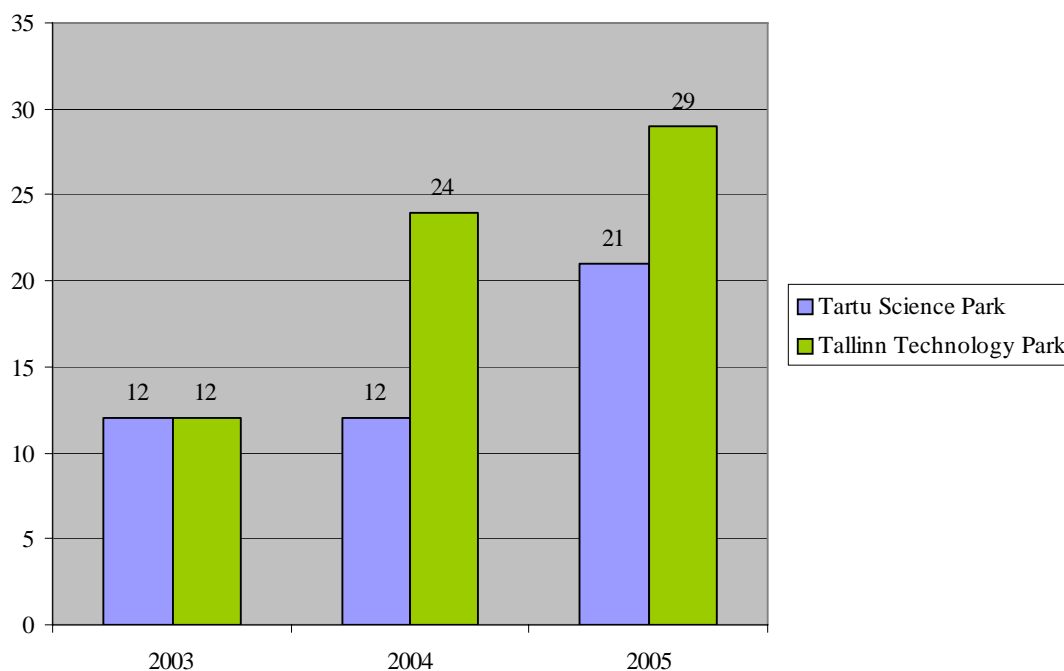


Exhibit 2: New jobs created in Tartu Science Park and Tallinn Technology Park in the 2003-2005 period³

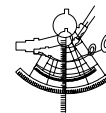


The Estonian innovation system has not changed in 2005, but it has gained a significant new element with the launch of the Development Fund. (However, following the establishment of the fund, changes in the national innovation system can be expected in the near future.)

The government submitted the bill establishing the Estonian Development Fund to parliament on 15 June 2006. The bill stipulates the mission of the fund, its tasks, basic operational aspects and administrative bodies. The main mission of the Development Fund is to stimulate and support changes in Estonia's economy which are conducive to economic modernisation, higher export volumes and the creation of new highly skilled jobs. The Development Fund will support the increase of innovation awareness, the emergence of innovative business ideas and the increase of entrepreneurship in the society as a whole. The Development Fund has two main types of functions – the generative or development monitoring function, concentrating on the promotion of development activities and the creation of the necessary coherence in the society, and secondly, the role of public venture capital. In other words, the Development Fund will invest in start-up knowledge- and technology-intensive Estonian businesses and will offer management support to corresponding entrepreneurs.

The highest volume of R&D expenses continues to be incurred in the university and higher education sector (see exhibit 3). A positive aspect is the growth trend displayed by private sector spending on R&D. While private sector spending in 1998 amounted to 20.1 % (0.4 + 19.7) of total R&D spending, the corresponding percentage in 2004 rose to 41.3 (2.3 + 39). The rapid growth was made possible by the low level of private sector R&D investments in 1998, and by a closer cooperation of enterprises with research and development institutions.

³ Ettevõtluse, infoühiskonna, transpordi ja energeetika infrastruktuuri arendamise rakenduskava; http://www.mkm.ee/failid/op_1_.infrastr.doc



Yet the involvement of the private sector in research and development activities remains significantly lower than in highly developed economies (63.1% in the USA, 69.5% in Finland, 55.5% in the EU25 on average). This reflects the structure of Estonia's economy, which is dominated by low-technology small and medium-sized enterprises.⁴

Exhibit 3 Expenses on research and development activities as to institutional sector⁵

Year	Total (thousand EEK)	University sector (%)	Public sector (%)	Non-profit private sector (%)	Business sector (%)
1998	450969	56	23,8	0,4	19,7
1999	572836	51,2	24,4	0,4	23,9
2000	579418	52,4	23,1	1,9	22,5
2001	763479	50,5	14,1	1,8	33,6
2002	871488	47,9	17	4,5	30,7
2003	1046224	47,3	15,8	3,1	33,9
2004	1294004	45,5	13,3	2,3	39

The strengths of Estonian NIS are found in the clarity of the implementing structure: practically all government financed innovation programmes, measures, schemes are implemented by one organisation – Enterprise Estonia (according to the concept of a one-stop-shop). Companies who would like to apply for state support therefore have a clear idea of which institution they should approach. Another aspect worth noticing is that several programmes include schemes supporting innovation, promoting cooperation between the research and enterprise sectors, promoting a better innovation infrastructure, attempting to increase Estonia's innovation capability etc. If implemented successfully, they can help to raise the overall competitiveness of Estonian companies. However, it is still too early to say whether these aspects are going to be the strengths of NIS. The competitiveness of the Estonian research community in several areas shows some potential of developing into another strength of the NIS. This is demonstrated by Estonia's successful participation in international cooperation activities (primarily in the EU R&D framework programmes) and the increasing number of start-up technology-intensive enterprises.

In terms of financing production and technology projects, certain aspects have improved in general⁶. Yet it is still difficult to find investors interested in financing high-tech-related and higher-risk projects. (The establishment of the Development Fund should help to solve this problem.) Other problems are created by the limited development activities of enterprises and the concentration of R&D in the science sector. Patenting activity, which reflects the application of development and innovation outcomes in the business sector, is very low in Estonia.

⁴ Teadmistepõhine Eesti 2007-2013, p. 10

⁵ Teadmistepõhine Eesti 2007-2013, p. 33

⁶ If, until May of 2002, the availability of financial resources was the greatest obstacle to business activities for 34 % of enterprises, then in 2005, the percentage of such enterprises is 21% of all operating enterprises. (Source: Action plan for growth and jobs 2005-2007. For implementation of the Lisbon Strategy)

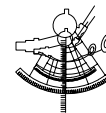


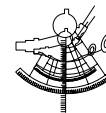
Exhibit 4: Selected key organisations within the National Innovation System

Type of organisation	Name of organisation (in English)	Website (where available)
Government and legislative bodies		
	Ministry of Economic Affairs and Communications	www.mkm.ee
	Ministry of Education and Research	www.hm.ee
	Government Research and Development Council	www.tan.ee
Government implementation bodies		
	Enterprise Estonia	www.eas.ee
	Estonian Science Foundation	www.etf.ee
Private sector organisations and entrepreneurship promotion		
	Estonian Chamber of Commerce and Industry	www.koda.ee
	Association of Estonian Information Technology and Telecommunications Companies	www.itl.ee
	Estonian Employers' Confederation	www.ettk.ee
Knowledge institutes (R&D and education bodies)		
	Tartu University, Institute of Technology	www.ut.ee , www.tuit.ut.ee
	Tallinn University of Technology	www.ttu.ee
	University of Tallinn	www.tlu.ee
	Estonian University of Life Sciences	http://www.emu.ee
Centres of Excellence		
	Centre of Molecular and Clinical Medicine	http://cmcm.ut.ee/
	Centre of Excellence for Chemistry and Material Science	http://www.chem.ut.ee/
	Centre for Basic and Applied Ecology	e-mail: Olevi.Kull@ut.ee
	Centre of Excellence of Gene and Environmental Technologies	www.tymri.ut.ee/TK/
	Centre for Behavioural and Health Sciences	http://www.psych.ut.ee/~ekttk/
	Institute of Physics	www.fi.tartu.ee
Industrial research centres and innovation intermediaries		
	Tallinn Technology Park – Tehnopol	www.tehnopol.ee
	Tartu Technology Park	http://park.tartu.ee/uus/
	Tartu Biotechnology Park	www.biopark.ee
	Estonian Patent Office	www.epa.ee
	Lasnamäe and Kopli business incubators	www.inkubaator.ee
	Jõhvi Industrial Park	www.jtp.ee
Financial system		
	Estonian Credit and Export Guarantee Fund KredEx	www.kredex.ee

1.1.2 National innovation policy making and delivery structures

The Parliament and the Government, with their respective legislative and executive functions, are at the highest level of the Estonian National Innovation governance system.

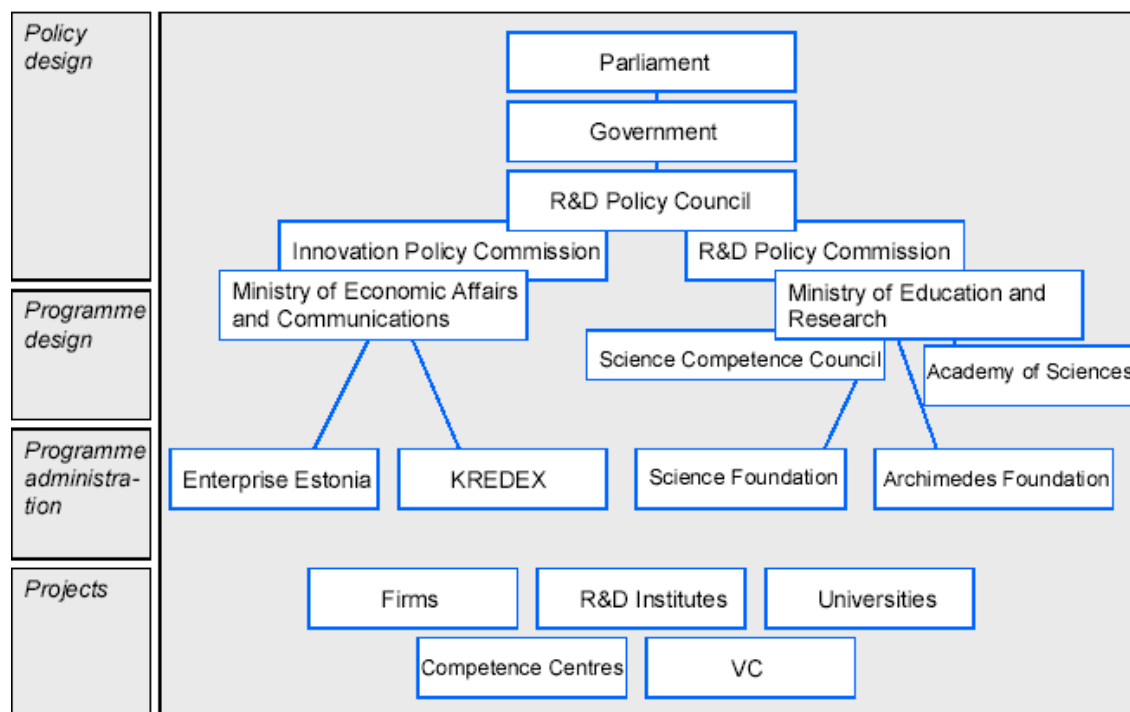
Education and science policies in Estonia are within the responsibility of the **Ministry of Education and Research**, while the **Ministry of Economic Affairs and Communication** is responsible for innovation and technology policy. The **Research and Development Council (RDC)** is the main strategic advisory body to the Government, chaired *ex officio* by the Prime Minister. The RDC's work is based on two sub-commissions, headed by the Minister for Education and Research and the Minister for Economic Affairs and Communication



respectively. One sub-commission specialises in research, the other in innovation. The items addressed in the RDC session agenda require the approval of one or both of the sub-committees (depending on the nature of the issue). In forming the sub-committees, the institution-centred approach has been replaced by a competence-centred one, especially as the sub-committees are composed of competent professionals rather than only formal representatives of institutions. Besides, various experts can be involved in the activities of the sub-committees when necessary. However, the effect of the RDC on Estonia's innovation policy can be said to be more modest than it could be.

The Ministry of Economic Affairs and Communication has a role in the formulation of government policies for the development of technology and innovation. The main administrative unit within the Ministry is the **Technology and innovation division** of the Economic Development Department. The Ministry is responsible for the planning, coordination and supervision of the implementation of technology and innovation policies.

Exhibit 5: Organisational chart of the innovation governance system



The Government's main arm in innovation policy is the **Enterprise Estonia Foundation** (EE) – a national foundation for the support of enterprises. The Enterprise Estonia Foundation is a non-profit legal entity established by the Government.

EE's objective is to increase R&D&I capacities in existing businesses and to stimulate the creation and growth of new technology-based businesses by implementing support measures for:

- Financing R&D and innovation;
- Strengthening innovation systems;
- Increasing awareness and knowledge about innovation;
- Strengthening international co-operation in the field of RTD and innovation.

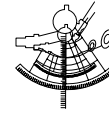
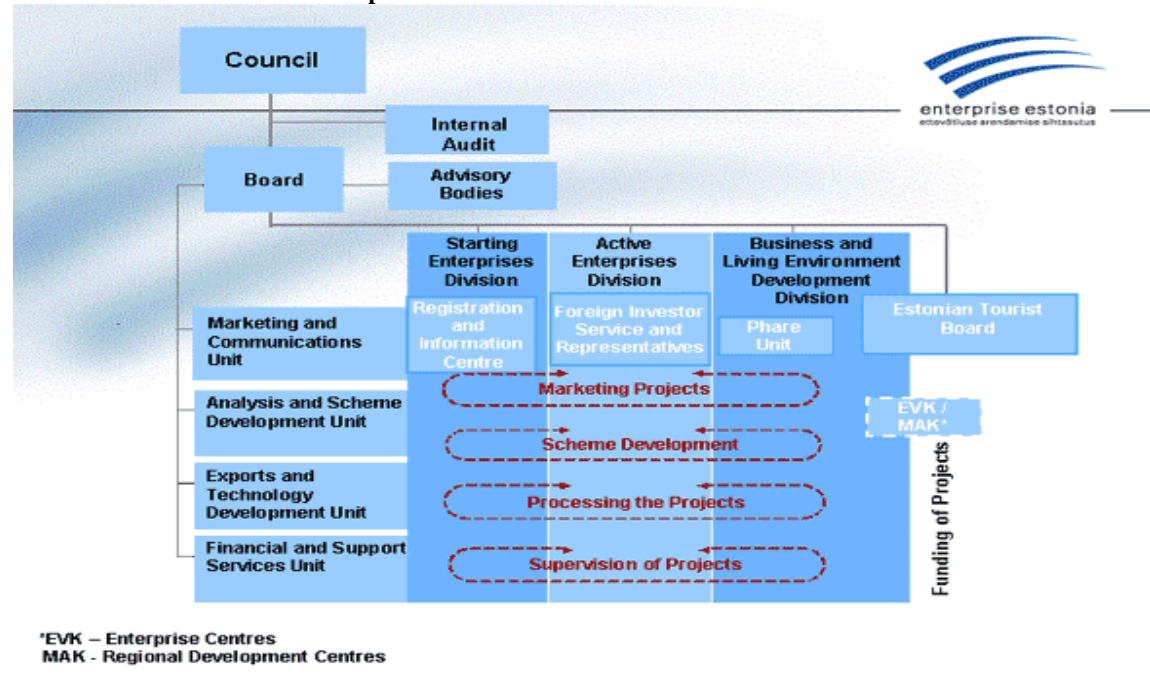


Exhibit 6: The structure of Enterprise Estonia



The restructured Enterprise Estonia started to operate in full on 1 October 2003. The structure of EE is a considerable challenge for the project managers who have to deal with a large number of different schemes, analysing their suitability to address the needs of enterprises.

