

INNO-Policy TrendChart –
Innovation Policy Progress Report

Finland

2009

PREFACE

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

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

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

INNO-Policy TrendChart products

INNO-Policy TrendChart, previously the TrendChart on Innovation, has been running since January 2000. It currently tracks innovation policy developments in all 27 EU Member States, plus Brazil, Canada, China, Croatia, Japan, Iceland, India, Israel, Norway, Switzerland, Turkey and the US. The INNO-Policy TrendChart website¹ provides access to the following services and publications, as they become available:

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

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: Cesar Santos (Cesar.SANTOS@ec.europa.eu).

The present report was prepared by Mr. Jari Konttinen (jari.konttinen@vtt.fi) and Mr. Juha Oksanen (juha.oksanen@vtt.fi) of VTT, Technical Research Centre of Finland. The contents and views expressed in this report do not necessarily reflect the opinions or policies of the Member States or the European Commission.

The report covers the period from July 2008 to June 2009.

Copyright of the document belongs to the European Commission. Neither the European Commission, nor any person acting on its behalf, may be held responsible for the use to which information contained in this document may be put, or for any errors which, despite careful preparation and checking, may appear.

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

CONTENTS

EXECUTIVE SUMMARY: PUBLIC SUPPORT FOR INNOVATION – A SNAPSHOT	I
1. MAIN TRENDS AND CHALLENGES IN THE NATIONAL INNOVATION SYSTEM.....	1
1.1 RECENT ECONOMIC TRENDS AND MARKET DEVELOPMENTS	1
1.1.1 <i>The credit crisis and its effect on innovation activity</i>	3
1.2 RECENT TRENDS IN THE NATIONAL INNOVATION PERFORMANCE	6
1.3 IDENTIFIED CHALLENGES	8
2. PUBLIC SUPPORT TO INNOVATION	12
2.1 MAIN OBJECTIVES FOR INNOVATION POLICY	12
2.2 INNOVATION GOVERNANCE SYSTEM	14
2.2.1 <i>Governmental bodies</i>	14
2.2.2 <i>Main bodies managing implementation of policies</i>	14
2.3 PUBLIC FUNDING TO INNOVATION	16
2.3.1 <i>Review of the current range of support measures for innovation</i>	16
2.3.2 <i>New or modified support measures</i>	18
2.3.3 <i>Strengths and weaknesses in the innovation policy support system</i>	19
3. INNOVATION POLICY AND COMPETITIVENESS: AN APPRAISAL	20
3.1 THE ABILITY OF POLICY TO ADDRESS CHALLENGES	20
3.1.1 <i>How well does policy respond to innovation challenges?</i>	20
3.2 EFFECTIVENESS OF POLICY DESIGN	21
3.2.1 <i>Process of delivery</i>	21
3.3 IMPACT OF PUBLIC SUPPORT FOR INNOVATION	22
3.3.1 <i>Conclusions: possible future actions and opportunities for innovation policy</i>	24
ANNEXES	25

Exhibits

Exhibit 1: Comparable indicators of economic performance..... 3
Exhibit 2: European Innovation Scoreboard: country pages 7
Exhibit 3: Main innovation policy challenges 10
Exhibit 4: Main innovation policy documents..... 12
Exhibit 5: New Innovation Policy Support Measures (since the last report)..... 19
Figure 1. Impact framework for science, technology and innovation (Lemola et al. 2008)..... 23

Executive Summary: Public support for innovation – a snapshot

1. Main trends and challenges in the National Innovation System

Finland has not remained untouched by the economic turmoil hitting the world in autumn 2008. The volume of Finland's Gross Domestic Product (GDP) diminished during both third and fourth quarter of 2008 which matches a definition given for recession. During the first quarter of 2009, GDP fell already by 7.6% on year-to-year basis. Finland has also witnessed a sharp collapse in foreign trade and the bleak economic situation is reflected in employment as well. The Government agreed in January 2009 on a stimulus package whose main focus is on measures that directly promote employment, including investments in transport infrastructure and broadband, support to construction and raising social insurance contributions. As part of implementation of the stimulus package, Tekes (the Finnish Funding Agency for Technology and Innovation) has received additional resources for research grants, as well as development and innovation grants, in order to secure the continuity and level of RDI operations.

Since the 1990s, Finland's innovation performance and innovation policies have repeatedly been ranked high in international comparisons. The European Innovation Scoreboard (EIS) 2008 is not an exception. Finland's performance was above or close to the EU 27 average almost in all individual indicators and the country belongs to the innovation leaders group. As in the previous year, in the Summary Innovation Index (SII) Finland ranks second out of 27 EU countries and third out of 32 European countries included, after Sweden and Switzerland. Finland ranks first in two of the seven dimensions through which innovation performance of the countries is assessed in the EIS – i.e. Human resources and Firm investments. Regarding the remaining five dimensions, Finland's performance is above the EU average in Finance and support (5th), Linkages and entrepreneurship (8th), and Throughputs (8th), whereas in two dimensions, Innovators and Economic effects, Finland harbours just below the EU average.

Although Finland's track record in innovation performance has undeniably been forceful since the mid-1990s there is however a need to develop new strategies for the future. First, it has become clear that the old innovation policy approach has clung too much to the traditional science and technology policy perspective. There is a need to adjust policies to match with changes taking place in firm strategies on the one hand and innovation activities on the other – innovation activity is ever more switching to customer- and user-oriented, networked and open innovation ecosystems which are embedded in a global economy. Second, the global economic system is dynamic and in constant flux which the present economic downturn further amplifies. A major future challenge facing economic and societal development will be to keep Finland sufficiently attractive for business and jobs, and as a living environment. Third, the overall positive development of the Finnish economy and industries over the past decade disguises uneven performance across the board and weaknesses in the composition of company population. In many instances, single industrial clusters and even individual large domestic multinational enterprises have accounted for a large part of the impressive progress in productivity, R&D investments and exports. In this situation, a lack of innovative growth-oriented small and medium sized companies and start-ups is one of the major identified weaknesses.

2. Main developments in public support for innovation

Innovation has become an explicit policy field in Finland only in recent few couple of years. Arguably, a decisive moment was decision to prepare a first ever national innovation strategy which was published in June 2008. A basic idea guiding the strategy is to revise and to complement the well-established competence-based innovation policy focused on science and technology by a demand- and user-based innovation policy approach highlighting the role of competition and market demand for

innovation in an open world. According to the strategy, Finnish innovation activities should be strengthened by a number of means, such as reinforcing international operations, increased involvement of users and customers in innovation processes, and broader approach to creativity and innovation.

Clearly one of the strengths of the Finnish innovation policy support system is the increasing (monetary) effort put on 'traditional' research and development activities. The system also strongly supports – and often necessitates – cooperation between research organisations and companies when allocating funding for R&D activities. At the same time, one of the weaknesses of the system could be its supply-based strategy which is strongly based on the coordination by Tekes. In addition, all the aspects of the innovation process have not been taken into account in policy development earlier, especially when it comes to commercialisation of inventions, acquiring risk capital and development of business competencies of SMEs. However, the policy development in recent years, including launching of new measures, shows that emphasis have been put on: (1) broadening the base of innovation activities in society both sectorally and by target groups; (2) developing processes that take into account users of R&D outputs; and (3) support business development, commercialisation and entrepreneurship.

3. Innovation policy and competitiveness: an appraisal

Although a lot seems to be happening in the innovation policy field and some new ambitious measures have been developed in recent years, it is wise to consider if these measures are adequate enough to meet the challenges in Finnish innovation system. For instance, are increasing public investments supporting innovative growth-oriented companies set to the level that we may expect to see in terms of a growing number of venture-capital backed growth companies in the near future? The public innovation governance system and the entire innovation and business development service system have been under critical consideration during the last few years in Finland. The wide scope of structural changes is demonstrated by reorganisation of ministry structure, ongoing structural reform of the universities and renewal of sector research, as well as plans to renew the enterprise service system. In addition, the relative importance of Tekes in government innovation policy has been growing steadily in recent years and has established a position in policy areas (e.g. healthcare and start-up incubation), which have been dominated earlier by other agencies.

Evaluation of science, technology and innovation policy instruments, programmes and organisations has become a systematic practice in Finnish policymaking. There is a tendency among key policymakers to develop a more general and commonly shared model for analysing impacts of science, technology and innovation. In 2008, Tekes and the Academy of Finland initiated a project whose goal was to create an overall view – called an impact framework – of effectiveness of science, technology and innovation. Based on existing information it is fairly difficult to assess what the impact of the whole innovation support system to Finnish economy and society is. Moreover, it is very challenging to assess whether e.g. input/impact ratio is efficient in Finland or how successful the support system is compared to other similar countries. It would require comprehensive evaluation studies, as well as comparable data from other countries. However, the currently ongoing international evaluation of the Finnish innovation system will provide more information about the functioning of the system later this autumn. Some evidence on the impact of innovation is provided by Tekes. For example, participating in Tekes projects has a positive effect on turnover, employment and competitiveness of the customer companies. Tekes funding has also proven to increase companies' own R&D investments.

In the near future, innovation policy development in Finland will be dominated by the implementation of the National innovation strategy, as well as by proposals put forward by the international evaluation panel in ongoing evaluation of the system. In many areas the National innovation strategy lacks concrete plans of action. In addition, the concept of demand- and user-oriented innovation policy needs clarification in order to become a concrete tool for policymaking. Nonetheless, some new measures are already launched which reflect the choices and guidelines set in the innovation strategy.

1. Main trends and challenges in the National Innovation System

1.1 Recent economic trends and market developments

Finland has not remained untouched by the economic turmoil hitting the world in autumn 2008. Still in late 2008, it seemed that Finland would survive the crisis rather well compared to many other countries in Europe. In the course of the first half of 2009 it has, however, become evident that after a long stable period the country's economic development has entered into a new uncertain phase. The economic outlook has sharply deteriorated and most of the indicators give a rather gloomy picture about the trend during the first months of 2009.

The volume of Finland's Gross Domestic Product (GDP) diminished during both third and fourth quarter of 2008 which matches a definition given for recession – a decline in output lasting for at least six successive months. According to the latest data available from Statistics Finland, during the first quarter of 2009, GDP fell already by 7.6% on year-to-year basis. Comparable figures have not been seen since the early 1990s when Finland was in middle of a severe recession. Continuing uncertainties in the international economy and rapidly decreasing exports together with decline in domestic demand have required a revision of economic forecasts for 2009 several times. The Ministry of Finance's latest forecast published in June 2009 predicts that GDP will contract by 6% in 2009. The forecast is based on view that the sharp downturn early this year is gradually levelling out.

The sharp collapse in foreign trade has had a major impact on the weakening economic outlook. Statistics Finland data demonstrates that during the first quarter of 2009, the volume of exports fell by 25.5% and the volume of imports by 19.4% when compared to the same period in 2008. Furthermore, in the first quarter, the volume of private consumption contracted by 3.7% and investments decreased by 8.9% from one year previously.

A closer look at data published by Statistics Finland shows that economic crisis has affected different sectors unevenly. In manufacturing, turnover in the first quarter of 2009 was 24.0% lower than in the corresponding period of the year before. The distress in manufacturing is visible also in new orders, the value of which decreased on year-on-year basis by 38.4% in the period January to April 2009. In service industries not including trade, turnover declined by 4%, in transport and storage by 11.7% and in construction by 11.9% in the first quarter 2009 compared with the corresponding three-month period the year before.

The Labour Force Survey of Statistics Finland proves that the bleak economic situation is reflected in employment as well. Unemployment rate adjusted for seasonal and random variation rose to 8.6% in May 2009, while the rate was at its lowest at 6.2% in spring 2008. At the same time, the employment rate has declined below 70%. The Ministry of Finance has estimated in June that the unemployment rate in 2009 will rise to 9% and employment prospects will continue to deteriorate during 2010.

On the other hand, there are some signs in recently published data which hint that the steepest decline in economy may have been overcome. For instance, data from Statistics Finland on development of industry turnover month-to-month shows that in March almost in all manufacturing industries turnover either grew more or contracted less than during the first two months of 2009 when compared with the respective months in 2008.

Furthermore, according to Statistics Finland's Consumer Survey, the indicator measuring consumers' confidence and expectations on Finland's economy has been recovering in April and especially in May after being negative from October 2008 to March 2009. The survey shows that consumers' expectations regarding households' saving possibilities and their own economic situation were positive, whereas views concerning the development of unemployment were rather gloomy. Positive

expectations on development of consumers' own economy may have been fuelled by rising earnings of the employed: according to Statistics Finland nominal earnings of wage and salary earners rose by 4.4% and real earnings adjusted for the change in consumer prices by 2.8% in the first quarter of 2009 in comparison to the respective period year before.

In contrast to consumers' attitudes, the EK business trends survey shows that confidence among Finnish enterprises in manufacturing, construction and service sector stayed in May 2009 considerably below their long term averages. According to the survey, manufacturing orders have remained at very low levels while stocks of final goods stayed above average. Orders are low also in construction, as companies expect major cuts in workforce in the coming few months. Service sectors have experienced a decline in sales growth and the declining trend is expected to remain in the coming couple of months.

