Country Report

Finland

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Innovation is a priority of all Member States and of the European Commission. Throughout Europe, hundreds of policy measures and support schemes aimed at innovation have been implemented or are under preparation. The diversity of these measures and schemes reflects the diversity of the framework conditions, cultural preferences and political priorities in the Member States. The 'First Action Plan for Innovation in Europe', launched by the European Commission in 1996, provided for the first time a common analytical and political framework for innovation policy in Europe.

Building upon the Action Plan, the *Trend Chart on Innovation in Europe* is a practical tool for innovation organisation and scheme managers in Europe. Run by the Innovation Directorate of DG Enterprise, it pursues the collection, regular updating and analysis of information on innovation policies at national and Community level, with a focus on innovation finance, setting up and developing innovative businesses, the protection of intellectual property rights and the transfer of technology between research and industry.

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

The Trend Chart products

The Trend Chart on Innovation has been running since January 2000. It tracks innovation policy developments in all EU Member States, plus Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Iceland, Israel, Latvia, Liechtenstein, Lithuania, Norway, Poland, Romania, the Slovak Republic and Slovenia. The Trend Chart website (www.cordis.lu/trendchart) will provide access to the following services and publications, as they become available:

- a database of policy measures across Europe
- a "who's who?" of agencies and government departments involved in innovation
- a series of six-monthly country reports for all countries covered
- a series of six-monthly trend reports covered on each of the four main themes
- a number of benchmarking reports
- the European Innovation Scoreboard and other statistical reports
- a news service and thematic papers
- the annual reports of the Trend Chart

The present report was prepared by **Pirjo Kutinlahti** and **Juha Oksanen** of VTT Technology Studies. The information contained in this report has not been validated in detail by either the Member States or the European Commission.

Contact: Christophe Guichard; Christophe.guichard@cec.eu.int

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Executive Summary

Since the recession of the early 1990s, the development of the Finnish innovation system and knowledge-based society has been at the top of the policy agenda for growth and competitiveness. Today, Finland is ranked as one of the leading countries in innovation. Despite the current success, there are growing concerns about whether the system and innovation policy matches the needs of industry and internationalisation. Innovation orientation rather than technology orientation is regarded as a critical condition for increasing growth and competitiveness. Emphasis on integrating user perspectives into innovation and on the usability of technology are also key conditions attached to economic success and competitiveness.

The Science and Technology Policy Council of Finland, which is responsible for the strategic development and co-ordination of Finnish science and technology policy as well as the national innovation system as a whole, published its sixth triennial review 'Knowledge, Innovation and Internationalisation' in December 2002. The Council paid special attention to the rapidly internationalising innovation environment and the ensuing pressures for structural and operational change in Finland. In addition to increasing research funding, the Council recommended that the major knowledge and know-how assets (education, research careers and the utilisation of research findings) must be further developed and that the development of new growth areas, research-based innovation and innovation environments must be strengthened. The Council also underlined need for systematic input in social innovation to prevent the divergence of societal and social development from economic and technological development. The review can be find at
http://www.minedu.fi/tiede_ja_teknologianeuvosto/eng/publications/Review_2003.html

During the year under review the general election was carried out and a new Government was elected. The Centre, the Social Democratic and the Swedish People's parties formed the Government, which is led by the Prime Minister Matti Vanhanen of the Centre Party. In the Government's action strategy the emphasis is on strengthening expertise, entrepreneurship and other growth factors. One of the primary objectives of the Government's economic policy is to increase employment and to find jobs for at least 100,000 persons by the end of the electoral period.

According to the Government key actions to maintain Finland's competitiveness are promotion of research and development, raising the educational level of the population, and pursuing a co-operative approach to incomes policy and boost the productivity of the public sector. Also faster application of new information technology is noted as a national challenge. Special attention in the Government programme is paid on regional development.

As a new governance approach, the Government has launched broad intersectoral policy programmes aiming at horizontal co-ordination and implementation of public actions promoting employment, entrepreneurship, information society and civil participation. For example, the new Entrepreneurship policy programme aims to foster company start-ups, growth and internationalisation. In particular, the programme aims at making entrepreneurship more attractive as a career and abolishing administrative obstacles to it. The Information society programme aims to boost competitiveness and productivity and to promote social and regional equality through effective utilisation of information and communications technologies in all sectors of society.