The most important division is the Active Enterprise Division, which provides most of the support measures to enterprises. The Exports and Technology Development Unit aggregates experts in different fields for consulting and project assessment. The Analysis and Scheme Development Unit deals with the development of support schemes and assesses their results. The Financial and Support Unit is the financial and accounting support structure. The Starting Enterprise Division is responsible for measures to help new SMEs and encourage the creation of new companies, such as the programme for business incubation, start-up grants, etc.

The reorganisation of Enterprise Estonia prior to October 2003 consolidated EE's structure. The foundation now seems to operate efficiently. The total budget for 2006 is EUR 93 855 000.

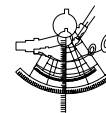


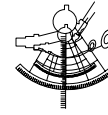
Exhibit 7: The budget of the Enterprise Estonia (2006)

REVENUE	Thousand EUR
State budget allocations	78314
Self-financing	963
Turnover from previous periods	18413
TOTAL REVENUE	93855
EXPENSES	
General administrative and implementation expenses and investments	5462
Support programme expenses	6387
Support programmes for new enterprises	6387
Support programmes for active enterprises	42687
Support programmes for the division for the development of entrepreneurship and human environment including support programmes for tourism	37121
Reserve	11193
Total expenses for support programmes	2198
TOTAL EXPENSES AND RESERVE	88393
	93855

The **Ministry of Education and Research** is responsible for the formulation and co-ordination of science and education policies. The **Estonian Academy of Sciences** and **Science Competence Council** advise the Ministry on science and education issues. The Estonian Academy of Sciences is a private advisory body. The functions of the Ministry of Education and Research in R&D are supported by the Archimedes Foundation, which coordinates the evaluation of higher education curricula and scientific research activities. Moreover, it acts as a national contact office for the EU Framework Programmes and consulting. The Ministry of Education and Research intends to handle its research-related structural funds allocations independently. The decision on the independent use has been made in principle, but the respective methods are still in the process of being defined (the main question is whether to use one or more implementation units or the ministry's own resources).

It is the responsibility of the **Estonian Science Foundation (ESF)** – which is maintained by the Ministry of Education and Research – to decide on providing grants to research projects. There are eight expert commissions in different science fields who decide on project financing. In 2006 the ESF financed 650 research projects with a total sum of EUR 6.12 million.

As compared to the previous period, Estonia's innovation system is very much concentrated on EU fund allocations. In 2004 Structural Fund resources amounted to EUR 8,3 million, which almost doubled to EUR 16,2 million in 2005. Total government funding for R&D&I was EUR 48.5 million in 2004 and EUR 59.4 million in 2005. At present, the biggest problem is that Structural Funds financing partly replaces government contributions, instead of providing additional resources.



1.1.3 Governance of regional innovation systems

For the purpose of innovation policy, Estonia, as a small country, can be seen as a single region with two main academic research centres in Tallinn and Tartu. Therefore, policy-making, co-ordination and implementation generally take place at the national level. Enterprise Estonia has established regional development centres in the counties (county development centres, CDC), but their main functions are the related to the implementation of existing policies. They do not usually run independent innovation policies.

Interest in regional innovation policy has, however, increased recently. This is most likely to be a preliminary or diagnostic stage. Accordingly, a working group (ERIS programme) meeting in Tallinn Technology Park (Tehnopol) unites representatives of various counties and organisations all over Estonia who are involved in the assessment of Estonia's regional innovation situation and the study of the emerging clusters.

There have been some changes affecting the incubators. The Mustamäe and Kopli incubators are fully operational and the Lasnamäe Industrial Park, mentioned in the Tallinn Development Plan 2005-2014, began its operations in April 2006. Most of the land plots have already been sold. The broader structure – the Tallinn Technology Park 'Tehnopol' – had 140-150 tenants in 2006. It is important to point out that only the Mustamäe incubator specialises in technology. The Kopli and Lasnamäe incubators also include non-technology-related enterprises.

Tallinn, together with Helsinki, has also initiated the so-called Twin-City project, which involves cooperation between the technology universities of both cities with the help of EU support funds. This project is still in a preliminary stage. There have been some brokerage events for SMEs, but the concept of the whole project is still rather weak. Discussions are underway on whether the extent of the project should be limited only to Tallinn and Helsinki or should it encompass a wider area (e.g. Tartu in Estonia and Oulu in Finland).

In North-East Estonia, the Jõhvi Industrial park was completed in spring 2005. The overall cost of the project was EUR 230 000 euros, 70% of which was provided by Enterprise Estonia.

There is a number of other interesting initiatives in South Estonia. For example, in 2005, the Tartu City Government decided to support the establishment of an innovative and sustainable enterprise, so as to encourage young people to realise their business ideas in Tartu. The Tartu Science Park will also offer free space for one year in its incubator together with varied consultation services for the author of the best idea. In addition, the EU-financed consultation centre for small and medium-sized enterprises was opened in early 2006. It is operated by the Tartu Science Park and the Tartu University. The EU finances the development stage of the project, which will last until the end of 2007. The aim is to establish a network of consultation and service centres supporting SMEs in nine Baltic Sea countries.

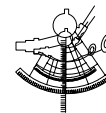


Exhibit 8: Regional governance of innovation policy matters

Level of regional/local government	Legislative &/or administrative authorities	Powers related to innovation policy, if any
Tallinn City	Tallinn City Government	Founder and financier of the Tallinn Technology Park, and incubators in Tallinn
Tartu region	Tartu Science Park	Implementation of southern Estonia (Tartu Region) regional innovation strategy

1.2 Appraisal of the governance system

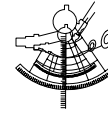
1.2.1 Policy making and evaluation practices

Estonian R&D and innovation policy is based on the Estonian research and development strategy ‘Knowledge-based Estonia’ for 2002-2006, which was adopted by Parliament in 2001, and the National Development Plan for the Implementation of the EU Structural Funds (SPD) 2004-2006.

Updated versions of both documents were drafted in 2006. There is a joint plan for the use of Estonian government funds and EU Structural Funds from 2007 onwards. For the years 2004-2006, there was a National Development Plan for the use of the Structural Funds, which is separate from the government’s budgetary strategy. For the planning period 2007-2013, the strategy for the implementation of the Structural Funds is drafted within the budget 2007-2010 and as a part of government’s budgetary strategy. By combining two important national strategic implementation and planning documents, it is hoped to improve both budgetary procedures and the transparency of the use of funds and accounting. Another goal is to improve the practical and technical quality of the national budgetary strategy via the efficient use of domestic and foreign funds. All this will create better conditions for ensuring a more practical use and a better efficiency of Estonia’s budget allocations (including the EU structural funds). The linking of the documents is based on a principle derived from the budget act, according to which the Structural Funds are treated as part of the government budget. The “National strategy for use of the Structural Funds 2007-2013”, written by the national budgetary strategy, determines Estonia’s strategic approach to the use of the Structural Funds during the next planning period 2007 - 2013.

The innovation support measures/schemes are developed by the Ministry of Education and Science and the Ministry of Economic Affairs and Communications (Technology and Innovation Division).

The RDC gives its opinion on innovation support measures/schemes that are bigger and politically more important and which require more inter-ministerial cooperation. In preparation of innovation support schemes, foreign expertise and benchmarking exercises are used. This is partly the case because there is only a limited number of innovation policy experts in Estonia and partly because there is a need to match international know-how with the needs of Estonian enterprises and the country’s R&D sector.



After an evaluation by the RDC, a draft policy document is submitted to the government. If approved, it becomes the basis of the respective R&D and innovation policy implementation measures, annual action plan, measure, programme, etc. Most programmes are prepared by ministries after consulting representatives of the target groups. Once approved, they are implemented to “Enterprise Estonia”, which ensures the measures address the target groups.

Although the RDC should have the guiding role in R&D and innovation policy development, the reality is different as most policies are planned and developed by the Ministry of Economic Affairs and Communications and the Ministry of Education and Research. The coordination between different documents and programmes is rather good within the Ministry of Economic Affairs and Communication (between different enterprise policy and innovation policy measures) and within the Enterprise Estonia. The coordination between the Ministry of Economic Affairs and Communications, the Ministry of Education and Research, and especially Ministry of Finance is rather complicated. All parties are driven by their own visions of R&D, innovation development and support. This is where the RDC’s weakness becomes apparent.

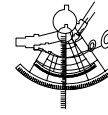
The members of the RDC are appointed for three years. The outgoing members have evaluated their work of the past three years and made recommendations for the future. The council’s key task is now to develop a new R&D and Innovation strategy 2007-2013, in cooperation with its sub-commissions and external experts. A draft working version of the strategy has already been completed.

Most of the ongoing programmes are still in too early a stage to be evaluated. Throughout the implementation period, support schemes, including Enterprise Estonia’s implementation capability, are being evaluated by foreign and local experts. The resulting recommendations are used in new calls of proposals and in the preparations for the new EU Structural Funds programming period (2007-2013). Broader impact analyses are not yet available as the support schemes are still too young.

An impact survey of the Spinno programme and a feasibility study of a mobility programme are currently being carried out. The mobility programme intends to improve the innovation capacities of enterprises and support the recruitment of development staff in order to promote knowledge and technology transfer. Both studies aim to report by December 2006.

At the end of 2005, the Belgian Technopolis Consulting Group completed an “Evaluation of the design and implementation of Estonian RTDI policy: implications for policy planning”. The overall objective of the projects is to assess the adequacy of the strategic RDTI policy goals and of Estonian policy measures in the light of most pressing challenges facing Estonia and in the context of recent strategic development directions in other EU countries. It also gives input for the upcoming SPD 2007-2013 and the national R&D&I strategy 2007-2013.

This study concludes that the most important shortcoming in policy implementation is the failure to launch national technology programmes in the key sectors identified by the strategy, despite some initial preparatory work carried out from 2002-3. Most observers put this failure down to a range of political factors (changing ministerial or government priorities) and to an in of the involved ministries to develop the necessary procedures (due to limited human resources and a significant workload related to other programmes).



However, the failure to launch such programmes perhaps needs to be seen in a more strategic sense, since it suggests that policy makers still fail to understand the concept clearly and that the business and research sectors have given these programmes insufficient priority to ensure a timely launch. What purpose will the technology programmes serve, what technological or sectoral fields will they focus on and what are the risks of such a choice? These and other questions need to be addressed in more detail by all stakeholders. To date, Estonian RTDI policy has tended to avoid prioritisation of funding towards sectors or technologies. Technology programmes would therefore *de facto* represent a shift in policy that would perhaps be more fundamental than simply raising the levels of expenditure on R&D infrastructure or for business R&D projects.

Similar criticisms were made in a survey by the Center for Policy Studies Praxis, of the lack of technology programmes. The survey “Entrepreneurship support measures in the State Budgetary Strategy 2007-2013”, was finalised in September 2005 and points out that *Knowledge-based Estonia 2002 – 2006* obliges the Estonian state to develop technology programmes in three key areas (info-technology, biotechnology and nanotechnology). This has not been achieved so far. Instead, emphasis has been placed on horizontal measures (e.g. technology development centres, PhD-level schools, schemes supporting researcher mobility, R&D projects support measures etc.). No sectoral priorities have been set. The authors of the Praxis survey consider that the positive effect of schemes for the development of Estonia’s economy cannot be systematic. Analysing the results of the survey, it can be concluded that the criticisms are justified regarding the lack of programmes in key areas. However, criticisms of the horizontal measures (an instrument that is also widely used in other EU countries) is not entirely correct.

Different evaluation reports and feasibility studies are published selectively in a series entitled ‘Innovation studies’. All documents of this series can be downloaded from the website of the Division of Technology and Innovation (<http://www.mkm.ee/index.php?id=7566>).

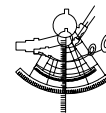


Exhibit 9: Overall appraisal of policy making and evaluation practice

Policy making/evaluation practice	Benchmark	Ranking (1 to 5)
Openness of the process of designing innovation policy (measures)	Policy development is undertaken through a partnership based approach involving consultation of key stakeholders at all stages	2/3
Quality of inputs to policy making (application of evidence based techniques, use of evaluation results):	Policy design is systematically evidence-based and account is taken of evaluation results	4
Regularity and transparency of policy monitoring and review processes	All major policy documents and instruments are the subject of a regular review involving stakeholder consultation	3/4
The impact on innovation of developments and regulations in other policy fields is appraised	A well-structured process exists for impact assessment of new regulations on innovation &/or innovation is taken into account as an issue in other policy documents.	3
Existence of coordination mechanisms (high-level councils, inter-ministerial committees, etc.)	Well organised coherent system of policy coordination at government and agency levels	2
Existence of an “evaluation culture” ⁷ in the field of innovation policy	Innovation policy measures are systematically evaluated at key milestones in their implementation.	4
External versus internal evaluations of innovation policy measures	Evaluations respect good practice criteria (involve systematically external experts, evidence based, quality appraisal of evaluation reports, etc.)	3/4
Transparency and publication of results of evaluations	All evaluations are published &/or discussed in a public forum.	3/4

Scoring: 1 completely unsatisfactory, 2 unsatisfactory (room for improvement) 3 satisfactory 4 above average compared to other EU countries 5 best practice in the EU.

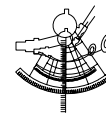
1.2.2 Policy benchmarking and transnational learning

Participation in the Community Innovation Survey gives Estonia plenty of opportunities for benchmarking with other European countries. The 2004 results as well as the outcomes of the previous survey indicated that Estonia has roughly the same share of innovative enterprises as other EU countries, but innovation is mostly carried out by means of purchasing machinery and equipment and providing training related to the new equipment.

In general, *ad hoc* transnational policy learning seems to prevail. Innovation officers participate in different international seminars, working groups and trainings, they follow relevant European literature and survey results (including TrendChart publications). Experiences made in Finland, other Nordic countries, Ireland and the UK have frequently been considered in the Estonian context.

Most attention is been paid to Estonia’s northern neighbours. Existing Finnish solutions have been particularly influential and shape the structure of Estonian Innovation System. The creation of Enterprise Estonia was largely based on the Finnish TEKES. The Development Fund is based on the Finnish National Fund for Research and Development (Sitra), although it has been amended to better fit the Estonian context.

⁷ An EVALUATION CULTURE (or culture of evaluation) is one in which evaluation, and the lessons drawn from it, form an important element of innovation programme management and policy formulation.



Experiences made in other countries is actively used and it is attempted to adapt foreign experiences to the local circumstances. For example, the establishment of the (Technology) Competence Centres Programme drew on Swedish and Austrian experience.

Estonia also closely follows the developments in Ireland, which have been used as a source of inspiration in connection with the establishment of Enterprise Estonia and various diagnostic and benchmarking methods that are used in the context of Enterprise Estonia's innovation support measures. Furthermore, Estonia has recently expressed an interest in the UK's business advisory practice and specialists have been sent on study missions. Enterprise Estonia intends to put these instruments to use to help finance consulting services.