Despite the current bleak outlook, available statistics and international comparisons on competitiveness imply that fundamentals of the Finnish economy were in rather good shape when the country entered into recession. In this sense, Finland seems to be among those countries which are better placed to withstand the economic crunch – as pointed out in a fresh *European Growth and Jobs Monitor 2009* conducted by Allianz Dresdner Economic Research for the Lisbon Council. The report ranks Finland in second consecutive year as the most competitive country among the EU's fourteen largest economies examined, fulfilling all criteria for the Lisbon Agenda. There is no doubt that the Finnish economy has suffered from the global economic downturn, but the report concludes that on the basis of past data the country shows strong performance in several areas investigated, topping the league in human capital and sustainability of public finances. Future-oriented investment in plants and machinery is the only area in which Finland does badly in comparison, ranking 12th among 14 countries studied. Furthermore, according to the European Competitiveness Report 2008, Finland (70.3% in 2007) is among those EU Member States which have employment rates above 70%, which is the target level for the EU average in 2010 as agreed in the growth and jobs strategy.

The World Economic Forum's (WEF) Global Competitiveness Report 2008-09 and the International Institute for Management Development's (IMD) World Competitiveness Yearbook 2008 do not provide any dramatic news about the development of Finland's competitiveness internationally. As previous year, Finland was ranked 6th in the WEF's Global Competitiveness Index for 2008-09. Finland got high marks in four out of 12 'pillars' used to analyse the competitiveness landscape in the reviewed countries; institutions (1st), health and primary education (1st), higher education and training (1st), and innovation (2nd). Finland was assessed to be one of the leaders – alongside of Denmark, Sweden and Switzerland – in terms of the macroeconomic environment and low levels of public indebtedness. According to the WEF, Finland and its Scandinavian neighbourhood countries are also at the top when functioning and transparency of institutions is assessed. Higher education and training were identified to be another strength of Finland, contributing markedly also to innovation and society's ability to adapt to changes. The country fares less favourably in labour market flexibility.

The International Institute for Management Development (IMD) ranked Finland 9th (15th in 2008) among the economies examined in the World Competitiveness Scoreboard 2009. Finland's major strengths identified by IMD include efficient business management, research and development personnel, volume of research and development investments and the country's education system. Finland scored also rather well in a new additional ranking – the Stress Test on Competitiveness, being in 9th place. IMD's stress test is an analysis of 'which countries are better equipped to fare through the financial crisis and improve their competitiveness in the near future'.

Parallel to the discussion above, Exhibit 1 indicates that since 2004 Finland's competitive position vis-à-vis the EU 27 has by and large remained rather strong and stable. In light of the indicators tracking economic performance of the national economies of the EU member countries, Finland has managed to develop its performance at least at a comparable pace to the EU 27 and in some instances even extend the gap. Notwithstanding the above, it is important to remember that the past performance does not eliminate present uncertainties concerning economic growth prospects. There will be growing pressure on public finances if economic recovery delays for a long period of time. For instance, the Ministry of Finance assesses that central government debt will grow by over EUR 10 billion during 2009 and anticipates that the deficit in the central government will further deteriorate next year.

Exhibit 1: Comparable indicators of economic performance

Indicator	National performance		EU 27 average	
	2004	2007	2004	2007
GDP per capita in PPS (EU 27=100)	116.2	115.8	100*	100*
Real GDP growth rate (% change previous year)	3.7	4.2	2.5	2.9
Labour productivity per person employed (EU 27=100)	112.4	110.9	100*	100*
Total employment growth (quarterly % change)	0.4	2.2	0.7	1.8
Inflation rate (average annual)	0.1	1.6	2.0	2.3
Unit labour costs (growth rate)	-0.3	-1.7	-1.4	-0.9
Public balance (net borrowing/lending) as a % of GDP	2.4	5.2	-2.9	-0.8
General government debt as a % of GDP	44.2	35.1	62.2	58.7
Unemployment rate (as % of active population)	8.8	6.9	9.0	7.1
Foreign direct investment intensity	0.5	3.7	0.9	3.4
Business investment as a % of GDP	15.4	:	:	:

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

Key: (*) EU25 average, (^) or latest available year (for example: 2005), (:) not available.

1.1.1 The credit crisis and its effect on innovation activity

While still in the midst of the crisis, it is extremely difficult to foresee what kind of impacts the current financial crisis may have on innovation activity of companies locating in Finland – especially if the crisis is prolonged and recovery is delayed. At this stage, besides 'hard' factors (stringency of financing) calling for cost cuts, the prevailing mindset among businesses has a major role to play regarding effects of the crisis on innovation. A key question is what type of strategies companies adopt in order to overcome the crisis: are they investing proactively in the development of new innovations or are they rather curbing investments on innovation?

Innobarometer 2009, surveying enterprises in sectors likely to be innovative, found that Finland is among countries in which there are an equal number of companies who have opted for defensive vs. forward-looking strategy as a response to the economic downturn; the former ones by cutting back on innovation while the others by increasing their innovation expenditures. A contrasting view emerges from the *EK Investment Survey*, according to which companies in all manufacturing industry branches have cut their investment plans considerably due to the economic recession. The survey published in June 2009 remarks that fixed investments were decreasing already in 2008 by around 10% in comparison to 2007 when investments peaked, and are foreseen to contract further by 30% or more in 2009. In contrast, investments in energy production are expected to remain considerable. Industrial companies' R&D activities recorded a slight increase in investments and the number of people employed in R&D in 2008 while in 2009 R&D expenditures as well as people employed in R&D are anticipated to decline somewhat – according to the survey cutbacks concentrate on companies' R&D in Finland, while R&D expenditure abroad is expected to still increase slightly. Notwithstanding this, the relative importance of R&D investments continues to grow and Finnish R&D expenditure is expected to match the level of fixed investments for the first time ever ⁽²⁾.

Finland's economic structure and the fact that the business sector is highly concentrated have arguably amplified the impacts of the ongoing global economic turmoil. Large domestic multinational enterprises play a significant role in the national economy and export, but also have their major markets as well as increasing production and development sites around the globe. Therefore, in times of international economic distress, the negative effects of decreasing demand abroad are almost instantly felt on home turf.

Particularly two of the traditional national industrial strongholds – forest industry, and engineering and manufacturing – have been hard hit because of the crisis. In the case of the forest industry, the blame cannot be placed on the financial crisis only, though. For a long time, there has been a widely shared

² The Confederation of Finnish Industries, EK: *Dramatic decline in fixed investments by the Finnish manufacturing industry*, 16 June 2009.

view that the forest industry in Finland is in need of renewal. Large investments and focusing on printing paper production helped the Finnish forest industry reach a leading position on global scale during the 1980s and the 1990s. However, the situation has in recent years changed and the forest industry is facing several concurrent challenges including changes and even a decrease in consumption on the major markets in Europe and North America and overcapacity in Europe. Moreover, it looks like mistakes have been made in internationalisation and core business strategy in the past. For example the Finnish-Swedish paper, packaging and forest products company Stora Enso had to withdraw from difficult North American markets in the end of 2007. The company invested EUR 4 billion for business operations in North America in the beginning of this decade and the withdrawal cost altogether EUR 3 billion for Stora Enso and its shareholders.

Moreover, until recently, cost efficiency rather than new innovative products has been a prevailing strategy of the industry to improve profitability. The economic crisis has accelerated the Finnish forest industry's inevitable readjustment to the changing operational environment. Communities and regions in which large paper and pulp plants but also sawmills locate are negatively affected by the restructuring process and plant close-downs. Impacts of readjustment of the forest industry are felt in the whole forest cluster, including manufacturers of forest machinery.

So far, the manufacturing industry has probably suffered most due to the sharp decline in demand on export markets – at least if decrease in turnover and volume of new orders are used as indicators. Many of the larger manufacturing companies locating in Finland have succeeded to achieve strong positions on selected market segments internationally. When demand abroad suddenly shrinks, the domestic demand cannot ease the situation. The domestic market often plays only a very minor role in market share of large Finnish manufacturing companies. If possible, the situation of small and medium-sized companies (SMEs) active in manufacturing is even more stringent. Firstly, SMEs are affected directly by downturns in domestic demand and slumps in export markets. Secondly, they are affected also indirectly because of their position as suppliers, sub-contractors and service providers of large companies which themselves are coping with demand problems. Thus, short-term outlooks in the manufacturing depend to large extent on recovery of international markets.

Effects of the financial crisis have been less evident in the software sector. Results of a fresh survey on SMEs show that 25% of software companies are planning to recruit new employees in 2009. Only one software company out of 100 assessed say they have need to issue lay-off notices during this year. The sector's outlook differs rather markedly from stated intentions among SMEs active in other sectors – for instance 10% of SMEs in manufacturing are planning to fire staff in one-year's time (³).

The number of lay-offs has increased with decreasing demand and stringent finances. For the time being though, there are signs that besides firing, companies are looking for temporary arrangements, such as temporarily lay-offs, in order to be in position to reply swiftly if demand picks up. If the economic situation does not, however, improve towards the end of 2009, the number of permanent lay-offs is likely to grow.

The current economic crisis does also provide opportunities for companies and the national economy. Crisis can be seen as a moment of Schumpeterian creative destruction during which the economic and industrial structure is revolutionised within. Shrinking demand and increasing competition opens up a process which may lead to restructuring of obsolete economic structures and industries characterised by inertia. In the current situation, companies with appropriate assets can conquer new markets when competitors are struggling, and new actors with innovative solutions can replace old players. Empirical evidence shows also that many of the current market leaders have been established during economic dips. In any case, the economic crisis calls for rethinking a new growth strategy for Finland as Chairman of the Confederation of Finnish Industries EK, Mr Tamminen recently stated. According to him, the crisis 'will transform in a significant way the competition positions of Finnish companies and the structure of the national economy'.

Indeed, many Finnish companies can be fairly well positioned when economy recovers; prior to the current financial crisis, companies were enjoying a rather long period of steady growth with substantial profits. For instance, manufacturing experienced a long upswing curve during this decade. Information

³ Metsä-Tokila T. (2009) *Ohjelmistoala*. Toimialaraportti, January 2009. Työ- ja elinkeinoministeriö, Helsinki.

and communication technology sector did suffer from the burst of IT bubble in the turn of the millennium but recovered later on. Other industries have also benefited from growth over several years time. Finnish enterprises' sustained investment in innovation and R&D indicates that generated resources have been, among others, used to renew and improve companies' offerings.

The Government agreed in January 2009 on a stimulus package whose main focus is on measures that directly promote employment, including investments in transport infrastructure and broadband, support on construction and lifting the social insurance contribution. Other priority areas of the stimulus package concern education, research and training. According to the stimulus package, the number of study places in vocational basic and further education and adult education will be increased, and appropriations allocated to research and development will be raised in addition to already existing high R&D support. A bulk of the package consists of tax cuts and other revenue measures, and to a lesser extent of increased Government spending.

As part of the implementation of the stimulus package, Tekes has received additional resources to allocate for research, development and innovation, in order to secure the continuity and level of RDI operations. Funding is available not just for technological but also non-technological development covering for instance development of services and service models, business concepts, working life and design. Tekes has also introduced modifications to its working methods. In addition, Tekes has lowered temporarily the share of company funding required in public research projects – companies' in-kind contribution is approved in addition to direct funding.

Also as part of the stimulus package, Finnvera started to grant counter-cyclical loans and guarantees at the beginning of March. For a three-year period, Finnvera can grant these counter-cyclical products to companies that have encountered temporary financial difficulties. To be eligible for counter-cyclical financing, the company must have the prerequisites for profitable business once the economic situation has improved. Another prerequisite for counter-cyclical financing is that other financiers reschedule their receivables. In addition, the Government has raised ceilings on Finnvera's outstanding financial commitments twice during 2009. The higher ceilings are applied for a fixed term, and they will be reviewed when the situation on the financial market has been normalised.

Separate from the stimulus package, a working group assigned by the Ministry of Employment and the Economy made in June a proposal for launching a new preferential tax treatment scheme to company R&D from the beginning of 2010 for a three-year trial period. The working group was assigned to assess if an R&D tax relief scheme could be utilised to broaden the base of innovative enterprises and improve conditions for high-growth companies.

To summarise, regarding innovation policy, the public response to the financial crisis has been in large part parallel to guidelines set out in the national innovation strategy published in 2008. Broad-based innovation policy paying special attention to demand and user-orientation and entrepreneurship seems to fit well with the current economic situation which requires actions with rapid impact on demand of new products and services. The long-term goal is to promote industrial renewal and companies' preparedness to react swiftly when the economy recovers. In the short-term, it is important to ensure that there are available incentives and funding to meet companies' need for innovation support. Increasing competition due to decreasing demand emphasises role of demand- and customer-oriented, open innovation models enabling a quick response.

Furthermore, continuous and diverse innovation activity in firms, public organisations and society in large has positively contributed to productivity and supports cost-efficiency – all of which assists Finnish society and companies to overcome the current financial crisis. A main goal of public policies tailored to combat recession is to ensure that viable businesses deemed to be profitable even during the current financial crisis won't go down and are competitive when growth again takes off. This is a prerequisite for sustainable employment as well.