An important contribution to the development of the Finnish innovation environment was made by the Ministry of Trade and Industry, which commissioned an international evaluation of the general conditions for innovation, with particular emphasis on company viewpoints. The evaluation focused specifically on key policy organisations under the Ministry of Trade and Industry. The evaluation group's conclusion was that the Finnish innovation system works reasonably well. However, more attention should be paid to innovation, to integrating user perspectives into innovation projects and to promoting entrepreneurship and entrepreneurial environments as a whole. The final report can be found at http://ktm.elinar.fi/ktm_jur/ (Evaluation of the Finnish Innovation Support System).

Already before the completion of the above mentioned evaluation, the division of duties of the public financing agencies (Finnvera plc, Finnish Industry Investment Ltd and Sitra, The Finnish National Fund for Research and Development) in regional capital investments under the administration of the Ministry of Trade and Industry was redefined.

The importance of innovation activity in universities and polytechnics has grown rapidly. In the year under review, one of the main policy issues debated was how to include the duty to promote the utilisation of new knowledge in the Universities Act as the university's third mission. Policy measures to promote more efficient commercial exploitation of research results have continued along the lines laid down by the previous Government. The Ministry of Trade and Industry launched a legislative reform encompassing this issue in autumn 2002. A Bill regarding University inventions will be presented to Parliament at the turn of the year.

An important topical issue in the education system has been how to increase the overall flexibility of the system to better respond both to opportunities for individual choice and to the needs of research and the labour market. Overall, one of the main objectives of Finnish education policy has been to raise the general standard of education and promote educational equality in accordance with the principle of lifelong learning and make the system internationally compatible. Lifelong learning is also integrated in most of the main innovation agents' strategies. During the year under review, the Committee set by the Ministry of Education made a concrete proposal for a two-tier university degree structure. The Committee proposes that the new structure would be adopted in 2005.

Adult education has overall become an increasingly important component in Finland's educational policy. At the beginning of 2003 a new national programme 'NOSTE' was launched for the period 2003-2007. The programme aims to improve the vocational skills of people lacking vocational training. The Ministry of Education and the Ministry of Labour are responsible for implementing the programme.

In August 2003 the Ministry of Education circulated a proposal for comment concerning the education and research development plan for 2003-2008.

0. Innovation Policy in Finland

0.1 National system of governance of innovation policy

The Science and Technology Policy Council of Finland has a visible role in the co-ordination of innovation policy activities at the national level. This committee was established in March 1987 to continue, with a slightly different emphasis, the tasks of the Science Policy Council founded in 1963. The Council is chaired by the Prime Minister. The membership consists of the Minister of Education, the Minister of Trade and Industry, the Minister of Finance, four other ministers, and ten other members well versed in science or technology (representatives of the Academy of Finland, Tekes, industry and employers' and employees' organisations). The Government appoints the Science and Technology Policy Council for a three-year term.

The main tasks of the council include directing science and technology policy, dealing with the overall development of scientific research and education, and issuing statements on the allocation of public science and technology funds to the various ministries and fields. These guidelines and issue statements are made public in triennial key policy documents, in so-called science and technology policy reviews. The reviews analyse past developments, draw conclusions and make proposals for the future. The latest review came out in 2002 ("Knowledge, Innovation and Internationalisation"). The previous documents appeared in 2000 ("Review 2000: The Challenge of Knowledge and Know-how"), in 1996 ("Finland: a knowledge-based society"), in 1993 ("Towards an innovative society – a development strategy for Finland") and in 1990 ("Review 1990 – guidelines for science and technology policy in the 1990s").

The two most important ministries in the Finnish national innovation system are the Ministry of Education and the Ministry of Trade and Industry (see Figure 1 below). Each administers approximately a third of the public research funding. Apart from these two ministries, the Ministry of Social Affairs and Health and the Ministry of Agriculture and Forestry, in particular, are also significant providers of finance for research.

The administrative field of the Ministry of Education covers all 20 universities, a network of polytechnics (29) and the Academy of Finland, which includes four national research councils. In addition, the Ministry of Education and the universities together maintain basic services and infrastructure (e.g. scientific libraries, archives and supercomputing facilities) for the national research system.

The Academy of Finland is the central financing and planning body in the field of basic and university research. The main function of financing high-quality research is carried out through individual projects, programmes, centres of excellence, research posts and research training. In 2003, approx. 13 per cent (EUR 185 million) of all Government research funding will be channelled through the Academy. The Academy's responsibilities also include the advancement of scientific research and the encouragement of its exploration, and the development of international scientific co-operation. It also serves as an expert body on science policy issues.