Exhibit 10: Overall appraisal of policy benchmarking and learning initiatives

Tool for policy learning	Benchmark	Ranking (1-5)
Formal mechanisms for policy learning (studies, innovation observatories, study visits, joint events with other countries, etc.)	Exists on a permanent basis (e.g. observatory) or at least one occurrence on an annual basis	4
Application of foreign experience in designing measures (e.g. involvement of foreign experts in design phase)	Systematically (all new policy measures take into account foreign experience)	4
Exchange or hiring of innovation policy staff/experts to/from other countries (e.g. twinning programmes with new member states or candidate countries)	Long-standing and regular policy of exchange of staff	3
Involvement of senior policy makers /executives in trans-national networks (e.g. TAFTIE, OECD committees, etc.)	Key government or agency staff are members in such networks and play an active role (e.g. management committee, organisation of events, etc.)	4
Carrying out quantitative or qualitative benchmarking exercises to assess comparative innovation performance (scoreboards, etc.)	Benchmarking is a systematic process & results are incorporated into policy	3/4
Implementing policy co-operation with other countries: bilateral or multilateral programmes on innovation, etc.	Many long-term agreements operating (specifically in field of innovation, technology transfer, etc. as distinct from scientific research agreements)	2/3

Scoring: 1 completely unsatisfactory, 2 unsatisfactory (room for improvement) 3 satisfactory 4 above average compared to other EU countries 5 best practice in the EU.

1.2.3 Overall appraisal and SWOT of innovation governance

The Ministry of Economic Affairs and Communication and other ministries involved in innovation issues, such as the Ministry of Education and Research, the Ministry of Finance, and others, find it difficult to agree on a common understanding and to establish smooth cooperation procedures. Furthermore, the role of the RDC in the development of innovation policy has remained limited, although its activities have increased recently.

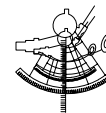


Exhibit 11: Innovation governance SWOT overview

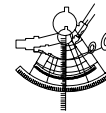
Strengths	Weaknesses
<ul style="list-style-type: none"> • Existence of a national R&D&I strategy • Operating support schemes and programmes for promoting innovation in companies and fostering industry – academy co-operation • Comprehensive enterprise support agency, offering broad range of support measures, including innovation support • Established practices of using international experts in programme development and evaluation • Ongoing improvement of the innovation support programmes according to the results of the interim evaluations • Solid pool of international contacts on innovation policy and good framework for trans-national learning • Established and improving experience in running an NIS (procedures, contacts etc) • An established network of innovation support structures (business incubators, technology/science parks, technology transfer offices at universities) 	<ul style="list-style-type: none"> • Lack of focus of innovation policy in terms of clusters or high-potential (key) areas on the implementation level (Programmes for key technology areas in the national R&D strategy have not materialised) • Lack of working measures concerning medium and low-technology companies • Lack of policy experts in ministries and agencies • Lack of pre-seed and seed capital • Insufficient coordination between different financing and other partnering institutions involved in NIS • Inability of politicians to reach agreement regarding planned innovation policy measures • Lack of proper practice and capabilities for conducting technology foresights • Underdeveloped (although gradually improving) R&D infrastructure • IPR regulated differently by universities • The principle of additionality of EU funds is not always respected by the government • Lack of private sector investments into RDI activities
Opportunities	Threats
<ul style="list-style-type: none"> • Opportunities related to Structural Funds (in 2007-2013) • Launch of the state venture capital fund • Increased financial support for national R&D infrastructure 	<ul style="list-style-type: none"> • Lack of policy coordination between different institutions • Opposition from the academic sector against more demand-oriented innovation policy developments • Lack of commitment of entrepreneurial associations to innovation policy making • Lack of co-ordination with other policy areas due to the predominant role of two sectoral ministries in innovation policy making.

There are no significant changes in innovation governance since the previous Trendchart SWOT table, although there have been some minor shifts and changes.

Strengths

The new national R&D&I strategy has been approved by the Government, but is still awaiting parliamentary approval⁸. Enterprise Estonia operates well and its support measures, including innovation support measures, have expanded and improved. The number of employees in Enterprise Estonia who deal with innovation support measures has also increased slightly. Similarly, the incubators are constantly developing and the number of new jobs related to them has increased.

⁸ However, the emphasis of the new strategy will be on research and development rather than innovation.



Weaknesses

The strategy has failed to launch government programmes in scientific key areas (user-friendly information society technologies, biomedicine, materials technologies). Since these remain unchanged in the new R&D&I strategy, some progress can be expected to be made in future. Preparations are in progress for the development of a new measure for clusters support – a feasibility study is to be completed by the end of 2006. The lack of technology foresights will be addressed by the Development Fund, the establishment of which is expected for the near future. The Fund will also monitor the development of key issues of Estonia's long-term economic development.

The European Union's Structural Funds have played a role in the implementation of R&D&I support policy since 2004. The contribution of the structure funds to the financing of R&D&I has been significant, but two serious problems have emerged. First, the Structural Funds are implemented with a considerable delay due to complicated administrative procedures. Therefore, the measures launched within the Single Programme Document for Years 2004-2006 are mostly implemented in 2006-2008. Secondly, the additionality of EU Structural Funding, supplementing rather than replacing national funding, was foreseen in the R&D&I strategy, but has not always been ensured. Instead, some Structural Funds measures have replaced planned national measures.

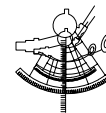
Opportunities

When the Structural Funds were first implemented, there were problems to ensure that all money was absorbed due to a lack of projects. By the end of the current financing period, this situation has been reversed and there are now too many project proposals for the available funds. The much-discussed need for venture capital will be addressed by the Estonian Development Fund. On 15 June 2006, the government presented a draft bill for the establishment of the Fund. Its main objective will be to improve the performance of Estonia's start-up enterprises based on innovative ideas by providing capital and management know-how.

The financing of R&D infrastructure has also improved.

Threats

Threats in the Estonian innovation environment are primarily related to cooperation issues in the implementation of innovation policy and to insufficient cooperation between the research and business communities. Despite various measures promoting the cooperation between the enterprise sector and the universities, innovation studies such as CIS4 show that the results of cooperation often remain modest. The same can be said about innovation related cooperation between ministries, where the situation has not changed significantly since the previous TrendChart study was published.



2 Developments in Innovation policy

2.1 Overview of trends in performance and policy

2.1.1 Recent trends in innovation performance and competitiveness

Estonia's economy has grown relatively rapidly for several years. While the average real GDP growth rate in the EU25 in the years 2000-2005 was to 2%, the corresponding Estonian rate was 7.7%⁹. The macro-economic pattern of development has not changed a lot. As Estonia has had an open (foreign) economic policy since it gained independence from the former Soviet Union and had already harmonised national legislation with EU laws well before 2004, the official accession to the EU did not bring any big changes.

The Estonian development model is marked by a balanced budget, low government debt (private sector debt indicators are a bit higher), high economic growth, moderate inflation (consumer prices rose by 3.6% per year on average from 2000 to 2005), and a strong dependency on foreign investments and exports. Unemployment has decreased in the recent years and was slightly below the EU25 average in 2005 (7.9% against 8.7%). The increase of employment is related to favourable developments in commerce, tourism, construction and manufacturing industries dependent on construction (timber industry, rubber and plastic products industry, metallurgy and non-metallic minerals industry)¹⁰. However, labour productivity per person employed is only just over half the EU25 level, in spite of an increasing tendency.

For a long time, the potentially strongest weakness of the model has been the rather high current account deficit (10.5% of GDP in 2005). According to the estimates of the Ministry of Finance, the current accounts deficit is expected to decline in 2006 due to a slower growth of the import rate caused by the decline of domestic demand.

The growth of exports will also slow down due to the base effect. In 2005, exports rose rapidly due to the positive impact of EU accession¹¹. The greatest contribution to export growth in 2005 was made by the equipment and machines sector, which benefited from the establishment of several new electronics firms and an increased production volume of Elcoteq¹². Exports of mineral fuels, metals, timber and furniture also expanded rapidly, as did the transport sector. The growth in exports of services was held back by a slower increase in the tourism and transport sectors.¹³

According to the Ministry of Finance, the growth of the manufacturing industry will outpace average economic growth in 2006–2007. The growth will be based on the expansion of production capacities, an improvement of the product competitiveness and better enterprise efficiency. An increase can mainly be expected in the sectors of timber processing, the

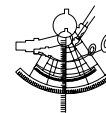
⁹ Source: Eurostat

¹⁰ Rahandusministeerium (2006) 2006. aasta kevadine majandusprognoos.

¹¹ <http://www.fin.ee/?id=14898>

¹² Elcoteq is a Finnish-based electronics manufacturing company with a subsidiary in Tallinn. The largest customers of the Elcoteq corporation are enterprises belonging to the Nokia and Ericsson groups.

¹³ Rahandusministeerium (2006) 2006. aasta kevadine majandusprognoos.



production of machines, equipment, electric implements and devices, building material industry and metal products. Continued growth can also be expected in business services, where added value will grow faster than the average economic growth. The growth of the transport, storage and communications sector is supported by the increase of production capacity and the improvement of the quality of services. The continuing growth in the hotel and restaurant business is supported by the development of travel services and the continued growth of domestic and foreign demand. It is expected that the real estate market will slow down during the period covered by the Ministry's estimate. This will have a knock-on effect on the construction, real estate development and financial brokerage sectors, resulting in a reduction of the share of the real estate sector in the development of value added¹⁴.

Exhibit 12: Comparable indicators of economic performance

Indicator	National performance		EU 25 average	
	2000	2005	2000	2005
GDP per capita in PPS (EU25=100)	41.1	55.8f	100	100
Real GDP growth rate (% change previous year)	7.9	9.8	3.9	1.6
Labour productivity per person employed (EU25=100)	42.4	54.4f	100	100f
Total employment growth (annual % change)	-1.5	0*	1.5	0.6*
Inflation rate (average annual)	3.9	4.1	2.4	2.2
Unit labour costs (growth rate)	-5.7	-2.1	-0.1	-0.3
Public balance (net borrowing/lending) as a % of GDP	-0.6	1.7*	0.8	-2.6*
General government debt as a % of GDP	4.7	5.5*	62.9	63.4*
Unemployment rate (as % of active population)	12.8	7.9	8.6	8.7
Foreign direct investment intensity	4.1	5.8*	2.4	0.9*
Business investment as a percentage of GDP	21.7	25.2*	18.3	17.1

Source: Eurostat - Structural Indicators and Long-term Indicators <http://epp.eurostat.cec.eu.int>

* latest available year (2004); (:) not available; (f) forecast, (e) estimated value

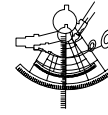
Estonia intends to work towards acceding to the EU's Economic and Monetary Union in the first round of the Member States by continuing its previous economic policy.

The current economic policy debate does not seem to worry about developments in the near future. However, there is some concern about Estonia's ability to maintain its competitiveness¹⁵ and productivity growth in the long term, especially against the background of rising expenses. The supply of a trained labour force is the most critical aspect in this context (in some areas of the service and construction sectors the outflow of the workforce to the higher wage EU countries has been noticeable). The quality of vocational education and innovation also play an important role. The steady emigration of workers results in higher wages. It is not certain whether this will have a negative impact on the competitiveness of the Estonian economy.

In 13th place out of 25 EU Member States, Estonia is in a mid-table position in the EIS 2005. The composite indicators rank Estonia among the group of poorly performing laggard countries, which also includes Greece, Latvia, Poland and Portugal. The apparent contradiction between Estonia's good score in the Summary Innovation Index (SII) and its

¹⁴ http://www.fin.ee/failid/RM_2006_kevadine_majandusprognoos__21.03.2006.doc

¹⁵ Compared to 2004, Estonia's position in competitiveness rankings has remained more or less the same. It has slightly improved rather than deteriorated. Estonia is in 26th place in the World Competitiveness Scoreboard (28th in 2004 and 22nd in 2003), and in 20th position in the Global Competitiveness Report, (unchanged since 2004, 22nd in 2003).



classification as a country lagging behind can be explained by Estonia's highly skewed strengths, with a very good performance in innovation & entrepreneurship and a good performance in innovation drivers, but a poor performance in IPR and knowledge creation. The good performance in innovation drivers is partly due to high levels of tertiary education, but Estonia is lagging behind in both aspects of the education spectrum that are essential for future improvements of Estonia's innovative capabilities: the supply of new S&E graduates and life-long learning (vital to improve and develop existing skills). Estonia's good innovation and entrepreneurship performance is reflected spans in four of the five available indicators, although innovation expenditures are below average.

According to Ministry of Economic Affairs and Communication, the European Commission's report is not entirely adequate due to a statistical anomaly. For the indicator "share of high-technology products and services export of overall export" the European Commission has analysed the 2000-2004 time period. The share of Estonia's export of high-technology products and services in 2000 amounted to 25% of its overall exports (the corresponding figure in 1999 was 10%). This was primarily caused by changes in the production strategy of Elcoteq, a large Finnish company whose output formally amounts for a large proportion of Estonia's high technology exports. In reality, however, Elcoteq's activities in Estonia are better classified as cheap subcontracted production (although for a high technology sector), the production volume of which has decreased over time.

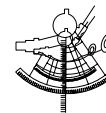
In 2000, Elcoteq sharply increased the import of production to Estonia for processing and export after processing. In 2001-2002 Elcoteq reduced the production volume in its Estonian subsidiary again and the export of high-technology products and services in 2004 amounted to approximately 10% of overall exports, thus reaching the same level as in 1999. Since the European Commission used the 2000-2004 period data for its analysis of growth rates, it appeared that the output of high-technology goods and services in Estonia had declined by a factor of approximately 2.5. This result apparently had a strong, but negative impact on the average growth rates of the relevant indicators¹⁶.

The study "Evaluation of the design and implementation of Estonian RTDI policy: implications for policy planning" notes that business expenditure on R&D as a percentage of GDP is only 22% of the EU25 average (2004). This is particularly true as the already very low figure for business R&D expenditure hides significant sectoral differences (with R&D expenditure in firms concentrated in a few sectors such as oil/chemicals, financial services, etc.). Furthermore, a high share of the existing BERD is funded from abroad (notably in the trade & financial services sector). This situation clearly reflects Estonia's economic structure, which is dominated by small and medium-sized enterprises in 'low technology' sectors and which largely lacks a hi-tech business sector capable of undertaking R&D activity¹⁷.

The indicators of the Community Innovation Survey (CIS4), which was carried out in 2002-2004, show that Estonia improved its performance in nearly all areas compared to CIS3 (1998-2000). Based on CIS4, it can be argued that Estonia reached the level of the EU four years ago. At the same time, Estonia's performance is better than that of less-developed EU Member States (Portugal, Greece) in CIS3 four years ago. The CIS4 results suggest that nearly half (49%) of all Estonian enterprises were innovative (i.e. have brought new or significantly improved products (goods/services) to the market or have introduced new or

¹⁶ Eesti 13. koht innovatsioonidetabelis on küllalt hea tulemus; <http://www.mkm.ee/index.php?id=10841>

¹⁷ p. 39



significantly improved (compared to earlier ones) processes (production or supply methods, auxiliary activities to production)) in the years 2002–2004. Compared to CIS3 (1998-2000), innovativeness has increased most among in services enterprises (CIS4: 51% *versus* CIS3: 32%), but less in industry (CIS4: 48% *versus* CIS3: 39%). A negative aspect revealed in CIS 4 as well as in the previous survey was the low intensity of cooperation between Estonian enterprises and universities or research and development institutions. Another weakness is that innovative activities are largely limited to the purchase of machinery and equipment and the accompanying training activities.