1.2 Recent trends in the national innovation performance

Since the 1990s, Finland's innovation performance and innovation policies have repeatedly been ranked high in international comparisons. The European Innovation Scoreboard (EIS) 2008 is not an exception in this sense. Finland's performance was above or close to the EU 27 average almost in all individual indicators and the country belongs to the innovation leaders group. As in the previous year, in the Summary Innovation Index (SII) Finland ranks second out of 27 EU countries and third out of 32 European countries included, after Sweden and Switzerland. Finland ranks first in two of the seven dimensions through which innovation performance of the countries is assessed in the EIS – i.e. Human resources and Firm investments. Regarding the remaining five dimensions, Finland's performance is above the EU average in Finance and support (5th), Linkages and entrepreneurship (8th), and Throughputs (8th), whereas in two dimensions, Innovators and Economic effects, Finland ranks just below the EU average.

In comparison to the EU average, Finland and other countries in the group of innovation leaders except Switzerland have been experiencing a relative decline in their innovation lead over time – i.e. their progress has been slower than the average growth rate of the EIS Summary Innovation Index. Finland, together with Germany, turns out to be a moderate grower among the innovation leaders group when the development of innovation performance is studied over a five-year period. These trend results reflect high initial values for a number of indicators making improvements harder to achieve over time.

A closer look at the three 'clusters' of EIS indicators – Enablers, Firm activities and Outputs – provides a more detailed view on Finland's innovation performance in relation to the EU average as well as on evolving trends in the last five years. Regarding the indicators grouped as Enablers, Finland performs well in Human resources indicators focused on education, even though improvement on this dimension is low in comparison to the EU 27 average, presumably because of already high performance levels leaving less room for fast development. As in the previous year, the indicator measuring the share of venture capital (including early stage, expansion and replacement capital) of GDP has evolved negatively in Finland, whereas the average trend among EU 27 has been clearly positive.

Cluster of indicators under Firm activities in the EIS 2008 consists of three dimensions; Firm investments, Linkages & entrepreneurship, and Throughputs. Finland is doing particularly well in Firm Investments. Again – because of high initial levels – high performance is combined with rather moderate rate of improvement over time. Results of Innobarometer 2009 support the finding: Finland was among the Member States in which the highest proportion of enterprises indicated that they had recently increased innovation spending and projected that they would continue to do so.

Linkages and entrepreneurship in EIS 2008 is one of those dimensions in which Finland has managed to improve its performance in time. Finnish SMEs cooperation in innovation has been growing evidently more than the average of EU 27 over the five-year period studied. Positive development has taken place also in SME in-house innovation activities. In contrast, indicator following Firm renewal – understood as the sum of the number of new and terminated SMEs with at least five employees – turns out to be one of those few indicators in which Finland's performance has been experiencing a downward development in time.

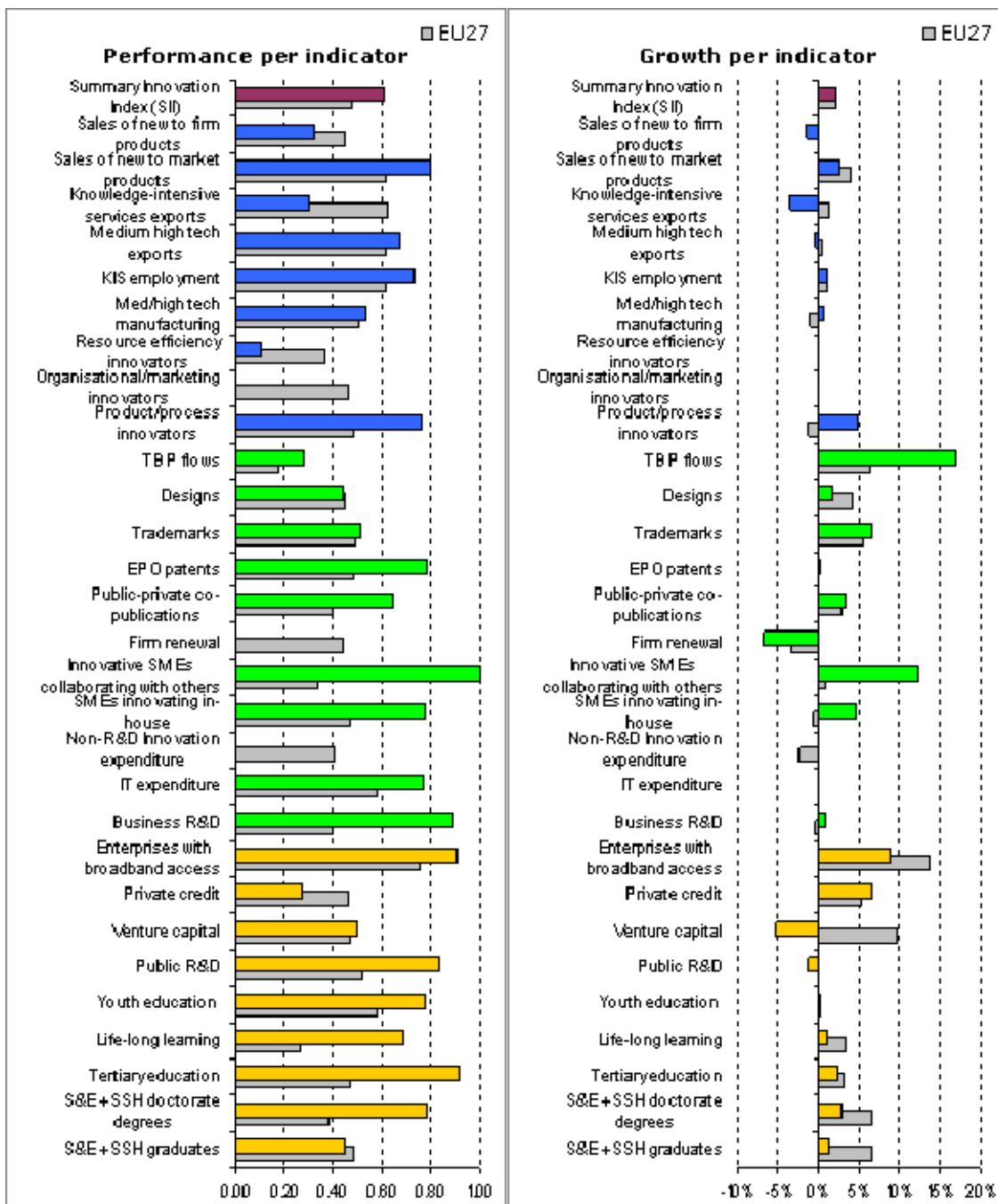
The throughputs innovation dimension comprises of four indicators covering EPO patents, Community trademarks and Community designs as well as the share of Technology Balance of Payments flows of GDP. EIS 2008 marks that the Throughputs dimension overall, and the Technology Balance of Payments flows in particular, has been over the past five years one of the main drivers of the improvement in Finland's innovation performance. In amount of EPO patents Finland has excelled for a long time.

Outputs indicators are divided into two innovation dimensions – one concerning Economic effects and the other Innovators. Trend-wise, Finland's performance in Economic effects has been weakening,

mainly because of a decrease in Knowledge-intensive services exports and New-to-firm sales. On the other hand, New-to-market sales have developed positively when compared to EU 27 average.

Statistics Finland has recently published additional information on the results of the Community Innovation Survey (CIS) which provides some insights on frequency of marketing and organisational innovations among Finnish enterprises in 2004-2006. The results show that organisational innovations were more common in services than in manufacturing. A large share of the companies with innovations reported having accomplished different types of innovations. Generally, the size of enterprise correlated positively with the adoption of marketing and organisational innovations – a phenomenon familiar in product and process innovations as well.

Exhibit 2: European Innovation Scoreboard: country pages



	2001	2002	2003	2004	2005	2006	2007	2008	Growth
SII				0,551	0,546	0,541	0,585	0,610	2,2%
ENABLERS									1,8%
Human resources									1,7%
1.1.1 S&E and SSH graduates	35,0	36,1	35,9	--	36,6	38,3	--	--	1,5%
1.2.2 S&E and SSH doctorate graduates	1,94	1,94	1,90	--	2,23	2,17	--	--	2,8%
1.1.3 Tertiary education	32,5	32,4	32,8	34,0	34,6	35,1	36,4	--	2,6%
1.1.4 Life-long learning	--	--	22,4	22,8	22,5	23,1	23,4	--	1,1%
1.1.5 Youth education	86,1	85,8	85,3	84,5	83,4	84,7	86,5	--	0,3%
Finance and support									2,1%
1.2.1 Public R&D expenditures	0,94	0,99	0,99	1,01	0,99	0,97	0,94	--	-1,3%
1.2.2 Venture capital (3-year average)	--	--	0,202	0,137	0,085	0,104	0,163	--	-5,2%
1.2.3 Private credit	0,56	0,58	0,65	0,69	0,76	0,80	0,84	--	6,6%
1.2.4 Broadband access by firms	--	--	65,0	71,0	81,0	89,0	91,0	--	8,8%
FIRM ACTIVITIES									3,8%
Firm investments									0,5%
2.1.1 Business R&D expenditures	2,35	2,34	2,42	2,42	2,46	2,46	2,51	--	0,9%
2.1.2 IT expenditures	--	--	--	3,2	3,3	3,2	--	--	0,0%
2.1.3 Non-R&D innovation expenditures	--	--	--	--	--	--	--	--	--
Linkages & entrepreneurship									3,2%
2.2.1 SMEs innovating in-house	--	--	--	34,0	--	40,9	--	--	4,8%
2.2.2 Innovative SMEs collaborating with others	--	--	--	17,3	--	27,5	--	--	12,4%
2.2.3 Firm renewal (SMEs entries + exits)	0,9	1,0	0,8	0,7	--	--	--	--	-6,7%
2.2.4 Public-private co-publications (2-year avg.)	--	63,5	63,4	66,2	79,3	83,1	--	--	3,4%
Throughputs									6,2%
2.3.1 EPO patents	263,5	238,9	240,5	261,9	267,6	--	--	--	0,2%
2.3.2 Community trademarks	93,1	84,2	81,3	82,4	97,8	118,9	137,3	--	6,6%
2.3.3 Community designs	--	--	57,3	101,5	102,1	98,2	116,8	--	1,8%
2.3.4 Technology Balance of Payments flows	--	0,86	0,68	0,87	1,19	1,61	--	--	17,0%
OUTPUTS									0,5%
Innovators									4,8%
3.1.1 Product/process innovators (SMEs)	--	--	--	37,0	--	44,7	--	--	4,8%
3.1.2 Marketing/organisational innovators (SMEs)	--	--	--	--	--	--	--	--	--
3.1.3 Resource efficiency innovators									
3.1.3a Reduced labour costs	--	--	--	13,0	--	10,7	--	--	--
3.1.3b Reduced use of materials and energy	--	--	--	5,9	--	5,2	--	--	--
Economic effects									-0,1%
3.2.1 Employment in medium-high/high-tech manuf.	7,44	7,38	6,85	6,79	6,76	6,81	7,03	--	0,7%
3.2.2 Employment in knowledge-intensive services	15,45	15,61	15,71	15,92	15,86	16,40	16,49	--	1,2%
3.2.3 Medium/high-tech manufacturing exports	--	52,5	52,0	50,5	54,5	51,5	--	--	-0,5%
3.2.4 Knowledge-intensive services exports	--	--	30,7	23,3	26,7	--	--	--	-3,4%
3.2.5 New-to-market sales	--	--	--	9,7	--	10,8	--	--	2,8%
3.2.6 New-to-firm sales	--	--	--	5,1	--	4,8	--	--	-1,5%

1.3 Identified Challenges

The performance and trend indicators of the EIS 2008 and other benchmarking studies provide a good snapshot on the country's innovation performance and competitiveness in international comparison. Finland's track record in innovation performance has undeniably been forceful since the mid 1990s, as reflected in the country's international competitiveness.

Today, there is however a need to find new strategies for the future – the past merits and means by which it is achieved cannot ensure success for tomorrow. The critical question concerns if and how Finland is to maintain and further develop its competitiveness in the future. The international

evaluation panel ⁽⁴⁾, which is currently assessing the Finnish national innovation system, pays in its interim report attention to the change in Finland's international position. According to them, Finland has moved from a catching-up country to the technology and productivity frontier during the last couple of decades. In opinion of the panel, in this new phase policies required differ from that of the catching-up stage of development. Consequently, the panel stresses need to (re)focus policies 'on capturing global knowledge spill-overs more than they do today by concentrating on human capital, education and other less mobile factors.'

The current economic crisis raging across the globe does not make the task of policymakers any easier. Serious financial troubles have led a wide number of countries to introduce unorthodox solutions in order to alleviate the situation. The increase of protectionism is a threat for a country like Finland, whose economy relies on large extent on export. In addition, other countries not just in Europe but also elsewhere are adopting more proactive, longer term strategic view to their future in the global economy. An increasing number of countries in the world opt for a knowledge-based high technology strategy on which Finland has built its competitive advantage in the past.

Demographic trends are further complicating the situation. In coming years, the post-war baby boom generation is retiring and this will have significant effects on the Finnish society, not least because the share of working age people will shrink. The demographic changes will also have impact on consumption and on demand for health and welfare services and public finances.

By focusing more closely on the changing landscape of innovation, it becomes clear that there is a distinct group of dynamic challenges Finland is facing because of ongoing transformation of company strategies and emerging new innovation models. Changes in company strategies include, among others, off-shoring of manufacturing industries, a shift from an integrated manufacturing system to globally distributed value networks, as well as a parallel increase in importance of alliances and new types of partnership arrangements. Simultaneously competition is increasingly converging on services instead of products which also calls for rethinking of strategies at company level.