In its recently reviewed strategy for the year 2003 the Academy of Finland announced its commitment to promoting the development of Finnish society, to implementing the European Research Area and to strengthening global co-operation in such a way that social welfare is essentially based upon the new knowledge produced by research within the developing

information and education society. Therefore it is deemed important that (1) Finnish research remains firmly at the cutting edge of modern science, and that (2) Finnish research environments, as part of the European Research Area, are globally co-operative as well as competitive.

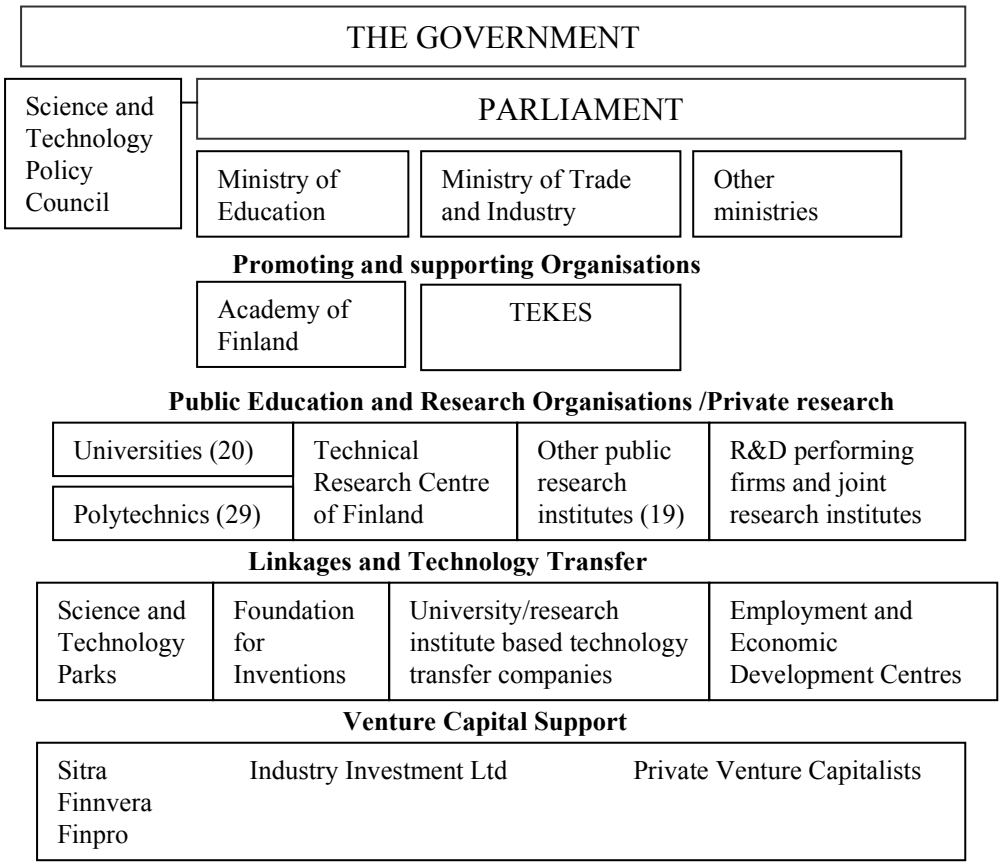

Figure 1. Players in Finnish innovation system. (Source: Pirjo Kutinlahti, VTT Technology Studies 2002)

The Ministry of Trade and Industry is responsible for technology policy and providing support for industrial research and development. It also exercises prime responsibility for issues related to EU research in Finland. The administrative field of the Ministry of Trade and Industry contains a number of organisations such as publicly supported research institutes, agencies and state-owned companies engaging in special financing, which are an important part of the national innovation environment. Some of these have innovation at the centre of their mission or focus on providing conditions for technology-oriented companies. Other agencies have more general tasks including promoting firms, internationalisation and export, and in some instances regional policies while at the same time also serving the needs of innovative firms to some extent (cf. Evaluation of the Finnish Innovation Support System, 2003).

Within the administration of the Ministry of Trade and Industry, Tekes, the National Technology Agency, has a central position in the planning and financing of technical research and development. It is the principal source of public funding for applied technological research and industrial R&D. It seeks to promote the competitiveness of Finnish industry and the service sector by promoting research and applications in the field of technological

development. Tekes prepares, funds and co-ordinates national technology programmes, and provides funds for applied technical research and risk-carrying R&D ventures in industry. It also contributes to the preparation of national technology policy. Tekes has a regionally comprehensive domestic organisation that acts in conjunction with the Employment and Economic Development Centres. With its close to 30% share (EUR 399 million in 2003) of Government appropriations for R&D, Tekes is the largest organisation in the field.