Exhibit 13: Main innovation policy challenges

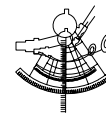
Description of challenge	Relevant EIS indicators and trends
1 Renewal of the knowledge basis, including improvement of research quality	<p>Participation in life-long learning is medium-low (68% of the EU average), but also shows a growth trend.</p> <p>S&E graduates indicator remains medium-low (72% of EU average), but shows a growth trend.</p> <p>Public R&D expenditures is EU 77% of the EU average, and business R&D expenditures in Estonia amounts to 22% of the EU average. However, both indicators show a limited growth tendency.</p>
2 Increase the competitiveness of traditional industries through technology change	<p>Innovation expenditures are below the EU25 average (79%) and according to the Community Innovation Survey (CIS4) there are no clear signs of improvement.</p>
3 Increase the creation of new high tech firms	<p>Med-hi/high-tech manufacturing employment is 51% of EU average, and employment in high-tech services is 73% of EU average. The EIS trends are negative.</p>

The level of investments in research and development activities in Estonia is relatively low compared to the other EU countries. Business investments in R&D are particularly modest.

Due to the modest volume and structure of investments, the R&D infrastructure is in bad state and more than 80% of the existing equipment needs renovation (much of the infrastructure still dates from the Soviet period). This infrastructure does not permit top-level research and studies and makes Estonia unattractive for foreign firms and researchers, thus limiting the country's participation in international cooperation projects. The outdated and unattractive infrastructure also limits the volume of R&D contracts and cooperation with foreign firms.

At the same time, the gradual increase of private sector R&D can be considered as a positive sign. Although the structure of public and business R&D expenditures has not yet reached the highest levels, new measures applied in 2004-2005 and the launch of government programmes indicate that the current modest growth tendency is likely to continue.

Estonia has internationally competitive research groups in several fields of science (especially in biomedicine, materials sciences, chemistry, environmental sciences) and is also successful in international R&D programmes. However, the practical application of ideas is weak. On the one hand this can be explained by the limited volume of knowledge and skills of Estonian businesses and the consequently low demand for research results. Furthermore, there is a limited awareness among Estonian businesses of the role of R&D as an engine of long-term economic development and increasing productivity. On the other hand the low use of R&D results can be explained with the limited ability of the universities to support businesses in the



transfer of new knowledge and technologies (inside and outside Estonia) and the equally limited capacity of R&D institutions to commercialise intellectual property.

The growth of business R&D investments is further limited by insufficient human resources. Although the number of researchers and engineers (full time equivalent) per 1,000 residents has increased slightly, it is still significantly below the level in other EU/OECD countries. In 2004, Estonia employed a total of 5.0 researchers and engineers per 1,000 workers. The OECD average is 6.5; Finland's ratio is 15.8; the EU average is 5.8.

The number of high level specialist graduates does not ensure the sustainability of university education and research, nor can it meet existing economic and societal needs. At the same time, the more active trained specialists are likely to leave abroad as the slow growth of R&D investments and Estonia's structural economic problems stand in the way of creating enough high quality jobs. This situation is exacerbated by the fact that the social perception lecturers, scientists, engineers and innovators does not recognise their true value.

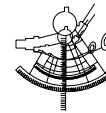
Despite limited investments and an outdated infrastructure, Estonian researchers and engineers participate in international cooperation initiatives with some success. Seventeen percent of all R&D investments in Estonia came from foreign sources in 2004, and more than half the publications of Estonian researchers have been published in cooperation with foreign scientists. However, due to the limited volume of R&D investments, Estonia cannot fully exploit the new opportunities arising from international cooperation and improved opportunities for relations and learning. This is also expressed, for example, in the insufficient academic mobility among post-graduates, lecturers and researchers¹⁸.

According to the Community Innovation Survey (CIS4: 2002-2004), the expenditures on four surveyed types of innovation expenditures of **innovative enterprises** amounted to 2.4% of their total net turnover. The corresponding figure in manufacturing industry was 4.4%, but only 1.2% in the services sector. Previous survey (CIS3: 1998-2000) measured seven types of expenditures, but it is possible to calculate the comparable indicator for Estonia or the percentage of the 2000 turnover of the innovative enterprises' innovation expenditures as per four types of expenditures (excluding expenditures on training, marketing and preparatory activities). It appears that the corresponding figure in 2000 was 2.1%. Compared to the 2.4% of 2004 we could argue that the volume of innovation expenditures has remained more or less unchanged.

When studying the innovation expenditures intensity of **all enterprises** (share of innovation expenses of the turnover of all enterprises involved in the study), it should be pointed out in this case as well that the volumes have not significantly increased: the corresponding percentage in 2004 was 1.6 and in 2000 1.2%¹⁹.

¹⁸ Riigi eelarvestrateegia 2007-2010 osa: Riiklik struktuurivahendite kasutamise strateegia 2007-2013. Eelnõu; http://www.ut.ee/orb.aw/class=file/action=preview/id=149844/Riiklik_struktuurivahendiste_strateegia.doc#_Toc129512868

¹⁹ The intensity of all enterprises' innovation expenditures as to all seven types was, according to CIS3, 1.43%. The 2000 innovation expenditures intensity used here have been made comparable to the 2004 indicator, or in other words, in case of all enterprises, the ratio of four types of innovation expenditures to turnover has been calculated.



Out of total output of the Estonian industry, approximately six percent is high-technology. The largest share out of individual sectors of industry in Estonia belongs to food industry, which is considered a low-technology sector. Compared to other EU countries, the share of high-technology production in Estonia is significantly lower. Compared to the Nordic countries in turn the share of the high-technology sectors is 3–5 times lower.

2.1.2 Objectives and targets of innovation policy

The broad guidelines of Estonian innovation policy are formulated in the strategy paper ‘Knowledge-based Estonia’. The term ‘**R&D and innovation policy**’ was used in this document. The strategy covers the period 2002-2006. The revision and development of the new strategy for 2007-2013 started in 2005²⁰.

The **strategic goals** of the Estonian R&D strategy for 2002-2006 are to ensure sustainable economic growth, improve the standard of living and social welfare by:

- Renewing the knowledge basis, including a higher research quality;
- Increasing the competitiveness of firms, including the stimulation of technology change in traditional industries and the creation of new high tech firms.²¹

Both goals require the availability of qualified human capital.

The strategy outlines key technology areas as no small country has the resources to be successful in all R&D areas. For Estonia **the key sectors** are: (a) User-friendly information society technologies; (b) Biomedicine; (c) Material technologies. A mapping exercise had been started in all three priority area to take stock of the current situation. The new strategy for the next funding period maintains these strategic key technologies.

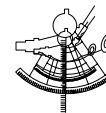
The strategy foresees an increase in R&D investments of 1.5 percent of GDP by 2006 (which is similar to the EU average). Public investments with a focus on market-oriented R&D and innovation systems are expected to encourage private capital participation in the long term.

Since 2000, government policy has been centred on innovation support in high-tech start-ups (university spin-offs) and R&D capable businesses (see EE_17 and EE_21). In 2004, in order to foster cooperation between enterprise and research sector, the Technology Competence Centres Programme (EE_20) was launched. The Innoawareness Programme, which aims to increase the awareness of innovation as an important factor of economical growth and to reinforce knowledge and know-how on innovation methods and tools, was launched in early 2005 (EE_18). The innovation audit programme (EE_28) was launched in May 2005. Another more important change of focus took place at the beginning of the 2005 when the R&D

²⁰ Several experts believe that the new R&D&I strategy has too narrowly a focus on R&D, since the development of the strategy was coordinated by the Ministry of Education and Research. This is not necessarily an entirely positive development.

²¹ The new strategy for 2007-2013 sets three main goals:

- competitive quality of research and development activities and increase of volume;
- innovative entrepreneurship in global economy creating new value;
- a society looking for long-term development that is favorable to innovation.



infrastructure development programme (EE_25) was launched. The focus of innovation policy implementation has therefore broadened.

The establishment of a state venture capital fund (Development Fund) has been discussed for the last three to four years. It has now reached a fairly advanced state as a corresponding draft bill has been passed by the government and is now awaiting parliamentary approval.

Exhibit 14: National innovation policy objectives

Objective	Quantitative target (if set)	To be achieved by (year)
1 Renewal of the knowledge basis, including improvement of research quality	R&D total expenditures 1.5% of GDP (this goal is unlikely to be achieved; the corresponding figure for 2004 was 0,91% of GDP)	2006
2 Increase the competitiveness traditional industries through technology change	-	
3 Increase the creation of new high tech firms	-	

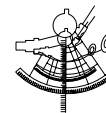
2.1.2.1 Regional innovation policies

The main developments at regional level have taken place in Tallinn and Tartu.

The EU-financed consultation centre for small and medium-sized enterprises (SME) has opened in Tartu in early 2006. Tartu Science Park and Tartu University take part in the project. The EU finances the development stage of the project until the end of 2007. The aim is to establish a network of consultation and service centres for SMEs in nine Baltic Sea countries.

In March 2006, the Tartu Science Park signed a framework cooperation agreement with the Tartu Biotechnology Park for the development of technology-intensive enterprises in South Estonia. The agreement defines mutual interests and directions of cooperation and sets the plans for common development projects, training and the sharing of competence. This is the Science Park’s first agreement with an Estonian organisation, although there are existing cooperation agreements with Finnish, Belgian and Chinese organisations. The cooperation agreement between the Tartu Science Park and the Tartu Biotechnology Park is the first step in structuring activities of institutions supporting entrepreneurship in Tartu and the South-Estonia region and reflects a bilateral commitment to serve as flexible and competent partners to enterprises.

The Tallinn Technology Park ‘Tehnopol’ is also experiencing positive developments. In early 2006, Tehnopol concluded Memorandums of Understanding with the Enterprise Network of Silicon Valley (TEN) and the Maryland Business Incubation Association (MBIA). The agreement with these US bodies is meant to encourage innovative firms to enter each other’s markets by providing advice, guidance, introductions, and other assistance.



2.1.3 Key developments in innovation policy measures

The TrendChart policy monitoring exercise tracks developments in innovation policy not only at the level of policy definition and the setting of overall objectives as discussed in the previous sections, but also through the compilation of information in an analytical structure on specific innovation policy measures (IPM). At the present time, the TrendChart innovation policy database contains over 1100 IPM fiches detailing measures implemented in 32 European countries (all countries covered by the TrendChart except Liechtenstein). An innovation policy measure is defined broadly to include any public policy initiative that directly or indirectly impacts on the innovation process in the enterprise sector. In practice, the TrendChart IPM fiches tend to fall into one of the follow categories of measures:

- Intervention in the form of financial support State Aid to enterprises through programmes of grants, loans, etc. (e.g. grants for product development);
- Funding of innovation programmes or projects aimed at groups of innovation stakeholders with the objective of improving co-operation and collaboration and thereby the functioning of the innovation system (e.g. cluster);
- Measures taken to improve, disseminate or develop knowledge about specific aspects of national innovation systems (e.g. sectoral or regional strategies, foresight exercises, the innovative performance of firms through spread of best practice, etc.);
- Action to improve the functioning of institutions (legal acts, regulations) which affect innovation processes and performance (e.g. intellectual property rights, financial markets, creation of firms);
- Funding of innovation infrastructure and intermediaries such as innovation centres, incubators, etc.

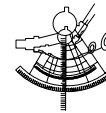
This section of the report describes in more detail the current policy mix adopted in Estonia in terms of the political priorities and human and financial resources allocated to each of these broad types of measures. Further details on the specific innovation policy measures can be found in annex 2 and via the TrendChart website.

Estonian policy measures for innovation can be divided into three categories:

- a) support for innovation activities;
- b) support for innovation awareness and capability raising;
- c) support for infrastructure development.

The ongoing programmes mainly deal with the first type of measures. These are the R&D financing programme (EE_21), the SPINNO programme for starting high-tech companies and enhancing entrepreneurial mindset in universities (EE_17) and the (Technology) Competence Centres programme (EE_20) to build a bridge between enterprise and research sector for long-term cooperation. The objective of the Business Incubation Programme (EE_27) is to support the establishment and provision of incubation services in Estonian business incubators.

The strongest efforts made in 2005 concentrated on launching programmes to raise the awareness of innovation and to develop the R&D infrastructure.



In early 2005, the Innoawareness Programme 'Good Estonian Idea' (EE_18) was launched. The objective of the programme is to increase the knowledge of Estonians about innovation as a key factor in welfare and competitiveness, and to raise their capabilities and skills to successfully implement innovation projects in the research and enterprise sector.

The programme has three main target groups:

- entrepreneurs, investors, specialists and engineers
- students and teachers
- policy makers, opinion leaders, media

The programme supports following activities:

- organising seminars, trainings, conferences and exhibitions
- preparation and dissemination of information materials
- producing television and radio programmes
- initiating and operating cooperation networks

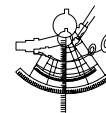
In 2005 there were two calls for applications: one for projects to raise the innovation and entrepreneurship awareness of schoolteachers and students, and another one for projects to raise the awareness of policy makers and entrepreneurs. A call addressing R&D and innovation specialists and engineers intending to develop their innovation management skills was launched in 2006. The call also intended to raise the awareness of entrepreneurs, investors and managers of innovation as a cornerstone of competitiveness skills development. The projects will last until mid 2008.

In 2005, the projects accounted for a total financing value of EUR 575 000. In 2006, this rose to EUR 831 000.

Enterprise Estonia will continue to implement the Innovation Audit programme (EE_28). The aim of the programme is to map the innovation potential of 100 Estonian enterprises. Based on the results, the enterprises can further outline their innovation activities to improve their competitiveness.

The pilot phase of the Innovation Audit was carried out in 2005, to map the innovation potential of 58 Estonian enterprises. 78% of the enterprises stated in their feedback that, as a result of the Innovation Audit, they intend to carry out some measures recommended in the action plan within the next six months. The budget of the programme in 2006 is EUR 215 063.

At the end of 2004, the Business Incubation Programme (EE_27) was launched by Enterprise Estonia. The objective of the programme is to support the elaboration and provision of incubation services in Estonian business incubators. Eligible activities include implementing feasibility studies for foundation of an incubator (for up to EUR 6 390 per applicant) and the establishment and provision of incubation services (for up to EUR 191 700 per applicant). In 2005 Estonian innovation policy primarily focused on the launch of the infrastructure development programme for R&D institutions. The aims of the programme (EE_25) are:



- 1) to stimulate the strategic planning of R&D activities, including the definition of priorities and making financially sustainable investment decisions in research and development institutions
- 2) to improve the efficiency of the R&D system as a whole by better linking higher education, R&D activities and innovation, concentrating resources and promoting of cooperation within R&D institutions and between them, between the various disciplines, the R&D institutions and entrepreneurs and at international level;
- 3) to increase the number of people involved in R&D activities and to ensure a sustainable availability of enough, suitably trained human resources by increasing the number and quality of involved researchers and engineers.