Related changes are taking place in innovation models through which new products and services emerge. For instance, there is a shift towards organisationally and geographically distributed innovation processes. A move from closed to open innovation is one of the facets of this change as are globally networked innovation processes. Another observable phenomenon concerns the growing importance of service innovation and delivery, which requires a new type of logics and organisational arrangements throughout the innovation chain from ideation to development, production and delivery of innovations as well as the ways a new product or service is introduced to market. An important additional element related to new emerging innovation models concerns a pronounced role of users and customers in an innovation process that eventually can lead to successful innovation.

Systemic challenges identified in the national innovation strategy include the high concentration of innovation activities in Finland, the relatively low level of internationalisation of the Finnish innovation system, the rather wide-ranging and scattered group of public activities on innovation, as well as an underdeveloped horizontal coordination of the innovation policy across administrative fields. Thus, there is strong pressure to reform the existing governance structures and to redefine inter-linkages and responsibilities between the public actors involved in innovation policymaking and implementation of policies. Below we have focused on three challenges having close linkages to many of the topical issues high on the innovation policy agenda in Finland.

⁴ The evaluation panel is headed by a panel of 18 experts including six foreign panellists. The foreign panellists who have the main responsibility of the six evaluation themes are professor Charles Edquist, professor Dan Breznitz, director Karl Aiginger, professor Gordon Murray, professor Gianmarco Ottaviano and professor Reinhilde Veugelers.

Exhibit 3: Main innovation policy challenges

Description of challenge	Relevant indicators and trends
1. Transformation of firm strategies and emerging new innovation models. Changes in company strategies, increasing importance of alliances and partnerships as well as changing modes of innovation reflect the need to rethink innovation policies in terms of goals, focuses, design and implementation.	High marks for innovation cooperation reveal the increasing importance of network-type arrangements for innovation. Increasing number of domestic origin multinationals illuminates changes in company structures with bearing on their strategies.
2. Increase and enforce Finland's attractiveness for investments. Maintaining the momentum of attractiveness for investments is not only crucial for future wellbeing, but also an ultimate test of the quality of the national innovation system.	Relevant indicators in this case concern FDI inflows and share of R&D expenditures of foreign affiliates in the host economy. For instance, the share of R&D funded by foreign sources of total R&D expenditures is rather low in Finland compared to the rest of the world. Finland has also not succeeded in attracting foreign direct investments in proportion comparable to some other small European open economies.
3. A need to broaden the base of innovative growth-oriented enterprises. There is evidence that the current Finnish innovation system and a stable business environment have not led truly innovative and growth oriented businesses or entrepreneurial behaviour to the extent expected.	The Global Entrepreneurship Monitor shows that the overall entrepreneurial participation rate in Finland is second highest among the Nordic countries. However, new and established Finnish entrepreneurs are significantly less growth oriented than in the other Nordic countries.

The highlighted challenges are to a large extent intertwined with each other. At the end of day, the central question concerns the continued competitiveness of Finnish economy in the future. The economic crisis has, if anything, accentuated this overarching challenge. Geography of business activities has evolved significantly during the recent years and this is reflected, among others, in companies' decisions concerning location of manufacturing as well as R&D and innovation activities. Against this background, the national policymakers are looking for policies, initiatives and structures which promote Finland's international competitiveness, provide an attractive operational environment for companies' innovation activities and equally attractive living environment for domestic and foreign experts and skilled workforce. This 'meta-challenge' highlights also the need to internationalise the domestic innovation structures and as part of that endeavour strengthen cross-border innovation networks both in Europe and globally. The challenges correspond with the priorities and key challenges identified in the Finnish NRP for 2008-10 in which strong emphasis has been put on the promotion of competitiveness and accelerating productivity development.

1. Transformation of firm strategies and emerging new innovation models. In recent years it has become clear that old innovation policy approach has clung too much to traditional science and technology policy perspective. There is a need to adjust policies to match with changes taking place in firm strategies on one hand and innovation activities on the other, particularly innovation activity that is ever more customer-oriented and user-oriented, as well as networked and open innovation ecosystems which are embedded in a global economy. Policies aiming to enhance innovativeness and promote innovation cannot be any longer restricted to manufacturing industries or technology and R&D intensive ones but have to take into account opportunities for innovation in widely different sectors and in society as a whole, while simultaneously responding the challenges and opportunities opened up by changing innovation models. In addition, there is an identified need to look for new innovative ways to tackle challenges public services is facing.
2. Increase and enforce Finland's attractiveness for investments. In hindsight it is clear that Finland has been among the winners of globalisation on the basis of its performance in the recent past. However, in future the country cannot count on past strengths because the global economic system is dynamic and in constant flux which the present economic downturn

further amplifies. A major future challenge facing economic and societal development will be to keep Finland sufficiently attractive for business and jobs and as a living environment. For instance, it was emphasised during preparation of the national innovation strategy that one of the major future threats facing the country is 'a corporate exodus from Finland due to its failure to offer an attractive business environment, leading to dwindling investments in research and development'.

3. Broaden the base of innovative growth-oriented enterprises. The overall positive development of the Finnish economy and industries over the past decade disguises uneven performance across the board and weaknesses in the composition of company population. In many instances, single industrial clusters and even individual large domestic multinational enterprises have accounted for a large part of the impressive progress in productivity, R&D investments and exports. In this situation, a lack of innovative growth-oriented small and medium-sized companies and start-ups is one of the major identified weaknesses. There is need to promote innovative action, entrepreneurial behaviour, and market dynamics in general.

2. Public Support to Innovation

2.1 Main objectives for innovation policy

In Finland, as in many other countries, innovation has not emerged on policy agenda overnight. During the past couple of decades, issues related to innovation have been usually dealt with in the framework of science and technology policies. This development has given birth to the proliferation of different acronyms, such as RTDI (Research, Technological Development and Innovation) and STI (Science, technology and innovation) in the policymaking context. What is at stake here is the evolving discourse around STI policy during the post world war period. In light of the discourse, the focus of policymaking has become with time broader with a move from science and technology policies towards innovation policy. The latter draws attention to 'all parts of the economy that have an impact on the innovation process' including institutional and organisational dimension of innovation systems – the relationship between different policies resembles an onion in a sense that innovation policy covers also more narrowly-focused science and technology policy (Lundvall & Borrás 2004, 603-615).

Innovation and promotion of innovation activity have been on the policy agenda in Finland since the early 1990s. A strategic policy review, drawn up by the Science and Technology Policy Council every third year since 1987, has been one of the major policy documents defining the framework and goals for science, technology and innovation policy in Finland. The Council has in its successive reviews evaluated the development of the science, technology and innovation policy and presented guidelines for the development in the future.

Notwithstanding the above, it is far from clear whether a standalone innovation policy has existed in Finland until very recently. Without a doubt, there has not been a lack of innovation rhetoric in policy and public discourse. Nonetheless, the bulk of actual measures and initiatives associated with innovation policy have focused on promotion of technology and development of a competence base of the country through research and development in enterprises as well as in universities and research institutes. In other words, policies in favour of innovation have been rather much technology-driven and anchored in science and technology policies flavoured with innovation system thinking.

Exhibit 4: Main innovation policy documents

Policy document	Main objectives
National Innovation Strategy	Strategy is to revise and to complement the well-established competence-based innovation policy focused on science and technology by a demand- and user-based innovation policy approach highlighting the role of competition and market demand for innovation in an open world.

Indeed, innovation has become an explicit policy field in Finland only in recent years. Arguably, a decisive moment was the decision to prepare a first ever national innovation strategy – an intention which was included in the government programme of the Prime Minister Matti Vanhanen's second Cabinet in April, coming into power in April 2007.

The Government committed itself to preparing a national innovation strategy at the very onset of its term. Implementation of the task was given to the Ministry of Trade and Industry, which launched a specific project for preparation of the strategy in autumn 2007. The ambitious goal set for the strategy was to define the package of policies and choices that will make Finland's innovation environment one of the best in the world by 2015. In addition, a steering group appointed for the preparation of the strategy was tasked to define the procedures whose implementation is considered necessary by 2011. Creation of preconditions for a broad-based innovation policy, ways to ensure international competitiveness of the Finnish innovation environment, and promotion of innovation were among the key issues to be tackled during the process.

The project resulted in a proposal for the national innovation strategy published in June 2008. Later that same year, the Government delivered the revised version to the Parliament. The report proposes new outlines for reforming Finland's innovation policy.

A basic idea guiding the strategy is to revise and to complement the well-established competence-based innovation policy focused on science and technology by a demand- and user-based innovation policy approach that highlights the role of competition and market demand for innovation in an open world. According to the strategy, Finnish innovation activities should be strengthened by a number of means, such as reinforcing international operations, increased involvement of users and customers in innovation processes, and broader approach to creativity and innovation. In the core of the proposed strategy are efforts to secure the high quality of innovation environment, international competitiveness and attractiveness of Finland.

A group of identified economic and societal changes facing Finland provides a starting point for the strategy. The strategy delineates four key drivers of change which all involve both threats and opportunities for society and the economy: globalisation, sustainable development, new technologies and demographic changes. It is seen as crucial that policy response and measures are connected with these changes. The document outlines and defines in detail four basic choices selected as a backbone of the national innovation strategy: innovation activity in a world without frontiers, demand and user orientation, innovative individuals and communities, and a systemic approach. Furthermore, the basic choices made in the strategy are translated into ten development guidelines for innovation policy in the future:

- reinforcing the competence base,
- broad-based innovation activity,
- internationalisation of the innovation environment and operating in a world without borders,
- strong and networked innovation centres,
- internationally competitive system of training and higher education,
- developing the Finnish environment to support growth businesses,
- strengthening demand and user orientation,
- central government's corporate steering and a systemic approach,
- resources for innovation activity,
- international review of the innovation system.

The guidelines put forward form, however, a diffuse group of proposals. Many of them are rather general and only loosely point to the direction in which more clearly defined plans and actions are required, whereas others include clear recommendations to be implemented.

Emphasis on demand and user-orientation in the strategy can be considered as one of the most significant novel additions to innovation policy thinking in Finland. However, the guideline concerning demand and user-orientation is still fairly vague. Therefore, the Ministry of Employment and the Economy has been tasked 'in the spring 2009 [...] to draw up a framework for policy measures required to implement the demand- and user-oriented innovation policy'.

The preparation of a demand- and user-oriented policy framework was carried out over a scheduled timeline and the result was published by the Ministry of Employment and the Economy in early June 2009. In the new policy framework, demand- and user-driven innovation policies are kept separate. The central elements of demand-driven and user-driven innovation policy are discussed in the framework under four major headings: knowledge and capability development, incentives for demand-driven innovation, infrastructure improvements and regulatory reforms. All these include in more detail defined actions for demand- and user-driven innovation policy respectively. In the next phase in autumn 2009, the Ministry of Employment and the Economy will on the basis of the framework develop an action plan for the demand- and user-driven innovation policy.

To summarise, from a policymaking perspective the national innovation strategy discerns three complementary dimensions of innovation promotion, namely know-how (science and technology), demand, and users. In the essence, all these are sources of innovation, even though the processes through which innovation emerges may differ – there is place both for R&D and UDI (using, doing,

interacting) approaches in innovation activity. Against this background, innovation policy in Finland is focused on businesses and clusters, new and growing firms, and public services.

At agency level Tekes, a major public funding agency, carried out its strategy formulation process in parallel to the preparation of the national innovation strategy. This concurrence enabled Tekes to take into account emerging guidelines of the national innovation strategy. This process resulted in defining new focus areas published in March 2008. The new guidelines include eight focus areas: well-being and health; knowledge society for all; clean energy; scarce resources; built environment; intelligent systems and environments; service business and innovations; and interactive media. The choices made will guide Tekes research, development and innovation prioritisation for the coming years. In practise, Tekes implements the choices through its programmes and Strategic Centres for Science, Technology and Innovation.

2.2 Innovation governance system

2.2.1 Governmental bodies

At the parliamentary level, a special Committee for the Future evaluates and assesses ongoing processes and trends in the society including issues related to innovation as well. The Committee has focused especially on information society issues, assessing wider societal impacts of technological development.

The main governmental advisory body responsible for RTDI policies is the Research and Innovation Council. A new decree on the Research and Innovation Council came into force in the beginning of 2009. Based on the development guidelines presented in the National Innovation Strategy, the decree stipulates that the new Council replaces the former Science and Technology Policy Council which has had a narrower scope in its tasks and composition. The Council, chaired by the Prime Minister, advises the Council of State and its Ministries in matters concerning research, technology and innovation and their utilisation and evaluation. The Research and Innovation Council is responsible for the strategic development and coordination of Finnish science and technology policy as well as of the national innovation system as a whole. The Advisory Board for Sectoral Research established in 2007 is another governmental advisory board. It is the responsibility of the Board to coordinate the overall steering of state sectoral research. The aim is to improve ministries' commissioning know-how, enhance the targeting of sectoral research and step up the utilisation of research over administrative boundaries.