The other significant body in the administrative field of the Ministry of Trade and Industry is the Technical Research Centre of Finland (VTT). VTT is an impartial expert organisation that carries out technical and techno-economic research and development work. It is the largest governmental research institute in the Nordic countries and has about 3000 employees.

The other ministries bear the responsibility for research which serves the development of their respective fields. Most of this sectoral research is carried out in Government research institutes. There are altogether 19 public research institutes. Research institutes in the public sector have an important role not only in the higher education sector, but also in the innovation system as developers of the knowledge-based society. In terms of research volume, the largest institutes are VTT in the Ministry of Trade and Industry sector, the Forest Research Institute and the MTT Agrifood Research in the Ministry of Agriculture and Forestry sector, the National Public Health Institute and the Institute of Occupational Health in the Ministry of Social Affairs and Health sector, and the Environment Institute in the Ministry of the Environment sector.

A visible feature in the Finnish national innovation system is the apparent high involvement of Government in the investment streams associated especially with Sitra, Finnvera and Industry Investment Limited. The activities vary from direct portfolio investments to minority ownership of technology-transfer companies at universities and research institutions. Although, there has been some privatisation of publicly funded initiatives in recent years, publicly initiated actors still play a significant role in the Finnish venture capital industry (see for instance *Seed capital investment in Nordic countries*, 2002).

Sitra, the Finnish National Fund for Research and Development is a relatively autonomous organisation that is subordinate to the Finnish Parliament. The organisation was founded in the late 1960's. Since then Sitra’s activities have expanded from the original task of financing technical research and development to cover a range of research, educational and venture capital activities that benefit the economy and society at large. Nowadays Sitra’s operating segments are technology transfer and seed finance, the financing of growth companies, investments in venture capital funds, and strengthening of the links between research and societal decision-making through research and training. In 2002, an international expert group evaluated Sitra's activities (the evaluation report in English can be downloaded at http://www.sitra.fi/Julkaisut/raportti27.pdf).

Finnish Industry Investment Ltd (FII) is a state-owned investment company, which is administered by the Ministry of Trade and industry. FII engages in equity capital investment and invests in venture capital funds, private equity funds and directly in selected target companies. The investment capital of Finnish Industry Investment Ltd is generated from the privatisation proceeds of state-owned companies.

FII has four main operating goals. Firstly, it encourages more efficient functioning of the venture capital investment market by investing actively in new venture capital and private

equity funds in Finland. Secondly the company promotes product development and commercialisation of innovations by setting up funds, which specialise in financing seed and growth stage technology enterprises. Thirdly, the company promotes regional venture capital investment and helps ensure that money available from EU sources for venture finance gets channelled efficiently and feasibly into funds and target companies. Fourthly, FII uses direct investments to further major investments in corporate development, corporate restructuring and the launch of important new industrial projects.

Finnvera is a specialised financing company, which is entirely owned by the Finnish state. The company was created through the merger of Kera Corporation and the Finnish Guarantee Board in 1999. The two organisations were merged in order to make the state's specialised financing operations more effective and to be able to offer Finnish companies financing services to further domestic operations, exports and internationalisation through one organisation. Finnvera has 16 regional offices around the country.

Finnvera acts as a provider of complementary risk financing services in close association with banks and other financing organisations. The company also has a visible role to play in covering export financing risks: Finnvera works as Finland's Export Credit Agency, which offers services for export business.

In financing businesses, Finnvera is tasked with identifying viable business ideas and development and expansion plans for which insufficient funds are available from market players on reasonable terms. Finnvera bases its financing decisions on the vitality and potential profitability of the target companies. One of the aims of financing a company's domestic business is to support the creation of new companies and the growth of SME's.

Finnvera's regional offices are mainly responsible for financing decisions pertaining to the domestic operations of companies and for the associated management of customer relations. The regional offices of Finnvera also market financing schemes to support the internationalisation or exports of companies. In addition the regional offices co-operate with other stakeholders to achieve the regional goals of business and industrial policy.

The State special financing has recently been under scrutiny. In 2002, the State Audit Office carried out an audit of state special financing, which focused on Finnvera and FII. The audit’s goal was to evaluate how well the companies have achieved the objectives set for them in legislation. In addition, the ownership and industrial objectives set for the companies were evaluated. As a result of the audit, a number of recommendations were made concerning both the evaluated companies and the Ministry of Trade and Industry. An issue brought up was the division of labour between the companies as suppliers of state special financing. According to the findings, the division of labour has been clearly defined but in practice the activities of the companies were partly overlapping especially in relation to regional capital investments. Finnvera has had investment commitments in funds in which FII also invests. In addition, it was found that Sitra, the Finnish National Fund for Research and Development, also invests in some cases in the same funds in which FII and/or Finnvera participate.