Research institutions can apply for financing for the construction of buildings, investments into laboratory equipment and apparatus, software, databases, electronic networks and other technical support structures. Improved and developed infrastructure should address the R&D needs of enterprises needs, in addition to a better quality research. The board of Enterprise Estonia decided on 25 April 2005 to finance five applications worth a total of EUR 14.6 million.

The general aim of the Scientific Centres of Excellence development programme (EE_26) is to increase R&D activities and innovation capability in Estonia by supporting the development of a small number of top research centres in priority areas for economic growth. Application were invited in September 2005 and all ten top centres received financing totalling EUR 6.4 million. No new application rounds will be announced until 2007. The interim assessment of the Scientific Centres of Excellence development programme is planned for this year.

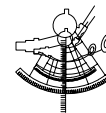
The R&D financing programme (EE_21) offers co-financing for business projects with a high innovation risk, so as to encourage entrepreneurs to undertake innovative projects. In 2005, the total amount of co-financing that was provided was EUR 8.1 million. For additional financing in 2006, an extra EUR 4 million have been allocated to Enterprise Estonia.

The general aim of the (Technology) Competence Centres Programme is to boost the competitiveness of enterprises by improving the strategic and long-term cooperation between enterprises and R&D institutions. The programme provides support to basic and applied research and product development within research plans meeting the goals of the programme. The programme has a budget of EUR 6.4 million. The call was closed in September 2005.

The Spinno Programme (EE_17) had two calls for application – one in June 2004 (preliminary applications) and a second one in September 2004 (full applications). The selected projects will be implemented until mid-2007. The programme budget for 2004-2007 is EUR 4.1 million. The evaluation of the effectiveness and efficiency of the Spinno programme will be carried out in the second half of 2006.

Exhibit 15: New Innovation Policy Measures over last 12 months

IPM N°	Title	Innovation policy framework category	Organisation responsible
EE_28	Innovation Audit Programme	1.3; 2.4; 3.3; 3.6; V1; V2; V4	Enterprise Estonia



2.2 How well does policy meet the innovation challenges?

Assessing the effectiveness of national innovation policy with respect to innovation performance is anything but a straightforward exercise. There are at least two main problems:

- First, there is an information problem. To answer the question requires information on intended and unintended changes in innovation behaviour of economic actors as a result of certain innovation policy measures and the (dynamic) impact of changed behaviour on the performance of both the direct target group of a measure and other economic actors (through positive and negative externalities, forward and backward linkages, macroeconomic relations, consequences upon market structures and competition etc.). Evaluation methodology has developed different approaches to tackle these challenges, ranging from qualitative ones (like peer review and systemic analyses) to quantitative modelling. Existing methodologies and data availability allow meaningful evaluations of individual schemes, especially with regard to the intended changes in behaviour and performance of the target group. Such evaluations have been carried out for a number of measures, and their results may be used to assess the effectiveness of innovation policy on the level of individual measures.
- Secondly, there is the problem of attribution. National innovation policy is only one area of policy making that influences innovation performance. A number of innovation activities are affected by European Trend Chart on Innovation policy measures designed on an international or multinational level, such as EU Framework programmes, EU regulations, agreements on trade and intellectual property in the framework of WTO, etc.). As innovation policies on the national and international level are interconnected, a purely national view on the link between innovation policy and innovation performance is therefore incomplete.

Given these limitations, this section of the TrendChart report is focused on exploring two key issues:

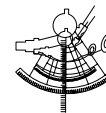
- 1) The relevance and effectiveness of the policy response to the challenge identified in this report. Here the objective is to appraise the extent to which the current policy mix is relevant given the challenge identified. It is an appraisal of pertinence or coherence in terms of evaluation-type criteria.
- 2) In addition, for each of these challenges, available evidence on the influence of policy measures on innovation performance is presented and discussed.

This is done for the challenges identified through the TrendChart reporting exercise and also with respect to the innovation relevant actions identified in the National Lisbon Reform Programme.

2.2.1 Policy responses to identified challenges

The **strategic goals** of the Estonian R&D strategy ‘Knowledge-based Estonia’ (2002-2006) are to ensure sustainable economic growth, improve the standard of living and social welfare by:

- Renewing the knowledge basis, including a higher research quality;



- Increasing the competitiveness of firms, including the stimulation of technology change in traditional industries and the creation of new high tech firms

These challenges are addressed by several innovation policy measures (see exhibit 16).

Exhibit 16: Innovation challenges and policy responses

Key challenge	Measures responding to the challenge
Renewing the knowledge basis, including a higher research quality	R&D infrastructure development programme Support for renewal of physical infrastructure of Centres of Excellence Measures of the research policy conducted by Ministry of Education and Research (evaluation, competitive financing, doctoral schools, centres of scientific excellence etc)
2 Increase the competitiveness traditional industries through technology change	Innoawareness programme Innovation Audit Programme Incubation Programme
3 Increase the creation of new high tech firms	Spinno Programme (Technology) Competence Centres Programme R&D financing programme Creation and development of technology parks and incubators (Incubation Programme)

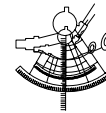
Challenge 1: Renewal of the knowledge basis, including improvement of research quality

Estonia's knowledge base is inconsistent. It is strong in some areas (e.g. biotechnology), but weak or in some other way not up to the requirements of the economy in a number of other areas, some of which are vital for economic development.

Estonia's R&D system has undergone several changes in 1990-2005. Research groups have mainly developed within universities. The financing of public sector R&D activities has been organised via target, grant and basic financing and infrastructure maintenance expenses financing as stipulated in the research and development activities organisation act. All financing decisions are made on the basis of quality criteria. Target and grant financing is competitive, based on peer reviews. Infrastructure maintenance expenses and basic financing depend on the weighted volumes of quality-based research. This financing system has resulted in a clear shift towards high quality orientation, which is inevitable to withstand with international competition.

Compared to other EU member countries, however, there are serious problems, which the present organisation of R&D&I in Estonia has failed to solve.

First, achieving good results requires a sufficient number of motivated researchers and high calibre specialists. In some research areas, (e.g. energy, construction), the continuity of research is not ensured as the average age of scientists is very high and it is not certain that there will be a sufficient supply of new researchers. An outdated infrastructure does not motivate a sufficient number of talented youths to choose research career and to stay in or come to Estonia. Therefore the number of researchers and engineers in Estonia as share of the labour force (0.5% in 2004) is slightly lower than the EU average (0.53% in 2003) and several times lower than in the Nordic countries (1.62% in 2003 in Finland, 1.02% in Sweden). The



share of female researchers is 43.1%, which is one of the highest proportion in the EU (only Latvia, Lithuania and Portugal have a higher share of female researchers). The number of doctor-level university graduates is very low, especially in technical and natural sciences. In order to build an internationally competitive research sector, Estonia needs to create attractive working conditions for researchers and engineers, while at the same time increasing the number of PhD degrees in natural and engineering sciences.

Secondly, carrying out modern research and participating in international cooperation requires a competitive R&D infrastructure. Estonia has made almost no investments in the modernisation of its research infrastructure and the purchase of new infrastructure in the past 15 years. Consequently, most of the existing infrastructure is outdated. However, innovation policy has recognised this challenge and addresses it by means of a specific programme for the development of the infrastructure of R&D institutions. The programme's budget has recently been increased.

The pilot stage of the R&D infrastructure development programme will be carried out in 2006-2008, but it will only be able to meet a small proportion of the investment needs. In order to ensure internationally competitive research, the R&D infrastructure must be modernised or created at a much larger scale.

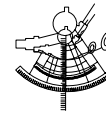
Research quality can also be improved by the Centres of Excellence Development Programme. The programme's general objective is to increase the capability for research, development and innovation activities in Estonia, to improve the competitiveness of Estonia in European research and innovation, and to create and maintain strong competences in research and development activities by developing a small number of centres of excellence in scientific key areas that can stimulate economic growth.

Challenge 2: Increase the competitiveness traditional industries through technology change

The main problem Estonia is facing is that the international competitiveness of the traditional branches of industry is declining due to rising input prices. Many branches currently only survive because of the generally vigorous economic growth and an orientation towards the scale economy (increases in volume leading to lower units costs). However, this situation is not guaranteed to continue. Some industries (especially textile production) are already in a critical situation.

Estonia's economy has made very rapid progress in recent years, supported by domestic demand, foreign direct investments and increasing export. In spite of this, Estonia had the third weakest productivity and productivity per employee rates in the EU in 2004 (50.6% of the EU average). In the current state of economic development the enterprises have been able to make a profit without particular investments in knowledge and skills. As a result, the competitive strategy of a large number of enterprises has been based on the cost advantage and/or an increase of domestic demand. The added value per employee and long-term competitiveness are only high in a few sectors, such as telecommunications and financial mediation.

Value added per person in the manufacturing industry is lower than the national average. Due to the rapidly increasing cost of labour, the competitiveness of several industry sectors



(textile, sewing and furniture industry) is under pressure, especially as this development is not mirrored by a corresponding increase in productivity. Consequently, profitability drops and the enterprises soon face the dilemma of either transferring their production to countries with lower labour cost or having to reorient to the supply of products and services towards significantly higher added value.

However, the development of products and services with a higher added value requires investments in equipment and qualifications of the work force. Development projects are also needed. Estonian businesses have invested more in R&D every year, but the total amount remains low, at 0.36% of GDP in 2004 (compared to an EU average of 1.22%).

The indicators characterising the development and innovation activities of Estonian businesses show that while the enterprises do concentrate on the implementation of new technologies, an expansion of their production volume and a better quality, they fail to expand their range of products to a sufficient extent. Especially, and more importantly, they fail to develop new higher value added products or more into higher value segments. Finding new markets is also a problem. Therefore, significantly higher investments in the development of new products and services are needed, thus creating new and innovative (sub)sectors of the economy that are vital for Estonia's long-term export capability and its economic growth.

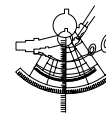
In view of Estonia's declining cost advantage, there is a serious challenge in continuing to attract direct foreign investments, which have played a vital role in productivity growth, economic restructuring and technological modernisation (Estonia has had the highest per capita volume of FDI of all new Member States). The share of reinvested profit has increased since 2001. The volume of new greenfield investments has not increased significantly. Over half the profit returns from foreign investments in 2003-2004 were made in two sectors (financial mediation and real estate). The manufacturing industry, in contrast, only accounted for 13.1% of all foreign investments in the first half-year of 2005.

The innovation awareness of entrepreneurs has been improved by the Innoawareness programme, the main aim of which is to raise the awareness of innovation and its role for competitiveness, economic growth and social welfare. The economic indicators of Estonian enterprises are improved by the Innovation Audit Programme, which aims at supporting training for entrepreneurs and employees, so as to retain and increase their competitiveness in the labour market, to develop entrepreneurship, create new jobs and to improve capabilities in the areas of research, development and technological development.

It is important to point out that several traditional industry enterprises have received support from the R&D financing programme. Furthermore, the incubation centres are relatively active and expand their range of activities. Two of the three incubation centres address the so-called "regular enterprises". It is hoped that some entrepreneurship policy measures will help address this challenge, for example by providing training and consulting and promoting a closer cooperation between entrepreneurship and innovation policies.

Challenge 3: Increase the creation of new high technology firms

The share of high-technology production in Estonia is significantly lower than in other EU countries. Approximately 6% of the output of the Estonian industry is high-tech. Estonia's high technology primarily consists of the production of communication equipment and, to a



smaller degree, the production of computers and scientific equipment. Due to the relatively high labour intensity and lower capital intensity, Estonia's high-technology production is characterised by relatively low added value compared to medium high technology. However, that the capitalisation of the high technology sector and above all the electronics industry is increasing, thus raising hopes for an increase in added value as well.

As in the first challenge, finding qualified labour has become a serious problem for high tech enterprises. The reason is the Estonian education system produces a relatively small number of graduates with a technical education. On the other hand, a relatively large number of Estonian researchers and engineers work in the academic sector, which explains why the largest share of Estonia's R&D and innovation policy measures has so far mainly addressed high technology areas or the commercialisation of research and knowledge of the research institutions²². There are several measures addressing the high technology industry in Estonia, but it seems that their overall effect has been lower than expected. On the positive side, the number of grant projects allocated to enterprises which has increased significantly, which is expected to benefit the respective sectors of economic activity in their entirety.

Exhibit 17: Innovation challenges, policy responses and impact

Challenge	Relevance of policy response	Evidence of impact
Renewal of the knowledge basis, including improvement of research quality	4	3
Increase the competitiveness traditional industries through technology change	2	-
Increase the creation of new high tech firms	4	2

Policy response ranking scored from 1 to 5 : 1 No specific measures addressing the challenge (possibly a debate but no evidence of any real policy development); 2 Policy development under way to respond to challenge (policy debate or design launched, e.g. announced in National Lisbon Reform Plan, etc.); 3 Specific measures existing for some time but insufficient to respond fully to challenge; 4 Existing measure plus one or more newly launched measures (during last 18 months) 5 A comprehensive set of measures which potentially responds fully to the challenge.

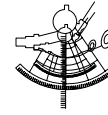
Evidence of impact scored from 1 to 5: 1 trend for indicators has worsened since measure(s) introduced, 2 no observable change in trend since measure(s) introduced, 3 too early to appraise (measures introduced in last 24 months), 4) trend for indicators has improved since measure(s) introduced, 5 Evaluation or study indicates measure(s) has clearly contributed to improving performance of country.

2.2.2 The Lisbon Agenda and innovation: an appraisal

The Estonian National Reform Programme highlights nine targets to boost economic growth and employment:

1. Ensuring a stable macroeconomic environment
2. Ensuring the long-term sustainability of fiscal policy
3. Directing fiscal policy to improve the economic growth and employment
4. Increasing the quality of research and development, as well as the capacity for innovation, growth, and long-term international competitiveness
5. Developing a business environment that is favourable to enterprise and entrepreneurship
6. Strengthening the synergies between environmental protection and growth
7. Improving the quality of the labour force

²² Kalvet, T., Kattel, R., Küünarpuu, K., Vaarik, D., Rahu, K., Ojamets, E. Innovation ja Eesti arvamusiidrid. Eeluurim riikliku innovationiteadlikkuse programmi sihtrühmade relevantsete vajaduste leidmiseks.



8. Increasing labour supply
9. Increasing the flexibility of the labour market and modernising the structure of the labour market (including the relations between the different actors)

The fourth aim listed above is to promote research and development and innovation. It has four specific measures:

1. Ensuring the sustainability and improving the quality of research and development

Research and development is the primary success factor in modern economies. Studies show that productivity increases of up to 40% are related to R&D investments, which positively influence other fields of economic activity. The people involved in R&D constitute the human resource on which a truly knowledge-based economy is based.

The current problems in Estonia's R&D are primarily related to the small size of the R&D system, especially in terms of people and infrastructure. Equally significantly its quality lags behind world standards in that it is not sufficiently able to react to priorities and that it has a weak link with Estonia's socio-economic objectives (including cooperation with business). Even though Estonia has been very successful in attracting foreign direct investment, most FDI has been made in sectors that are not especially knowledge- and skill-intensive, but have lured foreign investors with low labour costs. Given that Estonia is losing its cost-based competitive advantage, it is crucial to create an attractive environment for knowledge-intensive foreign direct investments. Therefore, it is highly important to raise the international competitiveness of the country's R&D sector and to create a critical mass of human resources in areas with a high growth potential.