The key ministries with responsibility for the science, technology and innovation policy include the Ministry of Employment and the Economy, and the Ministry of Education and Science. The Ministry of Employment and the Economy assumed in 2008 responsibility for the duties of the former Ministry of Trade and Industry, Ministry of Labour and the Regional Development Unit in the Ministry of the Interior and deals with, among others, matters relating to industrial technology and innovation policies. The administrative field of the Ministry of Employment and the Economy includes Tekes, the Finnish Funding Agency for Technology and Innovation and a number of public innovation service organisations and public research institutes. The Ministry of Education and Science is in charge of matters relating to education and training, science policy, institutions of higher education, and the Academy of Finland. The administrative branches of these two Ministries receive a bulk, over 80%, of government R&D funding.

2.2.2 Main bodies managing implementation of policies

At the agency level Tekes, the Finnish Funding Agency for Technology and Innovation has a central position in the formulation and implementation of technology and innovation policy. It is a principal government financing and expert organisation for research, technological development and innovation in Finland. The Academy of Finland, which includes four national research councils, is responsible for

the financing and strategy formulation of the basic research, research training and science policy. The financing function is carried out through individual projects, programmes, centres of excellence, research posts and research training.

Since its founding in 1983, Tekes has had a central position in the formulation and implementation of technology and innovation policy. It is a principal government financing and expert organisation for research, technological development and innovation in Finland. For instance in 2009, Tekes share of public R&D funding is 30% (EUR 574.9 million). Over time, Tekes has updated and broadened its focus in parallel with evolving innovation policy understanding and emphasises today – besides technology – the significance of service-related, design, business, and social innovations. Here it is worth noting that Tekes has had a rather strong role in technology and innovation policymaking in Finland. While Tekes falls administratively under the Ministry of Employment and the Economy – as it did under the former Ministry of Trade and Industry – it has enjoyed relative autonomy in setting up programmes and in commissioning R&D funds from the state budget.

There are a number of other public agencies and actors which are involved in implementing innovation-related policies in Finland as well. Finnvera, Finnish Industry Investment, Finpro, Sitra, Employment and Economic Development Centres (T&E Centres), and the Foundation for Finnish Inventions all have important roles to play in implementation of innovation policy. Finnvera, a state-owned company, acts as a provider of complementary risk financing services in close association with banks and other financing organisations. It has 16 regional offices around the country. Finnvera's subsidiary, Veraventure Oy, is responsible for capitalising and developing corporate regional investment funds. Finnish Industry Investment Ltd, a state-owned investment company engages in equity capital investment and invests in venture capital funds and directly in growth companies, together with private co-investors.

Finpro is an expert service organisation whose task is to speed up the internationalisation of Finnish companies. Recently, Finpro has also taken an active role in promoting innovation by utilising its international network of Trade Centres to identify new trends and signals on future market evolution. Finpro's activities are partly financed from public funds. The Finnish Innovation Fund, Sitra, is aiming to achieve a strong social impact by focusing competencies on selected programme areas by utilising a wide array of methods, including studies, strategy processes, innovative experiments, business development and corporate funding (see also section 3.2.1). There are 15 T&E Centres across the country who provide a wide range of advisory and development services for businesses, entrepreneurs and other clients. T&E-Centres' tasks include the promotion of business, employment and rural vitality within their region, based on the provision of advisory, training, development and financing services in issues related to labour and business. The Foundation for Finnish Inventions supports and promotes invention work and the development and exploitation of inventions in Finland.

In addition, the public research and education system has a prominent role in implementing Finnish innovation policy. The system includes a Higher Education sector that covers all 20 universities and a network of polytechnics (26 in 1 January 2009) as well as the state research institutes, altogether 19, spread out into eight policy sectors. The institutes provide knowledge and skills in their respective fields and have an important role in knowledge and technology transfer and developing the knowledge-based society. In terms of research volume, the largest institutes are VTT Technical Research Centre of Finland, the Forest Research Institute and the MTT Agrifood Research, the National Institute for health and Welfare and the Institute of Occupational Health, and the Environment Institute.

Apart from public actors involved in design and implementation of innovation policy, there are also stakeholders actively monitoring development and participating in policy formulation. The Confederation of Finnish Industries, EK, whose members cover a wide variety of business sectors and all sizes of companies, is a primary stakeholder organisation representing an industrial view towards innovation policymaking. EK has a department specialised in innovation environment and competences. EK influences national policy and legislation by providing opinions at request, releasing its own statements and recommendations, and participating in committees and working groups, through specific meetings and networking initiatives.

2.3 Public funding to innovation

2.3.1 Review of the current range of support measures for innovation

Analysis in this section is based on the PRO-INNO TrendChart-ERAWATCH support measure database. All the figures and tables used in the analysis can be found in the ANNEX 1.

The overview of policy priorities addressed by the support measures (see Figure 1 in ANNEX 1) indicate that Finnish innovation policy instruments are largely prioritised to support research in universities and public research organisations – when weighed by the number of support measures. Over 50% of all support measures have a priority to support such activities whereas the corresponding figure for the EU 27 remains under 20%. The reason for such a striking difference may be a relatively high number of disciplines or technology specific research programmes financed or administered by the Academy of Finland and Tekes. In addition, the distribution of policy measures according to policy priorities in Finland is relatively similar to the EU 27 average where the majority of policy measures falls into main categories of Research and Technologies (2) and Promote and sustain the creation and growth of innovative enterprises (4). Much less emphasis is put on Governance and horizontal research and innovation policies (1), development of Human resources (3) and Markets and innovation culture development (5).

A review Finnish support measures and how they are targeted to certain research and technology fields (see Figure 2 in Annex 1), highlights the most common fields, which include Health, Socio-economic sciences and humanities, Environment, Biotechnology and ICT. Compared to results of the EU 27 average Finland has significantly more policy measures targeted to Health, Socio-economic sciences and humanities, Services, Government and social relation and Industrial production than the EU 27. In the Finnish case, most of the policy measures are targeted to higher education institutions, research institutes and equally to all companies (see Figure 3 in Annex 1). A clear reason for this is, again, the large number of research and technology programmes administered by Tekes and Academy of Finland which are targeted to all universities and state research institutes, as well as to companies. The main difference compared to the EU 27 is the clearly less Finnish measures targeted to individual scientists and non-profit technology and innovation centres than in the EU 27.

When reviewing aspects of innovation process targeted by Finnish policy measures, most of the measures are targeted either to dissemination of technologies in enterprises, development/prototype creation, applied industrial research, awareness-raising amongst firms on innovation and promotion of entrepreneurship/start ups (see Figure 4 in Annex 1). In the EU 27 there are clearly more measures targeted to all aspects of innovation process, and the most notable differences – where the number of measures in Finland is smaller than in EU 27 – include aspects of commercialisation of innovation (including IPR) and innovation management tools (including quality).

Information on sources of co-financing of support measures shows that over 30% of the Finnish policy measures are co-financed by the private sector, as in the EU 27 (see Figure 5 in Annex 1) ⁽⁵⁾. However, some notable differences exist: over 20% of the Finnish measures are co-financed by foundations or charities whereas in the EU 27 the figure is much lower. In addition, nearly 30% of the EU 27 measures are co-financed by the Structural funds whereas in Finland the same figure is less than 10%.

Funding of support mechanisms are mostly based on grants, both in Finland (83%) and in the EU 27 (72%) (see Figure 6 in Annex 1). Only few of the measures include subsidised loans, venture capital, tax incentives or guarantees.

⁵ In the Finnish case nearly 40% of the measures also use 'Other co-financing' which refers to a fact that many measures, especially research and technology programmes, are financed by multiple public agencies.

A few remarks regarding the analysis of the support measure database should be made here. It is evident that most emphasis in Finnish innovation policy is put on research and technology programmes which support R&D activities in universities, public research organisation and companies, as well as on cooperation between research organisations and companies. That said, a simple counting of policy measures may not be the most sophisticated way to analyse policy priorities. Unfortunately, the annual budget data ⁽⁶⁾ of Finnish policy measures in the database does not enable us to make reliable monetary estimations how policy priorities are emphasised. However, there are some recent policy developments and changes in balance given to the different forms of public intervention.

Recent changes in policy priorities include the relative importance of Tekes in government innovation policy, which has been growing steadily in recent years. For instance between 2005 and 2008 nominal government spending on R&D increased 17.1% whereas Tekes funding increased 26.1% in the same period. As mentioned in Section 2.2.2, Tekes has updated and broadened its focus in parallel with evolving innovation policy understanding and emphasises which have had significant impact on the current policy priorities. For instance the annual amount of Tekes R&D funding targeted to services and non-technological industrial development ⁽⁷⁾ exceeded funding targeted to manufacturing industries ⁽⁸⁾ in 2007 and continued to increase in 2008. Whereas funding for service development has grown steadily since 2005, funding for manufacturing industries (including construction) has been declining since 2006 (Tekes 2009). Major changes in policy priorities set by Tekes include the launching of Serve programme (FI 77) in 2006 and the extension of time frame and increase in the programme budget in 2009. Other novel efforts by Tekes include the launch of the Innovations in social and healthcare services programme (FI 79) and the Innovations in public procurement (FI 105) funding scheme. These new measures indicate, in a concrete way, that policy priorities are set to broaden the base of innovation activities in Finland. On one hand, scope of public support is increasingly extended to development service innovations and service capabilities and, on the other hand, the scope of target groups has been extended to include more public service providers (municipalities, hospitals, health and social care centres, etc).

Probably the most ambitious innovation policy development projects in Finland in recent years have been the establishment of the Strategic Centres for Science, Technology and Innovation (SHOK). In Strategic Centres, companies and research units work in close cooperation, carrying out research that has been jointly defined in the strategic research agenda of each Centre. The research aims to meet the needs of Finnish industry and society within a five-to-ten-year period. Between 2008 and 2009 six Centres have started their operations ⁽⁹⁾. Each Centre is coordinated by a non-profit limited company, jointly owned by the shareholders (including companies, research organisations, funding agencies and different interest groups). Tekes is committed to the operations of the Strategic Centres and their development and will finance the Centres' research programmes and projects. It is estimated that in future half of the Tekes' programme funding is channelled through the Centres. It can be said that Strategic Centres represent market-driven and user-driven innovation policy approach by allowing industry and other interest groups, i.e. actors that utilise the research results, to participate into the decision making related to future R&D agendas.

⁶ Annual budgets of the policy measures are very difficult to obtain from the agencies and policymakers, and main innovation policy agencies, such as Tekes, do not differentiate annually the amount of spent money on specific instruments in their annual reviews or other official documents. Only a minority of the Finnish measures reveals the annual budget data, which does not allow us to make comparative analyses. Total budgets of the measures are better available but the database consists of ongoing measures and fixed-term measures which make the comparison problematic (or it would require sampling of the data – which in this case would not serve the purpose of this report).

⁷ including software and data processing; architecture, engineering and technical services; R&D services; wholesale and retail services; management consulting; and healthcare and social services (Tekes 2009).

⁸ including electronics and electro-technical industry; machines and metals industry; chemical industry; forest industry; foods; electricity, gas and water supply; and construction (Tekes 2009).

⁹ Centres include: Forest cluster, Forest Ltd; Information and communication industry and services, TIVIT Ltd; Metal products and mechanical engineering, FIMECC Ltd; Energy and the environment, CLEEN Ltd; Built environment innovations, RYM-SHOK Ltd; Health and well-being (launched in April 2009).

Another policy priority area where more emphasis has been put on recently is the development of innovative start-ups (including high-growth ventures). In 2008 Tekes launched a funding scheme for young innovative start-ups (FI 36) and the Ministry of Employment and the Economy in cooperation with Tekes and Avera (a subsidiary of Finnvera Ltd) established the Vigo Accelerator Programme (FI 104) in spring 2009. Important aim of the Vigo programme is to attract private risk capital investments for participating companies. Whereas public support in the former funding scheme was estimated to be approximately EUR 2 million in the first year (2008), public support (including Tekes grants/loans and investments by Avera) for the first three years period in Vigo programme is estimated to be approximately EUR 45 million. Yet another recent policy development related to innovative start-ups is that the Ministry of Employment and Economy announced in the beginning of 2009 that it will grant extra 3 M€ to the Foundation for Finnish Inventions (FI 33). The money is expected to be spent on pre-incubation activities of promising business ideas and ventures during the 2009. These new efforts imply that there is a growing interest among policymakers to shift emphasis of the innovation policy from 'traditional' research and development support to business development, commercialisation and entrepreneurship. Therefore, different aspects of innovation process are covered better in recent policy development.

When we consider the most important (non-financial) measure in recent policy development, the Government decree on research, development and innovation (298/2008), which came into force in May 2008, has enabled public agencies to expand R&D support to business development in a broader meaning, and consequently, prepared the way for launching above mentioned support schemes.

2.3.2 New or modified support measures

The Finnish Funding Agency for Technology and Innovation, Tekes decided to extend the Serve programme's (FI 77) time frame until 2013 with an increased budget. The programme aiming to increase and broaden the services development of the Finnish industry was launched in 2006, and without an extension would have run until 2010. Rapid changes in the service business sector and companies' increased interest in development of the service sector were taken into account when the decision to prolong the programme was made. At the same time, the programme's content was redirected – the focus is now on developing high value added services, especially in the business value chain, industry and expert services for business.

Innovations in social and healthcare services programme (FI 79) is a new Tekes programme which was commenced in summer 2008 and will run until 2015. The programme's ambitious goal is to promote the comprehensive revamping of the social and healthcare service system and the extensive development of the sector in Finland. Preparation and management of the programme is based on wide collaboration with the Ministry of Social Affairs and Health, the Ministry of Employment and the Economy, the Ministry of Finance, as well as a number of public, semi-public and private stakeholders. Overall, this is the first Tekes programme directed to the social and healthcare services and to the development of the service system. By its volume, the programme is one of the largest in Tekes history; the total budget is foreseen to be around EUR 240 million of which the Tekes share is around half.

The Ministry of Employment and Economy in cooperation with Tekes and Avera (a subsidiary of Finnvera Ltd which is coordinating public seed funding) established the Vigo Accelerator Programme (FI 104) in spring 2009. The programme is part of broader goal to strengthen growth company ecosystem in Finland. Besides enhancing the high growth business development, the way in which the programme is built supports as well the development of the venture capital industry in Finland. The first three accelerator teams were selected in June 2009. A 'high growth accelerator team' is a company founded by top level business development professionals who invest their capital and know-how in order to assist selected business cases to become rapidly attractive targets for prominent venture capital. The accelerator company commits to acquire new investments for and support growth of its target companies. Public funds channelled via Tekes and seed-fund Vera are to be used to advance the efforts. The incentive structure for the accelerator teams is based on appreciation of their possessions in the high growth companies and exit opportunity in later stage.

Tekes published in June 2009 a new funding scheme targeting Innovations in public procurement (FI 105). The initiative aims to use public procurement to further markets operation through demand. Funding can be granted for such public procurement cases in which the responsible key persons are committed to plan and develop procurement in innovative ways. The funding scheme can be understood as a concrete response to call for demand- and user oriented innovation policy voiced in the national innovation strategy in 2008.

Exhibit 5: New Innovation Policy Support Measures (since the last report)

IPM N°	Title	Innovation policy framework category	Organisation responsible
FI 77	Serve – Pioneers of Service Business	4.1.2 Support to innovation in services	Tekes
FI 79	Innovations in social and healthcare services	4.1.2 Support to innovation in services 4.2.2 Support to organisational innovation incl. e-business, new forms of work organisations, etc.	Tekes
FI 104	Vigo Accelerator Programme	4.3.2 Support to risk capital 4.3.1 Support to innovative start-ups including gazelles	The Ministry of Employment and the Economy, Tekes
FI 105	Innovations in public procurement	5.1.1 Support to the creation of favourable innovation climate (e.g. roadshows, awareness campaigns)	Tekes

2.3.3 Strengths and weaknesses in the innovation policy support system

Clearly one of the strengths of the Finnish innovation policy support system is the increasing (monetary) effort put on 'traditional' research and development activities. The system also strongly supports, and often necessitates, cooperation between research organisations and companies when allocating funding for R&D activities. At the same time, one of the weaknesses of the system could be its supply-based strategy (also noted in the interim report of the Evaluation of the Finnish national innovation system) which is strongly based on the coordination by Tekes. In addition, all the aspects of the innovation process had not been taken into account in policy development earlier, especially when it comes to commercialisation of inventions, acquiring risk capital and development of business competencies of SMEs.

However, the policy development in recent years (see section 2.3.1), including the launch of new measures (see section 2.3.2), shows that emphasis have been put to: 1) broadening the base of innovation activities in society (both sectorally and by target groups); 2) developing processes that take into account users of R&D outputs; and 3) support business development, commercialisation and entrepreneurship. So, recent policy development and launching of new measures are targeted to meet the challenges that Finland faces but at this moment it is too early to assess whether this policy will be successful.

3. Innovation policy and competitiveness: an appraisal

3.1 The ability of policy to address challenges

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

3.1.1 How well does policy respond to innovation challenges?

A recent development in policy priorities – which is extensively described in the national innovation strategy – shows that policymakers have taken serious efforts to meet the challenges that face the Finnish innovation environment and economy. Also some practical measures have already been launched to support the implementation of the innovation strategy. However, the guidelines that the strategy has put forward form a diffused group of proposals – many of them are rather general and only loosely point the direction in which more clearly defined plans and actions are required, whereas others include clear recommendations to be implemented. In particular, the highly emphasised concept of demand-based and user-based innovation policy needs further clarification in order to be implemented. Comments in the interim report of the evaluation of the Finnish national innovation system were rather critical about the demand-driven and user-driven innovation policy approach: 'The panel's view is that most firms are not in need of further public motivation or direct public support for demand and user orientation [...] even if demand and user orientation might be lacking in certain firms, in this domain the private market does not necessarily fail'.

Although a lot seems to be happening in the innovation policy field and some new ambitious measures have been developed in recent few years, it is worth considering whether these measures are adequate enough to meet the challenges in the Finnish innovation system. For instance, are increasing public investments on supporting innovative growth-oriented companies set to the level where we may expect to see a growing number of venture capital backed growth companies in the near future? For long there has been a shared opinion that Finland has been unsuccessful in generating and supporting high-growth start-ups. The Finnish high-growth ecosystem has been regarded too fragmented – it produces a fair number of new potential high-growth companies but average VC investments per company are fairly modest compared to similar countries or regions. For example, when average initial investment on Finnish early-stage companies was around EUR 300 000 in 2006, in Israel the average initial investment per company was EUR 2.8 million (VICTA 2007) ⁽¹⁰⁾. New measures taken to incubate innovative high-growth companies in Finland (as described in Section 2.3.1) will increase the amount of annual public funding in this area approximately EUR 20 million. Thus, these additional investments do not provide significant monetary upgrades to the high-growth ecosystem, unless the new measures are successful in attracting additional private venture capital for early-stage companies.

¹⁰ VICTA (2007) VICTA – Virtual ICT Accelerator, Final Report, Arvoketju Ltd.

3.2 Effectiveness of policy design

The public innovation governance system and the entire innovation and business development service system have been under critical consideration during the last few years in Finland. The wide scope of structural changes is demonstrated by reorganisation of ministry structure, ongoing structural reform of the universities and renewal of sector research, as well as plans to renew the enterprise support system.

The establishment of the Ministry of Employment and Economy at the turn of 2008 was one of the most significant changes in the Finnish innovation governance system for a long time. Compared to the past, it seems that the new ministry has taken a more proactive stance in formulation of the policy and aims towards a more coherent policy approach within its administrative field. The new ministry follows a corporate/consortium management approach adopted at the central government and it also formulated its first concern-level strategy in spring 2009. Whether this will affect the ministry's subordinate agencies in the future, such as the relatively autonomous Tekes, remains still an open question. In public debate, the establishment of the new ministry has not gone through without challenges. By merging functions from three different ministries some 'cultural clashes' have been identified.

An often reminded governance failure in the Finnish system relates to the publicly funded enterprise support system (including the support for innovative start-ups). The system includes 1 200 service points throughout the country and it employs approximately 4 500 people. In the interim report of the Evaluation of the Finnish National Innovation System it is reported: 'the enterprise support system has become excessively complex to both access and administer [...] The need to devote time and attention to understanding the complex public support system diverts scarce managerial resources from a more productive customer and market orientation. Furthermore, the provision of advice and support does not seem to take fully into account how firms evolve over time'. Thus, there is increasing pressure to streamline the support system and/or to develop more effective governance tools to administer it.

3.2.1 Process of delivery

As mentioned before, the relative importance of Tekes in government innovation policy has been growing steadily in recent years. The total number of staff, as well as operational costs in Tekes have slightly grown during the last five years. However, the administration has not grown as fast as the funding mandate. Also in 2008, the Tekes organisation gained 11 experts when the implementation of the Workplace Development Programme (FI 76) was assigned to Tekes (previously the Programme was administered by the Ministry of Employment). By the end of 2008 the total number of Tekes staff was 291 people. The Ministry of Employment and Economy employed 606 people in 2008. The whole administrative branch under the ministry employs over 10 000 people. The currently running Government Productivity Programme has set some restrictions regarding the human resources of many public agencies. For instance, the number of staff in Tekes is expected to remain the same between the years 2008 and 2012. The whole administrative branch under the Ministry of Employment and Economy is obliged to decrease its number of staff by 1000 people within the same period.

There is a slight but important change in the process of implementing incubation and start-up support policy. As put forward earlier, carrying out new measures targeted to this area (the funding scheme for young innovative start-ups and Vigo Accelerator Programme) has been assigned to Tekes. However, this policy area has been dominated earlier by the Finnish Innovation Fund (Sitra), an independent public fund which operates under the supervision of the Finnish Parliament. Sitra has been actively investing in high-tech start-ups and it has initiated several technology transfer companies, technology incubators and measures aiming to support commercialisation of inventions (mainly during the 1990s). However, in recent years Sitra has been less active in investing in start-ups and has also gradually withdrawn its holdings from the technology transfer companies (see e.g. Pelkonen et al. 2008). Thus, the system has undergone a change in the process of delivering support for incubation and start-up activities.

The main reason why Tekes has gained more responsibility recently in implementing Finnish innovation policy is that it is considered, among public authorities and industry, a highly respected and successful organisation. However, current development which has broadened the focus of the innovation policy may add challenges to Tekes operations in the future. There is an increasing need to build competencies, as well as human and social capital related to non-technological aspects of R&D.

3.3 Impact of public support for innovation

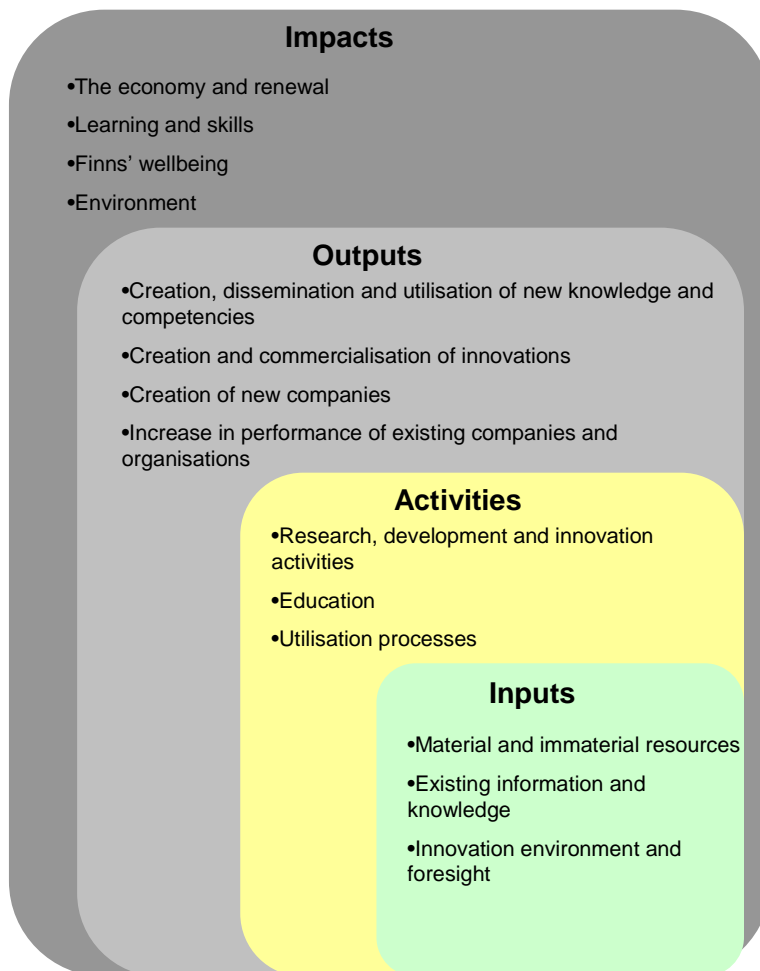
Evaluation of science, technology and innovation policy instruments, programmes and organisations has become a systematic practice in Finnish policymaking. It is systematic in a sense that every instrument, programme or organisation is expected to be evaluated at some point – however there is no commonly approved framework how these evaluations should be carried out. In 2008 the National Audit Office came into rather critical conclusions about current R&D evaluation practices in Finland (¹¹). In general, R&D and innovation evaluations are, in most cases, aiming at development and reorientation of the instrument, programme or organisation under review. According to the Audit Office, the evaluations that have been recently carried out do not take into account sufficiently the accountability aspects related to public administration.

There is a tendency among key policymakers to develop a more generic and commonly shared framework for analysing impacts of science, technology and innovation. In 2007, the Science and Technology Policy Council of Finland made a statement on the assessment and forecasting of the effectiveness of science, technology and innovation in Finland. As a response to the statement, Tekes and the Academy of Finland initiated a project titled the Impact Framework and Indicators for Science, Technology and Innovation (VINDI) in early 2008 (¹²). The goal of the project was to create an overall view – called an impact framework – of effectiveness of science, technology and innovation, and to determine the most important indicators of effectiveness, as well as their sources of data. The impact framework is presented in Figure 1 below.

¹¹ Valtiontalouden tarkastusvirasto (2008) T&k-arviointitoiminta. Valtiontalouden tarkastusviraston toiminnantarkastuskertomus 157/2008.

¹² Lemola, T., Lehenkari, J., Kaukonen, E. and Timonen, J. (2008): *Vaikuttavuuskehikko ja indikaattorit*, 'The Impact Framework and Indicators for Science, Technology and Innovation'. *Publication of the Academy of Finland* 6/08.