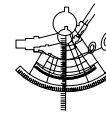
2. Developing the human capital that is necessary for R&D advancement and the long-term international competitiveness of the enterprise sector

In order to develop a knowledge-based society and economy, Estonia needs a significantly larger number of researchers and engineers, who ensure the sustainability and competitiveness of public sector R&D and of the higher education system, while at the same time constituting to the quality of human resources for innovative entrepreneurship. Research and engineering careers must therefore be made more attractive for young people and experienced specialists, and measures must be taken to halt the brain drain, to guarantee that enough specialists receive doctoral degrees at universities, and to improve the possibilities for embarking on successful research careers.

In order to increase the competitiveness of enterprises, the knowledge and skills of the workforce in SMEs (including managers) must be improved to meet the actual needs of the enterprise sector and the knowledge-based economy. In order to intensify in-company training to better use existing human capital, more high-quality training needs to be available.

3. Ensuring access to capital for start-up companies and companies with a great growth potential.

The opportunity for a company to obtain the equity and loan capital necessary for financing and implementing business plans depends to a great extent on the size and maturity of the company and the risk level of the business idea. In order to direct financial resources into



business activities that have greater risks, the opportunities for investors to put their money (and knowledge) into Estonian business must be developed. Furthermore, the interest of banks to offer micro-loans must be increased. At the same time, SME's need easier access to the necessary resources for financing growth. SME's will also gain easier access to Structural Funds means as support measures are re-focused and training seminars and information events are held.

4. Promoting higher productivity and supporting companies entering foreign markets and investments for the development of new technologies, products and services

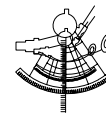
Despite the small size of the Estonian market, 3,500 companies are active in foreign markets, but 50% of all export income is generated by 30 leading companies. This is reflected in Estonia's negative trade balance. This is a particularly important problem for the growth of enterprises as breaking into foreign markets is still a great challenge for most businesses.

It is worrying that subcontracting is very common in the Estonian export market, which is not very knowledge- or skill-intensive. This translates into low productivity and low incomes for entrepreneurs. Therefore, diversified government support for innovative start-ups, but also for more mature companies that wish to move towards knowledge and skill-intensive activities, is extremely important as it would lead to an increase in the added value created by companies.

The current Estonian R&D strategy is primarily based on a science-driven approach and mainly focuses on the creation of knowledge and its transfer to the enterprise sector. This has caused a situation where innovation policy focuses on a narrow base of technologically competent firms and consequently only has a limited impact on the competitiveness of enterprises on a wider scale. This is why Estonia now intends to adopt a more market-driven approach in the latest strategy by directing innovation policy at a significantly wider range of enterprises and supporting a much wider range of innovative activities. While the emphasis in the current planning period was on the modernisation of the R&D infrastructure and on enterprises-university linkages, the period from 2007 onwards will put more emphasis the innovation capacities of existing enterprises. It will also support the creation and growth of new innovative companies.

Opinions of entrepreneurs regarding the availability of financial resources have improved in the last few years. While in May 2002, the availability of financial resources was the greatest obstacle to business activities for 34 % of enterprises, it was only the predominant problem for 21% of all enterprises in 2005. The problem is more acute among new and small enterprises, which do not have enough knowledge to involve capital and where there is no basis to assess the financial capacities of the enterprise. The problem is especially acute in new, rapidly growing enterprises.

In order to improve the access of new and small enterprises to capital, their knowledge and skills in financial management and capital involvement must be improved. In order to offer risk capital to innovative enterprises in the preliminary phase, the Estonian Development Fund will be created. In order to direct Estonian capital to Estonian business, thereby increasing their access to financial resources, a network of local investors will be developed and contacts between investors and the companies requiring investment will be established.

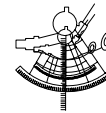


The cost of providing information and making small loan transactions is disproportionately high. Therefore, granting small and micro loans is not economically practical for banks. At the same time, 41% of enterprises needing loans estimate that their capital needs are lower than EEK 200,000 (the needs of 96% of the SME-s do not exceed EEK 5 million). Consequently, the information costs of financial institutions must be reduced to make small volume loan capital available. This could be accomplished by creating corresponding information applications. From the studies on the initiative of the Estonian population, it appears that entrepreneurs starting their business first apply to banks for financial resources and consultations. Therefore, the cooperation between the private and public sector should be made more effective in order to better apply existing support measures and financial aid mechanisms for start-up entrepreneurs.

Exhibit 18: Policy Measures relevant to Lisbon guidelines n°8 and 15.3

Lisbon guidelines n.8 - Innovation	Referenced in NRP	IPM Fiche Number*	Title of measure
1. Improvements in innovation support services, in particular for dissemination and technology transfer.	Y Y Y	EE 28 EE 27 EE 21	Innovation Audit Programme Enterprise Incubation Programme R&D financing programme
2. The creation and development of innovation poles, networks and incubators bringing together universities, research institutions and enterprises, including at regional and local level, helping to bridge the technology gap between regions.	Y Y Y	EE 26 EE 17 EE 25	Centres of Excellence Development Programme Spinno Programme Infrastructure development programme for R&D institutions
3. The encouragement of cross-border knowledge transfer, including from foreign direct investment.	Y	EE 20	(Technology) Competence Centres Programme
4. Encouraging public procurement of innovative products and services.	N		
5. Better access to domestic and international finance.	Y		
6. Efficient and affordable means to enforce intellectual property rights.	Y		
Lisbon guidelines n.15 - Entrepreneurship and SMEs	Referenced in NRP	IPM Fiche Number*	Title of measure
3. Strengthen the innovative potential of SMEs	Y		

Most of Estonia's policy measures are related to guideline 8.1. (Improvements in innovation support services in particular for dissemination and technology transfer) and guideline 8.2. (creation and development of innovation poles, networks and incubators bringing together universities, research institutions and enterprises, including at regional and local level, helping



to bridge the technology gap between regions). Numerous measures are intended to foster cooperation between research institutions and business. Nevertheless, innovation studies like the CIS4 reveal that results in the area of cooperation remain modest. Changes can be expected in the support programmes for clusters – the feasibility study of a new measure is currently in progress (to be completed by the end of 2006.).

“The encouragement of cross-border knowledge transfer including from foreign direct investment” (guideline 8.3.) is addressed by some programmes (such as the (Technology) Competence Centres Programme, which aims, among others, to improve the internationalisation of research and development activities). In general, Estonia has been highly successful in attracting foreign direct investments. The influx of direct investments grew sharply in 2005, reaching EUR 2.3 billion according to the Bank of Estonia.

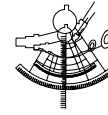
There are no measures linked to guideline 8.4. (Encouraging public procurement of innovative products and services). However, there has been an extensive debate whether there should be measures in this area. There is some support for the purchase of equipment and services by public procurement tenders, but regrettably, this does not cover the development activities component, which could help to give products or services a new quality. Furthermore, the public procurements act, for example, does not mention innovation or any other term with a similar meaning. Presumably, this is going to change with the re R&D and innovation strategy, which states that the decision criterion used in public procurement should be diversified and the participation of enterprises supplying innovative products and services in public procurements should be supported.

The Development Fund, which is currently being established, is a new measure for a “better access to domestic and international finance” (guideline 8.5.). It is expected to become an important factor in the creation of new enterprises and jobs.

Regarding guideline 8.6. (Efficient and affordable means to enforce intellectual property rights), the NRP states that there is a need to spread entrepreneurial knowledge and skills throughout the universities and other teaching and research institutions in order to develop entrepreneurial attitudes. The legal framework that is needed for the commercialisation of intellectual property created in the universities must also be created in order to increase the transfer of knowledge, skills and technologies to the business sector (2007).

The patenting situation is also problematic. Estonia lags behind other countries in terms of patenting activity. For example, 3.7 Estonian patent applications per one million residents in 2003 were submitted to the European Patent Office (11.6 applications for US patents were received in the same time). Estonia’s patenting activity is 9.6 times lower than that of the EU (on average) and 16.7 times lower than that of the USA. The comparison with Finland is even more unfavourable: the Finns are 46.4 times more active in applying for and defending patents in Europe and 40.4 times more active in the USA. The initial CIS4 results show that the situation has not improved in that respect.

With regard to guideline 15.3 (strengthening the innovative potential of SMEs), it is important to point out that most of Estonia’s enterprises are SMEs, therefore majority of the programmes target them.



3 What lessons can be drawn from policy implementation?

3.1 Lessons from the evaluation of innovation policy measures

In general, Estonia has made rather good progress in launching of different innovation support programmes. The first programmes primarily aimed to support high tech product development and university-business cooperation. In 2005, two new programmes for innovation awareness raising and R&D infrastructure development were launched. Considering the shortage of resources, the selected means can be assessed as more or less satisfactory at the moment.

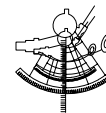
The Technopolis Consulting Group study (December 2005) remarked in this respect that, while a full review of procedures for implementing the programmes has not been carried out, a high bureaucratic burden for the beneficiaries was a recurrent theme in many programmes. The principal difficulties highlighted include:

- Micro-management of planning and implementation of projects by Enterprise Estonia staff with insufficient technical expertise;
- Use of experts with insufficient knowledge of the relevant technology or sector, or with a conflict of interest when selecting projects;
- General risk aversion culture which limits additionality of public funding (preference for funding existing successful companies, reluctance to accept a higher commercial or technological risk or less well-known firms);
- Design of application forms reflect the control requirements of Enterprise Estonia more than the needs or capabilities of the applicants;
- Non-transparent and subjective criteria for project selection (e.g. avoiding to grant funding to certain sectors such as software);
- Enterprise Estonia staff unaware about other support schemes within Enterprise Estonia;
- Heavy financial control and audit requirements (e.g. six-monthly audit of competence centres).

The main change is that the much-discussed need for venture capital looks as if it will now be addressed by concrete actions. The government submitted the Estonian Development Fund bill to parliament on 15 June 2006. The proposal defines the mission of the Fund, its tasks, basic principles of activities and bodies. The mission of the Development Fund is to improve Estonia's competitiveness and promote the transition to a knowledge-based economy, and to finance science and innovation and the generation of ideas in the society. The functions of the Development Fund can be divided in two parts –the generative or development monitoring function, which concentrate on promoting development activities and creating the necessary cohesion in the society, and secondly its role as national venture capital provider. In other words, the Development Fund makes investments in the start-up knowledge- and technology-intensive Estonian businesses and provides management support to qualifying enterprises.

The primary goal of the Development Fund is to improve the international competitiveness of Estonia's start-up enterprises based on innovative ideas by providing them with capital and managerial know-how. The Fund's investment capital is estimated at EEK 500 million.

The National Development Fund will also have a monitoring function, which includes studying key issues of Estonia's long-term economic development. Its findings are expected



to inform strategic decision-making at national level. The Fund has an estimated development monitoring budget of EE K100 million kroons (EUR 6.4 million) over five years.

The estimated economic impact of the Development Fund's activities will be the establishment of at least 50 successful enterprises within five years, employing at least 450 people. The indirect effect on employment would be even more favourable as enterprises co-financed by the Fund would primarily create expensive and high-quality jobs. It seems likely one should presume that after an initial investment of approximately EUR 12.8 million per year (together with the involved private sector capital), the supported entrepreneurs will be able to invest at least a further EUR 6.4 million per year. The investment volume of the Fund's operations in the first year (EUR 12.8 million) are not very high compared to Estonia's total private investment, but entrepreneurs would make further investments as their companies start to grow.

3.2 Review of good practice

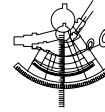
Examples of good practice in innovation policy tend to refer to schemes and solutions adapted in the innovation policy approach of other countries (Finland and others). Best practice examples are defined on the basis of a set of criteria including a) the existence of an institutional solution, and b) a proven record of efficiency over several years. Estonia's innovation practice is rather young and it cannot be assessed yet whether the implemented solutions and measures have delivered the desired results (stronger marketing of new technologies or products, more people working in the high-tech sector, etc.).

The cooperation between Enterprise Estonia and enterprises applying for grants has improved and, according to expert estimates, has resulted in the formulation of a large number of better quality projects.

Exhibit 19: Summary of good practice cases in Estonia

Year (start date)	Title of good practice case	Justification for selection
2004	Enterprise Incubation Programme	The envisaged target (number of supported incubators) is rather high.
2005	Innovation Audit Programme	The Innovation Audit pilot project was carried out in 2005 and involved mapping the innovative potential of 58 Estonian enterprises. Feedback from the enterprises was good – according to the reports the participating firms rated the IAs at 4.1 on a scale from 1 to 5. 78% of respondents claimed that they would carry out some of the activities recommended in the action plan within the subsequent six months as a result of the innovation audit.

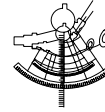
The examples of good practice listed in the table practices are not unique: similar initiatives exist in several other countries. However, they presume certain level of institutional development and could be instructive for other Central and Eastern European Countries whose development level is similar to that of Estonia. They might also be of interest to some Southern European countries.



Annex 1: overview of innovation policy documents

Main policy documents concerning innovation policy adopted/published since 2000

Title of document (in English)	Date (of approval, publication, etc.)	Organisation responsible (Ministry, etc.)	Legal status (Law, Government Decision, strategy (white) paper, action plan, etc.)
Knowledge-based Estonia. Estonian R&D strategy for 2002-2006	December 2001	Ministry of Economic Affairs and Communications	Strategy paper
Single Programme Document for Years 2004-2006, measure 2.3. Promotion of research and development activities and innovation	28.01.2004	Ministry of Economic Affairs and Communications	Action Plan
Estonia's Success 2014	10.11.2004	State Chancellery in co-operation with Ministry of Economic Affairs and Communications	Strategy paper
Action Plan for Growth and Jobs 2005-2007 for Implementation of the Lisbon Strategy	14.10.2005	State Chancellery in co-operation with Ministry of Economic Affairs and Communications	Action Plan
Knowledge-based Estonia. Estonian R&D and innovation strategy for 2007-2013	in progress	Ministry of Economic Affairs and Communications	Strategy paper
Part of national budgetary strategy 2007-2010: National strategy for use of structural funds 2007-2013, priority 2: increase of efficiency of research and development activities and innovativeness and productivity of enterprises	in progress	Ministry of Finance	Action Plan

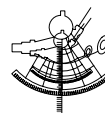


Annex 2: overview of innovation policy measures

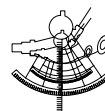
List of Innovation Policy Measure Fiche in the TrendChart database

Table A2.1: Policy Monitoring framework (2005-2007) objective(s)

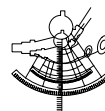
IPM Fiche Number	Title of measure	Policy Monitoring framework (2005-2007) objective(s)	IAP96 Action line	Start Date	End date	Status during reported period	Evaluated
EE 28	Innovation Audit Programme	<p>I.3. Improve the effectiveness of the policy-cycle in order to increase the impact of public intervention activity and outputs in enterprises</p> <p>II.4. Increase rates of expenditure on research and technological innovation in enterprises</p> <p>III.3. Increase the availability, range and quality of specialised services to enterprises in order to increase the effectiveness of their in-house innovation activities</p> <p>III.6. Facilitate the development of collaboration between enterprises and other actors with a view to joint innovation activities and knowledge exchange</p> <p>V.1. Upgrading innovation related skills and diffusing new technologies in enterprises</p> <p>V.2. Increase rates of non-technological innovation in enterprises</p> <p>V.4. Increase the rate of commercialisation/marketing of the results of innovation activity in enterprises</p>	I.3. I.4. III.2.	2005	2007	Ongoing	Yes