Figure 1. Impact framework for science, technology and innovation (Lemola et al. 2008)



The key question from the point of view of the impact framework is what overall impacts are expected of science, technology and innovation, and what impacts can be expected. The aim is examination of the impacts on a normative basis and enabling such examination to be used for the strategic development of science, technology and innovation policy. Within the impact framework, the impacts of science, technology and innovations are examined in relation to four key areas of society and the economy, called impact areas. They are: 1) the economy and renewal, 2) learning and skills, 3) the Finns' well-being, and 4) the environment. The report of the VINDI project states that there are many indicators available addressing inputs, outputs and activities of science, technology and innovation. However, there is a shortage of indicative data about the social and economic impacts of science, technology and innovation, and particularly of indicators that would enable tracing of successive chains of impacts (Lemola et al. 2008).

The conceptual work done in the VINDI project does not give any evidence of the impact of public support for innovation. However, some evidence can be gathered from different sources. Tekes prepared a review in 2008 which addressed the impacts of innovation activities and the role of Tekes in promoting innovation in Finland¹³. The review was prepared by utilising existing studies and evaluations and Tekes' own project database and customer surveys. The impact assessment framework that Tekes is using resembles the framework presented above. In Tekes' framework the impacts are presented in a logical chain: inputs – outputs/outcomes – immediate impacts – impacts to economy and society. For

¹³ Innovaatio toiminnan vaikutukset. Osaamista, uudistumista, kasvua ja hyvinvointia, Tekes 2008, published only in Finnish.

instance in 2007, 1 940 finished Tekes projects generated all together 976 academic theses, 2 072 publications, 695 patent applications, 906 new or improved products or services, and 222 new or improved production processes. According to most of the Tekes' customers, participating in Tekes projects enable e.g. more expanded development projects than what would occur without Tekes funding, and increased resources and an increased number of cooperation partners for the projects. In addition, customers report that Tekes funding has increased the competence of their staff. It has enabled higher-risk and longer-term development projects (especially among smaller companies), and funding has assisted companies to reach better international markets. Some immediate impacts to companies operations, when they participate in Tekes projects were also identified. It was estimated that SMEs gain EUR 15-20 increase in annual turnover and exports per public EUR 1 invested, and almost 60 new jobs per public EUR 1 million invested within a five year period. Tekes funding was also considered to generate positive impacts on competition within industries – the majority of Tekes customers reported that projects increased their competitiveness through product and technology differentiation. Moreover, several Finnish studies carried out in this decade have found strong evidence that Tekes funding does not replace private R&D investments – instead it has an increasing effect on companies' own R&D funding.

During this reporting period no other relevant evaluation results were published by central policymakers. Based on existing information it is fairly difficult to assess what the impact is of the whole innovation support system on the Finnish economy and society. Moreover, it is very challenging to assess whether e.g. input/impact ratio is efficient in Finland or how successful the support system is compared to other similar countries. It would require comprehensive evaluation studies, as well as comparable data from other countries. However, currently ongoing international evaluation of the Finnish innovation system will provide more information about the functioning of the system later this autumn.

3.3.1 Conclusions: possible future actions and opportunities for innovation policy

In the near future, innovation policy development in Finland will be dominated by the implementation of the National innovation strategy, as well as proposals put forward by the international evaluation panel. In many areas the National innovation strategy lacks concrete plans of action, and especially the concept of demand-oriented and user-oriented innovation policy needs clarification in order to become a concrete tool for policymaking. Nonetheless, some new measures are already launched (as described in the section 2.3.1) which reflects the choices and guidelines set in the strategy.

Certainly the complex enterprise support system will face some actions in the future. The aim of the current Cabinet is to create a 'one-stop shop' for public business development services. Attention will be given to address unnecessary overlaps that may exist. However, streamlining the system may prove to be challenging task since many enterprise support services are not directly governed by governmental actors. Some of the services are financed and/or administered by local municipalities, a consolidation of municipalities or by universities, delimiting the central government's possibilities to revise the system alone. Launching the new preferential tax treatment scheme to company R&D from the beginning of 2010 and its impact on R&D behaviour of companies will also be carefully observed by policymakers. Interesting aspects in the follow-up are how the tax treatment will broaden the base of R&D performing companies in Finland and to what extent it will complement or replace current direct R&D funding.

Annexes

Annex 1: Country pages – Innovation Policy Support factsheet

Figure 1. Policy priorities addressed by the support measures in Finland and EU 27

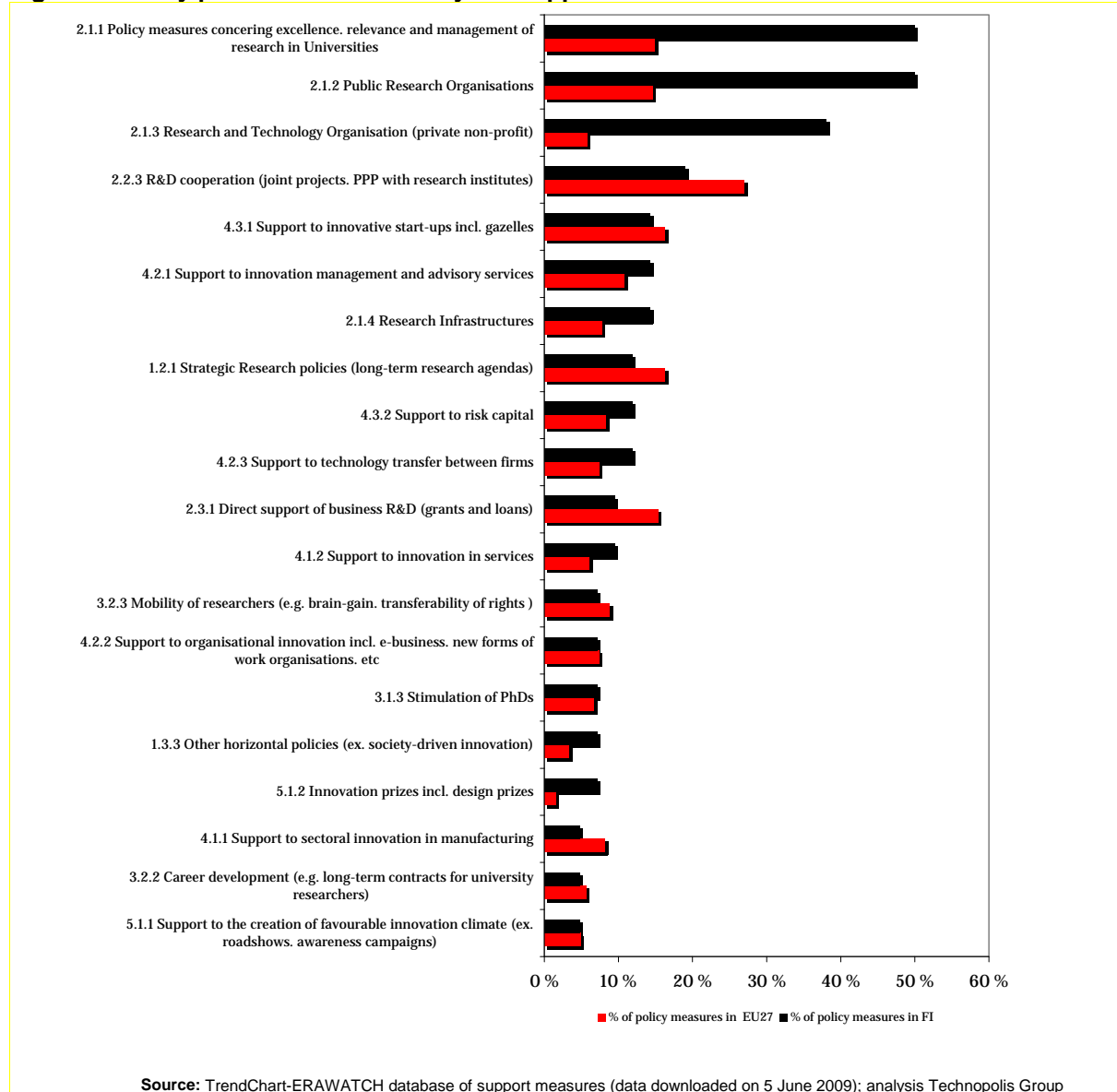
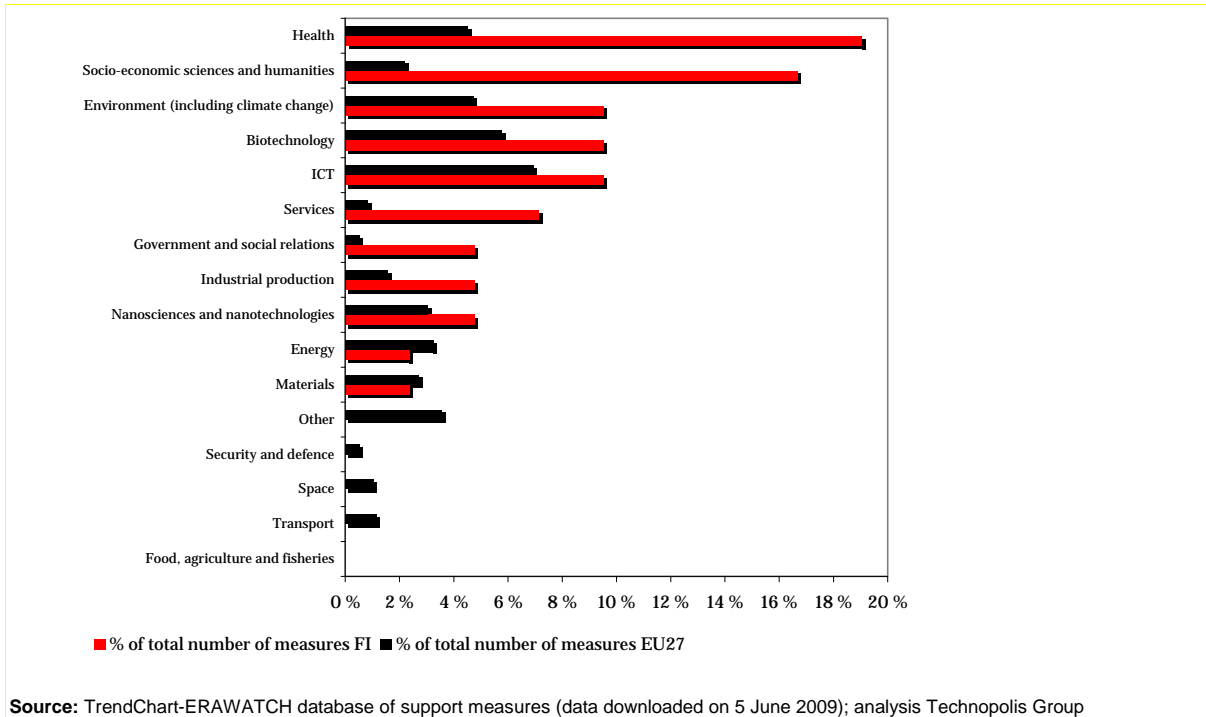
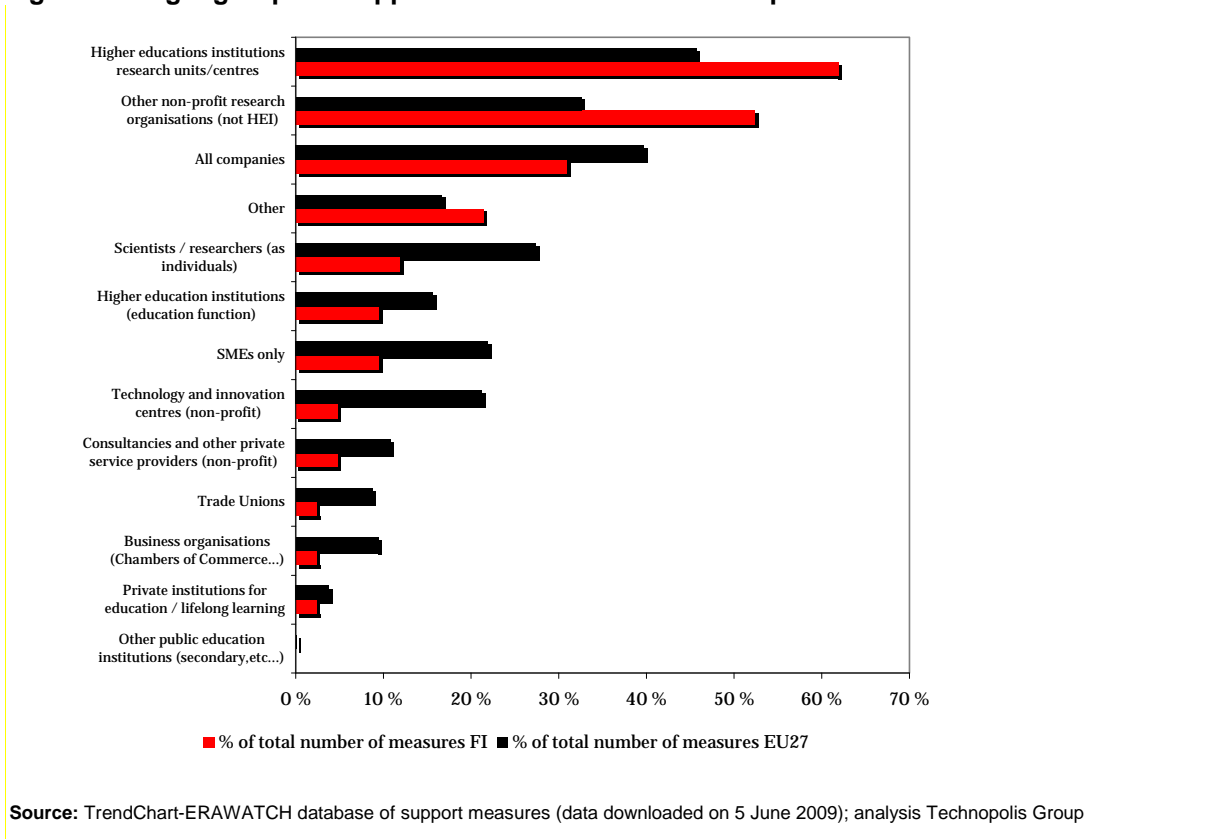


Figure 2. Targeted R&T fields by support measures in Finland compared to EU 27



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

Figure 3. Target groups of support measures in Finland compared to EU 27



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

Figure 4. Aspects of innovation process targeted by measures in Finland compared to EU 27

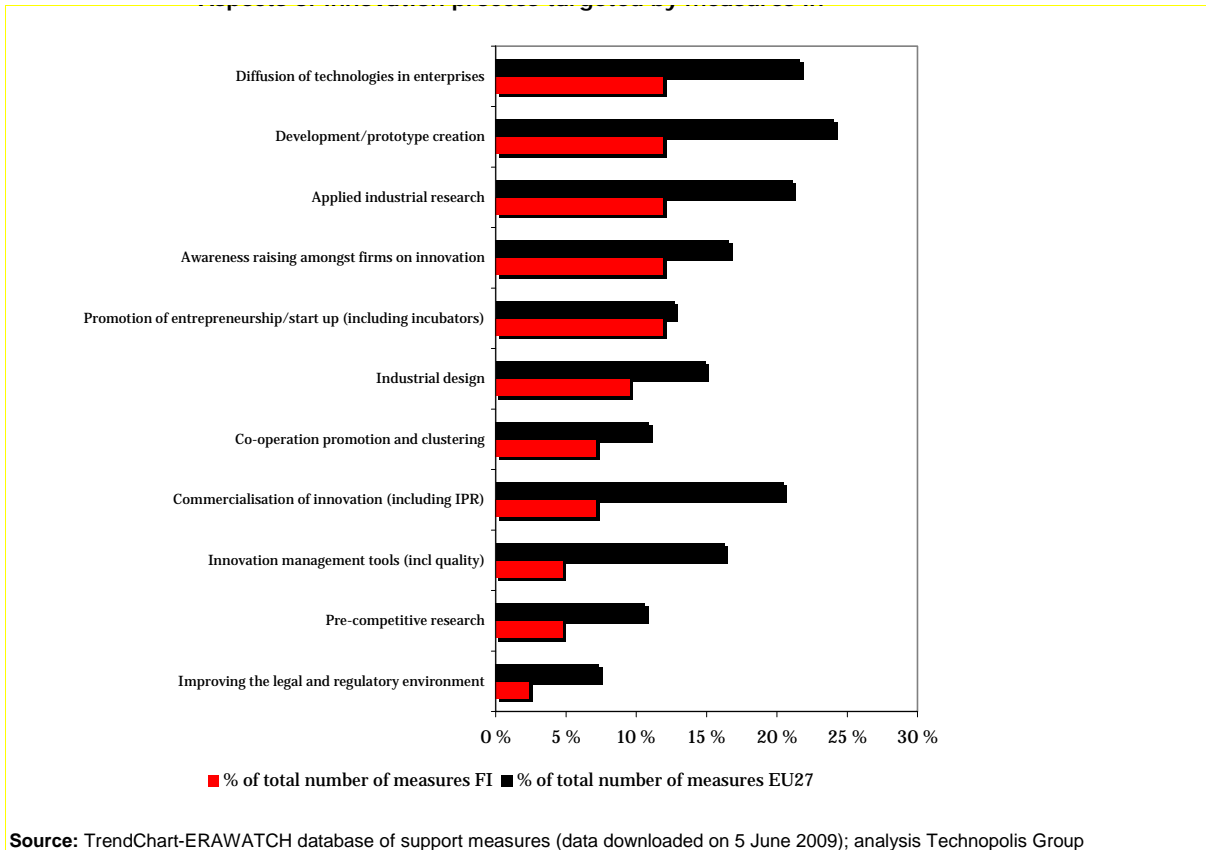


Figure 5. Sources of co-financing of support measures in Finland compared to EU 27

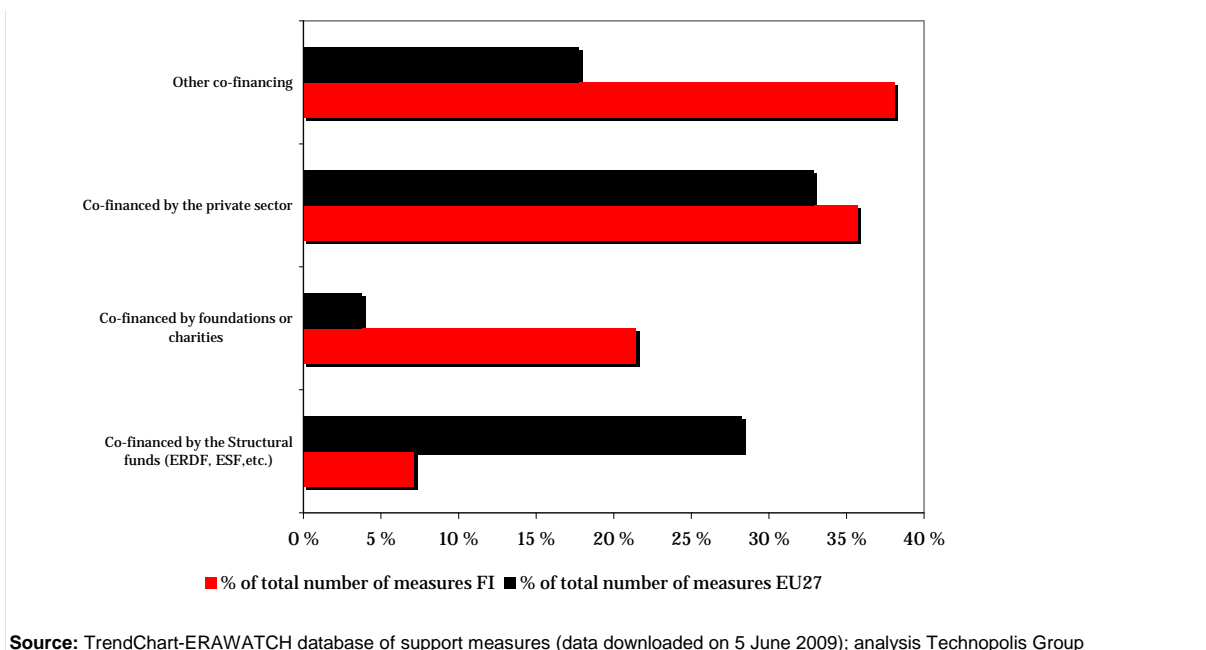
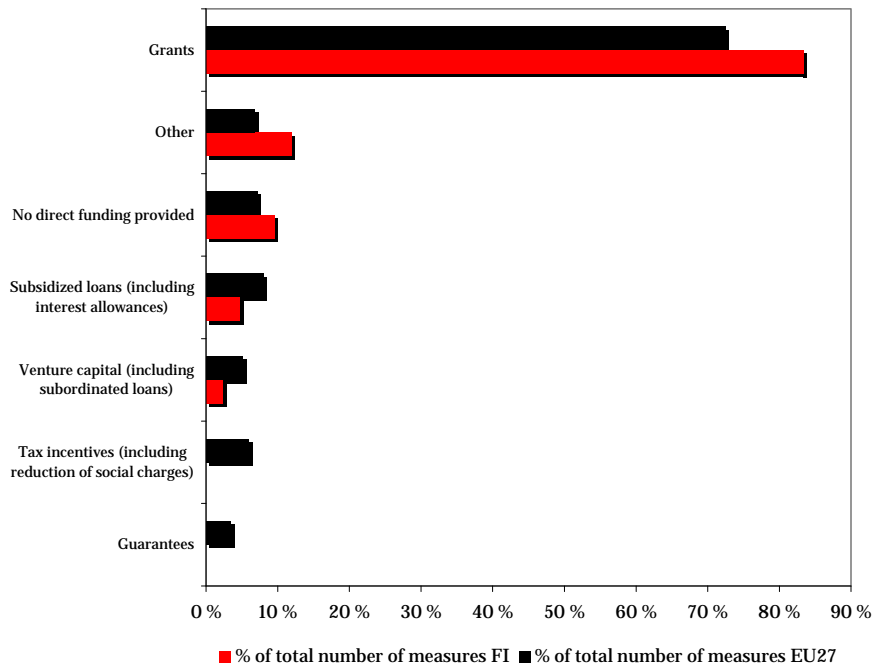


Figure 6. Forms of funding of support measures in Finland compared to EU 27



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

Bibliography

Allianz Economic Research and Development (2009) *European Growth and Job Monitor 2009 – Indicators for Success in the Knowledge Economy*, Allianz Economic Research and Development Frankfurt/Main. Available at: http://www.lisboncouncil.net/media/publications/egjm_2009.pdf online.

Bosma N., Acs Z.J., Autio E., Coduras A., Levie J. (2009) *Global Entrepreneurship Monitor - 2008 Executive Report*.

Confederation of Finnish Industries EK (2009) *EK Investment Survey, June 2009* (only in Finnish). Available at: http://www.ek.fi/www/fi/tutkimukset_julkaisut/2009/Inv tied_1-09.pdf online.

Confederation of Finnish Industries EK (2009) *Confidence Indicators, May 2009*. Available at: <http://www.ek.fi/www/en/publications/indicators/Confidence09-05.pdf> online.

Gallup Organisation Hungary (2008) *Entrepreneurship Survey of the EU25, Secondary analysis, Finland*. European Commission, the Directorate-General for Enterprise and Industry E/1: Entrepreneurship. Available at: http://ec.europa.eu/enterprise/enterprise_policy/survey/static2008/finland_static.pdf online.

Government of Finland (2009) *Government's Communication on Finland's National Innovation Strategy to the Parliament*, 9.10.2008. Available at: http://www.tem.fi/files/21010/National_Innovation_Strategy_March_2009.pdf online.

Innovaatiotoiminnan vaikutukset. Osaamista, uudistumista, kasvua ja hyvinvointia. Tekes 2008. Published only in Finnish.

International Institute for Management Development (2009) *IMD World Competitiveness Yearbook*.

Lemola, T., Lehenkari, J., Kaukonen, E. and Timonen, J. (2008): *Vaikuttavuuskehikko ja indikaattorit (The Impact Framework and Indicators for Science, Technology and Innovation)*. Publication of the Academy of Finland 6/08.

Metsä-Tokila T. (2009) *Ohjelmistoala. Toimialaraportti 1/2009*. Työ- ja elinkeinoministeriö, Helsinki. Available at: http://www.tem.fi/files/23107/Ohjelmistoala_web.pdf online.

Pelkonen, A., Teräväinen, T. and Waltari, S-T. (2008): *Assessing policy coordination capacity: higher education, science, and technology policies in Finland*. Science and Public Policy, 35(4), 241–252.

Rouvinen P., Ylä-Anttila P. (2009) *Evaluation of the Finnish National Innovation System. End-of-March 2009 Interim Report, Executive Summary*, ETLA/Etlatieto Oy. Available at: <http://www.evaluation.fi/index.htm> online.

Science and Technology Policy Council of Finland (2008) *Review 2008*. Available at: http://www.minedu.fi/export/sites/default/OPM/Tiede/tutkimus- ja_innovaationeuvosto/TTN/julkaisut/liitteet/Review2008.pdf?lang=en online.

Statistics Finland (2009), *Labour force survey 2009, May*.

Statistics Finland (2009), *Index of turnover in industry, March 2009*.

Statistics Finland (2009), *Turnover of service industries 2009, March*.

Statistics Finland (2009), *Wage and salary indices, March 2009*.

Statistics Finland (2009), *New orders in manufacturing 2009*, April.

Statistics Finland (2009), *National Accounts 2009, 1st quarter*. Available at: http://www.stat.fi/til/ntp/2009/01/ntp_2009_01_2009-06-09_en.pdf online.

Statistics Finland (2009), *Index of wage and salary earnings, 1st quarter*.

Statistics Finland (2009), *Government R&D; funding in the state budget 2009*.

Tekes (2009), *Tekes annual review 2008*. Available at: <http://www.tekes.fi/en/annualreview2008/> online.

Valtiontalouden tarkastusvirasto (2008) T&k-arviointitoiminta. Valtiontalouden tarkastusviraston toiminnantarkastuskertomus 157/2008.

VICTA (2007) VICTA – Virtual ICT Accelerator. Final Report. Arvoketju Ltd.

World Economic Forum (2008) *The Global Competitiveness Report 2008-2009*. World Economic Forum, Geneva. Available at: <http://www.weforum.org/pdf/GCR08/GCR08.pdf> online.