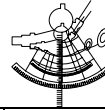
EE 27	Business Incubation Programme	<p>III.3. Increase the availability, range and quality of specialised services to enterprises in order to increase the effectiveness of their in-house innovation activities</p> <p>III.4. Increase the availability of innovative infrastructures to facilitate knowledge exchange and product/service development by enterprises</p> <p>IV.1. Increase the number of new innovation intensive enterprises created and their survival</p> <p>IV.2. Provide adequate infrastructure to new technology based firms to facilitate their survival and growth</p>	I.4. II.5. III.3.	2004	2007	Ongoing	Yes
EE 26	Centres of Excellence Development Programme	<p>III.1. Facilitate access of enterprises to skilled personnel</p> <p>III.2. Facilitate the acquisition and transfer of knowledge and technologies to enterprises, encouraging in particular cross-border initiatives</p> <p>III.5. Ensuring that the future skills base in the region/sector/country will correspond to the innovation needs of enterprises</p>	I.1. I.2. III.4.	2005	2008	Ongoing	Yes
EE 25	Research and development institutions' infrastructure development programme	<p>III.2. Facilitate the acquisition and transfer of knowledge and technologies to enterprises, encouraging in particular cross-border initiatives</p> <p>III.3. Increase the availability, range and quality of specialised services to enterprises in order to increase the effectiveness of their in-house innovation activities</p> <p>III.4. Increase the availability of innovative infrastructures to facilitate</p>	I.1. III.4. IV.1.	2005	2008	Ongoing	Yes



		<p>knowledge exchange and product/service development by enterprises</p> <p>III.5. Ensuring that the future skills base in the region/sector/country will correspond to the innovation needs of enterprises</p> <p>III.6. Facilitate the development of collaboration between enterprises and other actors with a view to joint innovation activities and knowledge exchange</p>					
EE 21	R&D Financing programme	<p>II.4. Increase rates of expenditure on research and technological innovation in enterprises</p> <p>IV.4. Increase the availability of private sector innovation financing to enterprises</p> <p>V.4. Increase the rate of commercialisation/marketing of the results of innovation activity in enterprises</p>	<p>II.5.</p> <p>III.1.</p> <p>III.2.</p>	2001	2006	Ongoing	Yes
EE 20	(Technology) Competence Centres Programme	<p>II.4. Increase rates of expenditure on research and technological innovation in enterprises</p> <p>III.2. Facilitate the acquisition and transfer of knowledge and technologies to enterprises, encouraging in particular cross-border initiatives</p> <p>III.6. Facilitate the development of collaboration between enterprises and other actors with a view to joint innovation activities and knowledge exchange</p> <p>V.3. Favouring the protection and optimising the exploitation of intellectual property as a driver for innovation</p>	<p>I.6</p> <p>III.2.</p> <p>III.3.</p> <p>III.4.</p>	2003	2007	Ongoing	Yes



		V.4. Increase the rate of commercialisation/marketing of the results of innovation activity in enterprises					
EE 18	InnoAwareness Programme	<p>I.3. Improve the effectiveness of the policy-cycle in order to increase the impact of public intervention activity and outputs in enterprises</p> <p>I.4. Encourage mutual policy learning and networking between policymaking at regional, national and EU levels</p> <p>II.4. Increase rates of expenditure on research and technological innovation in enterprises</p> <p>II.5. Encourage the uptake of strategic technologies, notably ICT</p> <p>V.1. Upgrading innovation related skills and diffusing new technologies in enterprises</p> <p>V.2. Increase rates of non-technological innovation in enterprises</p> <p>V.3. Favouring the protection and optimising the exploitation of intellectual property as a driver for innovation</p>	I.2. I.3. I.4. III.2. III.5.	2001	2007	Modified	Yes
EE 17	Spinno Programme	<p>II.4. Increase rates of expenditure on research and technological innovation in enterprises</p> <p>III.2. Facilitate the acquisition and transfer of knowledge and technologies to enterprises, encouraging in particular cross-border initiatives</p> <p>III.3. Increase the availability, range and quality of specialised services to enterprises in order to increase the effectiveness of their in-house innovation activities</p>	I.4. II.2. III.2. III.3. III.4.	2001	2006	Modified	Yes



		<p>IV.1. Increase the number of new innovation intensive enterprises created and their survival</p> <p>IV.6. Promote adequate support to enterprises aimed at new and developing markets</p> <p>V.1. Upgrading innovation related skills and diffusing new technologies in enterprises</p> <p>V.2. Increase rates of non-technological innovation in enterprises</p> <p>V.3. Favouring the protection and optimising the exploitation of intellectual property as a driver for innovation</p> <p>V.4. Increase the rate of commercialisation/marketing of the results of innovation activity in enterprises</p>					
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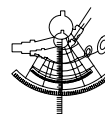
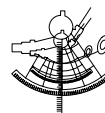


Table A2.2: Policy Measure Fiche: overview

IPM Fiche Number	Title of measure	Overview
EE 28	Innovation Programme Audit	<p>Innovation Audit Programme is targeted to small and medium-sized enterprises and the impact of the programme is gained through raised innovation awareness in these companies. The nature of the programme is that trained consultant carries out an innovation audit (IA) in the company. After that IA reports are compiled and the bottlenecks and opportunities are discussed with the company. Based on the IA results, the consultant in collaboration with the audited company puts together action plan, which brings out both short and longer term activities. Taking into account the results alternatives are proposed to the company on how to implement the above-mentioned activities, including e.g. the opportunities of financing those activities via EU programmes. The objective of the Innovation Audit Programme is: 1. to raise the innovation awareness of company leaders, 2. to motivate and encourage the enterprise's management to start, support and implement innovative activities in his/her company.</p>
EE 27	Business Incubation Programme	<p>Main goal of the Enterprise Incubation Programme is to support the incubation services development and provision in Estonian enterprise incubators. The financing is provided to:</p> <ul style="list-style-type: none"> - feasibility study about founding the incubator (up to 6,400 euros and maximum 80% of eligible costs) - development and providing of incubation services (up to 192,000 euros and maximum 75% of eligible costs)
EE 26	Centres of Excellence Development Programme	<p>The general objective of the sub-measure is to increase the capability of research and development activities and innovation in Estonia, to improve the competitiveness of Estonia in the European research and innovation area, and to create and maintain top qualifications of research and development activities by developing a small number of centres of excellence in the areas considered a priority from the viewpoint of economic growth.</p>
EE 25	Research and development institutions' infrastructure development programme	<p>The general objective of the programme is to increase the capability of research, and development activities and innovation in Estonia. This is by developing an internationally competitive research and development infrastructure system providing comprehensive support to higher education, research and development activities and innovation in strong and strategically important areas of research and development.</p> <p>The sub-objective of the programme is to support large-scale research and development infrastructure investment projects so that these would:</p>



		<ol style="list-style-type: none">1) Stimulate the strategic planning of research and development activities, incl. establishing priorities and making financially sustainable investment decisions in research and development institutions.2) Increase the efficiency of the research and development system as a whole through improved inter-relatedness between higher education, research and development activities and innovation, through concentration of resources and enhancing cooperation inside and between research and development institutions, between different disciplines, research and development institutions and enterprises and on the international level.3) Increase the human resources used in research and development activities and ensure the sustainable development thereof by increasing the number and quality of scientists and engineers involved.
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EE 21	R&D financing programme	<p>Scheme foresees the financing of the enterprises' R&D projects with grants and loans and R&D institutions with grants.</p> <p>The scheme consists of 3 parts:</p> <p>A) financing of enterprises' applied research and product development projects;</p> <p>B) financing of R&D institutions' applied research projects;</p> <p>C) financing the feasibility studies of applied research and product development projects.</p>
EE 20	(Technology) Competence Centres Programme	<p>Enterprise Estonia will co-finance the technology competence centres, which are founded and led together by (at least) 3 enterprises and 1 research centre. The purpose of the centre is to implement the research activity important to the founders. The main focus is on applied research, but the centre could put into practice product development projects and basic research if the founders want that.</p>
EE 18	InnoAwareness programme	<p>InnoAwareness programme foresees a broad improvement of innovation awareness via various publications, seminars, and training programmes, innovation prize and also aims at involving the media. The main goal is to raise the awareness of innovation subject and its role in competitiveness of enterprises, and as a warrantee of economic growth and social welfare increase among different actors of innovation system and wider public.</p>
EE 17	Spinno Programme	<p>The emphasis of the new SPINNO programme is on having a comprehensive approach, including all phases of commercialising an innovative idea. The emphasis is placed on building up and strengthening capacity at universities for supporting entrepreneurship and ability to manage spin-off processes. The programme supports activities, which contribute to the increase of entrepreneurship in universities and the development of a systemic higher education environment, which should promote entrepreneurial activities.</p>

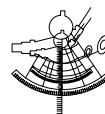
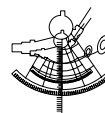


Table A2.3: Policy Measure Fiche: Lisbon guidelines n°8

Integrated Guideline No 8 - Innovation								
1. Improvements in innovation support services, in particular for dissemination and technology transfer.								
1	EE 28	Innovation Audit Programme						
<p>Innovation Audit Programme is targeted to small and medium-sized enterprises and the impact of the programme is gained through raised innovation awareness in these companies. The nature of the programme is that trained consultant carries out an innovation audit (IA) in the company. After that IA reports are compiled and the bottlenecks and opportunities are discussed with the company. Based on the IA results, the consultant in collaboration with the audited company puts together action plan, which brings out both short and longer-term activities. Taking into account the results alternatives are proposed to the company on how to implement the above-mentioned activities, including e.g. the opportunities of financing those activities via EU programmes. Consultant carries out an innovation audit (IA) in the company. After that IA reports are compiled and the bottlenecks and opportunities are discussed with the company. The objective of the Innovation Audit Programme is: 1. to raise the innovation awareness of company leaders, 2. to motivate and encourage the enterprise's management to start, support and implement innovative activities in his/her company.</p>								
Measures referenced in the 2005 NRP: Yes, page number 30 in NRP								
Status: full scheme								
Timeline for implementation: Start date: 2005 End date: 2007			before 2005	2005	2006	2007	2008	beyond 2008
Budgetary costs (in millions of €)			0	0,16 millions of €	0,21 millions of €			
source(s) of funds: financed by state and ESF								
Expected impact: (type & when): the IA programme impact can be measured by the increase of innovativeness and thus the improvement of economic indicators of the enterprises participating in the programme. The impact is expected within three years after the auditing of the enterprise.								
Suggested indicators to measure progress: Programme's impact is measured by the raise of innovative activity and improved economic indicators in the companies involved. The programme foresees that in 3 years after auditing at least 1/3 of the audited companies have: 1. raised their innovation expenditures 2. increased their turnover and profitability.								
Comments:								
2	EE 18	InnoAwareness Programme						



InnoAwareness programme foresees a broad improvement of innovation awareness via various publications, seminars, and training programmes, innovation prize and also aims at involving the media. The main goal is to raise the awareness of innovation subject and its role in competitiveness of enterprises, and as a warrantee of economic growth and social welfare increase among different actors of innovation system and wider public.

Measures referenced in the 2005 NRP: Yes, page number 30 in NRP

Status: full scheme

Timeline for implementation: Start date: 2001 End date: 2007

	before 2005	2005	2006	2007	2008	beyond 2008
<u>Budgetary costs</u> (in millions of €)		0,7 millions of €	0,7 millions of €			

source(s) of funds: financed by state and ERDF

Expected impact: (type & when)

Suggested indicators to measure progress: The main indicators for the measurement are: 1) increase in the number of innovative enterprises; 2) stable and reliable innovation policy; 3) competent and positive attitude of wider public to the R&D and innovation issues.

Comments:

2. The creation and development of innovation poles, networks and incubators bringing together universities, research institutions and enterprises, including at regional and local level, helping to bridge the technology gap between regions.

3EE 26

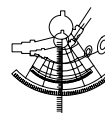
Centres of Excellence Development Programme

The general objective of the sub-measure is to increase the capability of research and development activities and innovation in Estonia, to improve the competitiveness of Estonia in the European research and innovation area, and to create and maintain top qualifications of research and development activities by developing a small number of centres of excellence in the areas considered a priority from the viewpoint of economic growth. The sub-objective of the sub-measure is to support, pursuant to the general objective of the sub-measure, the centres of excellence research and development infrastructure investment projects, which would:

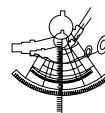
- 1) create conditions for creating and transferring the knowledge necessary for the new developments in economy and society;
- 2) assemble the top level research potential into large, competitive units thereby supporting the relation between various disciplines and realisation of bigger, strategically-oriented research projects;
- 3) ensure the presence of high-potential researchers which enables the capacity to be increased in enterprises which are essential for economic and social development;
- 4) create better preconditions for the participation of Estonian R&D enterprises and entrepreneurs in the international R&D cooperation, first and foremost in the EU Framework Programmes for Research and in the establishment of the European research and innovation area.

Measures referenced in the 2005 NRP: Yes, page number 26 in NRP

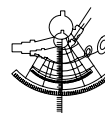
Status: full scheme



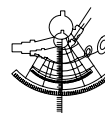
Timeline for implementation: Start date: 2005 End date: 2007	before 2005	2005	2006	2007	2008	beyond 2008
Budgetary costs (in millions of €): 2005-2008: 6,4 millions of €						
source(s) of funds:						
Expected impact: (type & when) The realisation of the objectives of the sub-measure will result in an increasing number of the Centres of Excellence joining the EU Network of the Centres of Excellences; the number of doctoral and post-doctoral students in the fields necessary for economic and social development will increase, income from R&D contracts of research and development institutions will increase, the number of internationally accepted high-quality research publications (ISI publications) will increase and income from the sale of intellectual property will grow as well. Due to the implementation of the sub-measure the research and innovation capacities will be increased in Estonia, top qualifications of R&D activities will grow and the ability of research and development institutions to cooperate with the enterprising sector will strengthen in the areas strategically important for the economy of Estonia.						
Suggested indicators to measure progress: number of centres joined with the EU centres of excellence network rises; increases the no of doctors and post-doctors in the supported institutions; increases the profit from RD contracts; the no of ISI publications rises; increases the profit from IPR						
Comments: the latest round of applications took place in 2005 no new rounds of application would be announced in 2006-2007.						
	4EE 17	Spinno Programme				
The objective of the programme is to enhance cooperation between the business sector and research and development institutions, strengthen the ability of research and development institutions to participate in this cooperation and manage innovation process. The lower level objectives of the programme in Estonian research and development institutions and institutions of professional higher education are the following: 1)creating of a favourable business environment; 2)developing the ability to respond more effectively to the needs of businesses and society; 3)increasing the revenues received from the implementation of knowledge and research and development results.						
Measures referenced in the 2005 NRP: Yes, page number 27 in NRP						
Status: full scheme						
Timeline for implementation: Start date: 2001 End date: 2007	before 2005	2005	2006	2007	2008	beyond 2008
Budgetary costs (in millions of €): 2004-2007: 4,2 millions of € 2001-2003: 2,3 millions of €						
source(s) of funds: Co-financed by the Structural Funds (ERDF, ESF, etc)						
Expected impact: (type & when): a) Profit of the R&D institutions involved in the project from R&D services and IP selling to the enterprises; b) the number of the spin-offs grown up from the R&D institution involved in the programme in a year.						



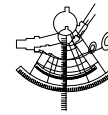
<u>Suggested indicators to measure progress:</u> During the period, sixty spin-off enterprises have been established, which have existed for 3 or more years by the end of the project.								
Comments: The realisation of the financed projects takes place during the period June 15, 2004 – June 30, 2007. No additional rounds of application have been planned for this period.								
5EE 25		Research and development institutions' infrastructure development programme						
The general objective of the programme is to increase the capability of research, and development activities and innovation in Estonia. This is by developing an internationally competitive research and development infrastructure system providing comprehensive support to higher education, research and development activities and innovation in strong and strategically important areas of research and development.								
The sub-objective of the programme is to support large-scale research and development infrastructure investment projects so that these would:								
4) Stimulate the strategic planning of research and development activities, incl. establishing priorities and making financially sustainable investment decisions in research and development institutions.								
5) Increase the efficiency of the research and development system as a whole through improved inter-relatedness between higher education, research and development activities and innovation, through concentration of resources and enhancing cooperation inside and between research and development institutions, between different disciplines, research and development institutions and enterprises and on the international level.								
6) Increase the human resources used in research and development activities and ensure the sustainable development thereof by increasing the number and quality of scientists and engineers involved.								
<u>Measures referenced in the 2005 NRP:</u> Yes, page number 27 in NRP								
<u>Status:</u> full scheme								
<u>Timeline for implementation:</u> Start date: 2005 End date: 2008			before 2005	2005	2006	2007	2008	beyond 2008
<u>Budgetary costs</u> (in millions of €)				14,6 millions of €				
<u>source(s) of funds:</u> Research and development institutions' infrastructure development programme is co-financed by the Structural Funds (ERDF, ESF, etc.)								
<u>Expected impact:</u> (type & when) The realisation of the objectives of programme will result in improving the strategic planning capability of research, and development activities in research and development institutions, reducing the diffuse wastage in the research and development system, improving the cooperation in research and development activities and between different disciplines. Due to the implementation of the programme the level and volume of research and development activities will be increased in the subsidised research and development areas, the number and efficiency of scientists increased and the international attractiveness of the Estonian research and development system improved.								
<u>Suggested indicators to measure progress:</u> Created new jobs (gross) by the end of the project								



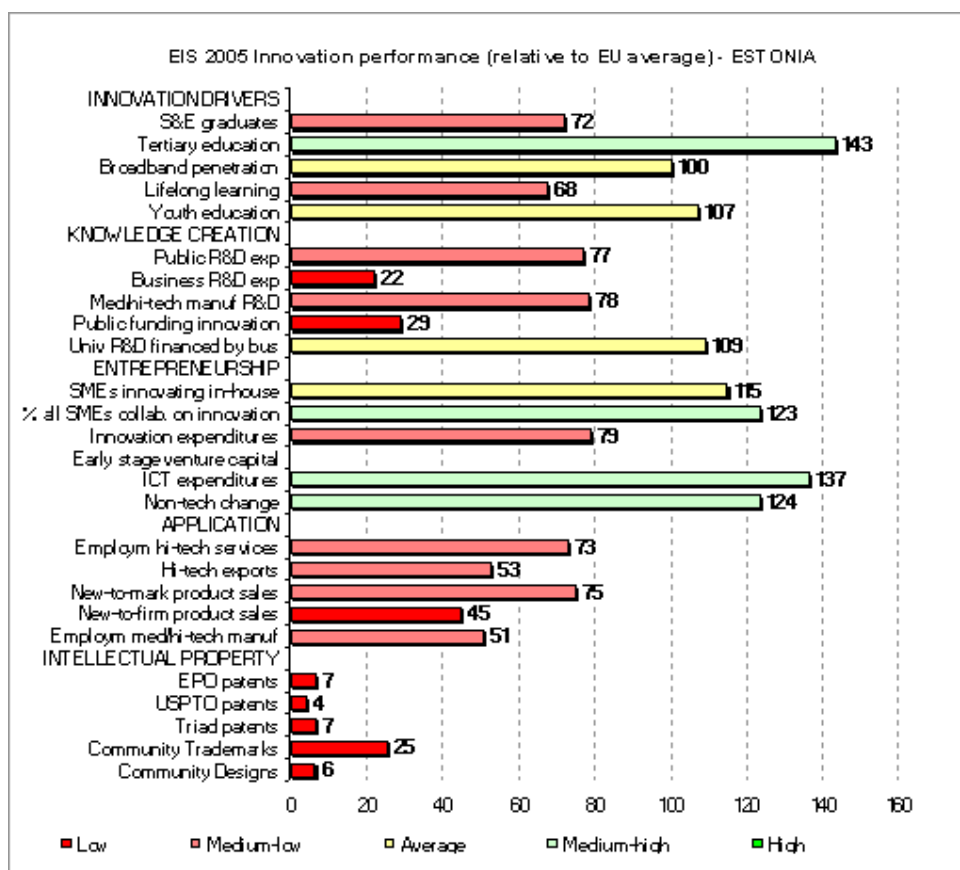
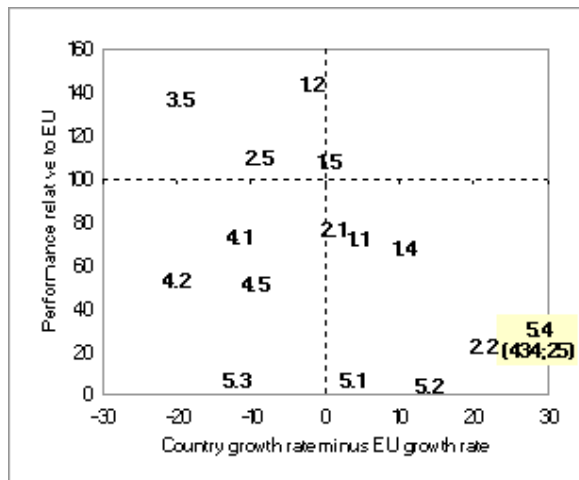
Comments: No application rounds of the programme take place in 2006.								
6	EE 20	(Technology) Competence Centres Programme						
Enterprise Estonia will co-finance the technology competence centres, which are founded and led together by (at least) 3 enterprises and 1 research centre. The purpose of the centre is to implement the research activity important to the founders. The main focus is on applied research, but the centre could put into practice product development projects and basic research if the founders want that.								
Measures referenced in the 2005 NRP: Yes, page number 30 in NRP								
Status: full scheme								
Timeline for implementation: Start date: 2003 End date: 2007			before 2005	2005	2006	2007	2008	beyond 2008
Budgetary costs (in millions of €): 19,2 millions of € for 2004-2006								
source(s) of funds: Co-financed by the Structural Funds (ERDF, ESF, etc) and co-financed by the private sector								
Expected impact: (type & when)								
Suggested indicators to measure progress: The number of the launched centres. The volume of the self-financing of the centres. The share of R&D expenditures in the enterprises. The number of new high-quality jobs.								
Comments:								
7	EE 27	Business Incubation Programme						
The general goal of the measure component is to support the emergence of innovative entrepreneurs with growth potential and their sustainable development. The sub-goal is the support of development and supply of incubation services based on the needs of start-up entrepreneurs in Estonia's business incubators.								
Measures referenced in the 2005 NRP: Yes, page number 30 in NRP								
Status: full scheme								
Timeline for implementation: Start date: 2004 End date: 2007			before 2005	2005	2006	2007	2008	beyond 2008
Budgetary costs (in millions of €):								

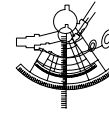


<u>source(s) of funds:</u> Co-financed by the Structural Funds (ERDF, ESF, etc) and by the private sector								
<u>Expected impact:</u> (type & when):								
<u>Suggested indicators to measure progress:</u> The achievement of the general goal is measured by the number of new enterprise and their jobs created as a result of the financed projects and the indicators of sustainability and growth of the created enterprises. By the end of 2007 there should be 7 new enterprise incubators in Estonia.								
Comments:								
5. Better access to domestic and international finance.								
8EE 21		R&D financing programme						
Scheme foresees the financing of the enterprises R&D projects with grants and loans and R&D institutions with grants. The scheme consists of 3 parts: A) financing of enterprises applied research and product development projects; B) financing of R&D institutions applied research projects; C) financing the feasibility studies of applied research and product development projects.								
<u>Measures referenced in the 2005 NRP:</u> Yes, page number 30 in NRP								
<u>Status:</u> full scheme								
<u>Timeline for implementation:</u> Start date: 2001 End date: 2007			before 2005	2005	2006	2007	2008	beyond 2008
<u>Budgetary costs</u> (in millions of €):				8,1	4,6			
<u>source(s) of funds:</u> Co-financed by the Structural Funds (ERDF, ESF, etc) and by the private sector								
<u>Expected impact:</u> (type & when): As a result of the implementation of the sub-measure the competitiveness of the supported enterprises will improve, their export turnover will grow, new jobs will be created or existing ones will be retained, the base of knowledge and skills will increase, the number of industrial property protection applications and activity of foreign parent application in export countries will grow and a cooperation network will develop. The orientation of R&D activities at the needs of economy will increase in the supported R&D institutions, as well as cooperation with enterprises and profit from knowledge and technology transfer. The sub-measure will have impact on the increase of Estonian enterprises' expenditures on R&D activities and innovation, increase of involvement in the high and medium high technologies sectors, the increase of share of innovative enterprises and the share of new products or services in the enterprises' turnover.								
<u>Suggested indicators to measure progress:</u> 1) the growth of the annual turnover of the supported enterprises from the supported new innovative projects, services or technologies (EEK). 2) the growth of the annual export turnover of the supported enterprises from the supported new innovative projects, services or technologies (EEK). Both indicators will be measured 5 years after the end of the implementation period of the scheme.								
Comments:								



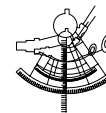
Annex 3: European Innovations Scoreboard: country pages





ESTONIA				2003	2004	2005	Relative to EU	Trend	Trend EU		
				0.34	0.31	0.32		-25	0.0		
	relative to EU			70	71	75					
	2000	2000	2000	18	19	18					
	1999	1999	2000	2001	2002	2003	2004				
	INPUT - Innovation drivers										
1.1	SSE graduates	3.3	8.3	7.1	7.3	8.8	8.8	72	13	8	
	relative to EU	-	87	89	89	88	77				
1.2	Population with tertiary education	30.2	28.8	28.8	30.2	30.5	30.8	143	3	4	
	relative to EU			146	160	149	141				
1.3	Goodband penetration rate	-	-	-	-	-	7.8	100	-	80	
	relative to EU	-	-	-	-	-	100				
1.4	Participation in life-long learning	8.3	8.5	8.1	8.2	8.2	8.7	88	11	-	
	relative to EU	-	-	79	89	89	87				
1.5	Youth education attainment level	83.1	83.0	83.8	78.5	80.4	81.4	82.3	107	1	0
	relative to EU	-	111	109	101	105	109				
	INPUT - Knowledge creation										
2.1	Public R&D expenditure	0.47	0.53	0.48	0.48	0.52	0.43	77	3	2	
	relative to EU	71	87	79	77	79	77				
2.2	Business R&D expenditure	0.11	0.17	0.14	0.25	0.23	0.28	22	22	1	
	relative to EU	8	14	11	29	18	27				
2.3	Share of med-high-tech R&D	-	-	88.7	88.5	88.8	-	78	-	-	
	relative to EU	-	-	78	77	78	-				
2.4	Enterprises making public linkage	-	-	2.4	-	-	-	28	-	-	
2.5	Business financed university R&D	7.5	9.8	7.4	6.1	7.2	8.3	109	8	1	
	relative to EU	118	159	119	79	109	-				
	INPUT - Innovation & entrepreneurship										
3.1	SMEs innovating in-house	-	-	20.8	-	-	-	115	-	-	
3.2	Innovative SMEs co-operating with others	-	-	11.2	-	-	-	123	-	-	
3.3	Innovation expenditure	-	-	1.43	-	-	-	78	-	-	
3.4	Early-stage venture capital	-	-	-	-	-	-	-	-	-28	
	relative to EU	-	-	-	-	-	-				
3.5	KI expenditure	-	-	13.1	8.5	-	-	137	-13	7	
	relative to EU	-	-	207	101	-	-	137			
3.6	SMEs using non-technological changes	-	-	82.1	-	-	-	124	-	-	
	relative to EU	-	-	-	-	-	-				
	OUTPUT - Application										
4.1	Employment in high-tech services	2.80	2.83	2.87	3.42	2.87	2.32	73	-12	0	
	relative to EU	-	-	89	101	89	73				
4.2	Exports of high technology products	-	10.1	25.1	17.1	8.8	8.4	83	-27	8	
	relative to EU	-	91	129	83	64	68				
4.3	Sales new-to-market products	-	-	4.5	-	-	-	75	-	-	
4.4	Sales new-to-firm not new-to-market products	-	-	5.4	-	-	-	45	-	-	
4.5	Med-high-tech manufacturing employment	3.81	3.84	4.25	4.88	3.41	3.25	81	-12	-3	
	relative to EU	-	-	87	79	69	61				
	OUTPUT - Intellectual property										
5.1	New IPO starts	5.0	5.8	11.7	12.4	8.8	-	7	8	5	
	relative to EU	8	8	8	8	7	-				
5.2	New IESG IO starts	-	0.7	3.1	1.1	2.7	-	4	281	8	
	relative to EU	-	1	8	2	4	-				
5.3	New Triad starts	2.1	1.5	1.5	-	-	-	7	-11	1	
	relative to EU	8	7	7	-	-	-				
5.4	New community trademarks	-	-	-	-	0.7	132	222	25	480	18
	relative to EU	-	-	-	-	1	19	25			
5.5	New community designs	-	-	-	-	-	5.2	8	-	-	
	relative to EU	-	-	-	-	-	8				

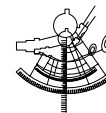
NOTE: Break in scales / 2000 data for CIS indicators refers to CIS 3 survey / 2012 data refer to estimates based on CIS Ligt data



Annex 4: Sources of further information

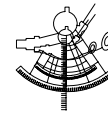
A4.1 Websites of key innovation organisations

Type of organisation	Name	Website
Other	Research and Development Council	http://www.tan.ee
National Government Ministry/department	Ministry of Education	http://www.hm.ee
Other	The Estonian Patent Office	http://www.epa.ee/
Other	Enterprise Estonia Foundation	http://www.eas.ee/
Other	The Credit and Export Guarantee Fund KredEx	http://www.kredex.ee/
Other	Estonian Science Foundation	http://www.etf.ee
National public agency	Archimedes Foundation	http://www.archimedes.ee/
Other	The Estonian Patent Library	http://www.patentlib.ee/
Other	Estonian Academy of Sciences	http://www.akadeemia.ee
Other	Tallinn Technology Park – TEHNOPOL	http://www.tehnpol.ee/
Other	University of Tartu, Institute of Technology	http://www.tuit.ut.ee/
Other	Tartu Science Park	http://park.tartu.ee/uus/
Other	Tartu Biotechnology Park	http://www.biopark.ee/
Other	Estonian Biotechnology Association	http://www.biotech.ee/
Other	Estonian Association of Information Technology and Telecommunications	http://www.itl.ee/



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