FII was also evaluated individually in 2002 (the evaluation report in English is available at http://www.ktm.fi/julkaisu/ark2003/ju1eloeng.pdf). In the early 2003, after publication of the evaluation and audit reports the Ministry of Trade and Industry made a decision redefining the division of duties between the public financing agencies in regional capital investments under the administration of the ministry. Accordingly, Finnish Industry Investment will focus

on the capitalisation and development of limited partnership (LPS) regional funds while Finnvera plc will assume responsibility for all corporate regional funds on behalf of the State. To this end, Finnvera plc established in June 2003 Veraventure Oy, an investment company responsible for capitalising and developing corporate regional investment funds. All Finnvera holdings in regional investment companies will be amalgamated into Veraventure Oy, a subsidiary of Finnvera plc.

Other public service providers supporting innovation include Finpro, the Employment and Economic Development Centres (TE-Centres) and the Foundation for Finnish Inventions. Finpro is an organisation whose sphere of tasks is broadly defined: to speed up the internationalisation of Finnish companies while minimising the risks involved, using the resources of its own organisation and co-operating with other service organisations working for the same goals.

Finpro has a long history, which began in 1919 when the Finnish Export Association was founded. The newly founded organisation started to create an international network of representatives, and placed correspondents and liaison personnel in different parts of the world. In 1938 the Association changed its name and became the Finnish Foreign Trade Association. The Association adopted a new image and a new name in 1999.

Recently, support of innovation has emerged as a new theme in Finpro's mission. In practice Finpro aims to offer a new kind of contribution to the other innovation supporting organisations. Finpro offers its partners expert services needed in their own development and research programmes, either through specific projects or through consulting assignments. In addition, Finpro's public funding will increasingly be based on its mission as an innovation supporting organisation and on projects financed through the new partners.

In the mid-1990's new regional employment and economic development centres were established. The centres were composed of regional offices of three different ministries — the Ministry of Trade and Industry, the Ministry of Agriculture and Forestry, and the Ministry of Labour. Nowadays also experts of regional networks of Tekes and the Foundation for Finnish Inventions can be found under the same roof of the TE-centre.

Fifteen centres countrywide provide a wide range of advisory and development services for businesses, entrepreneurs and other clients. The centres support and advise small and medium-sized enterprises at the various stages of their life cycles. Tasks also include a number of other activities, such as promotion of technological development in enterprises, assisting companies in matters associated with export activities and internationalisation, implementation of regional labour policies and participation in regional development. For instance, the TE-Centres have a significant role in implementation and administration of EU structural funds in areas eligible for EU funding.

The Foundation for Finnish Inventions, founded in 1971, supports and promotes invention work and the development and exploitation of inventions in Finland. The staff includes a network of innovation managers in the main universities and in the regional Employment and Economic Development Centres all over Finland. The Foundation’s main tasks consist of consultancy, evaluation and protection of inventions, funding product development and marketing as well as other promotional activities for commercialising inventions. The key criteria for funding are the market potential, inventiveness and protection of the invention, and its level of technology. The objective of funding is to develop the inventions of private

individuals, researchers and small entrepreneurs into products for the market either in the inventor-entrepreneur's own production or under a licence or other exploitation agreement.

0.2 Innovation policy developments

Recent economic and societal development in Finland has largely been built on developing high technology, its effective utilisation and determined efforts to increase exports. This has significantly improved Finland's position in international competition. In many international comparisons Finland has ranked as one of the leading European innovation countries as measured in terms of growth, competitiveness and technological sophistication and infrastructure. According to the EU's science and technology indicators, Finland, Sweden and Denmark are the countries, which are rapidly transforming into knowledge-based economies.

In 2002, the rate of economic growth in Finland was 1.6 per cent, and GDP stood at EUR 140 billion. Growth of demand in the Finnish economy was driven by exports as well as private and public consumption. Finland's exports in 2002 amounted to EUR 47 billion and imports to EUR 35 billion, remaining below the previous year's level due to lower prices. According to statistics, high tech products accounted for 20.6 per cent of export (21.0 per cent in 2001). The unemployment rate was 9 per cent in 2002, unchanged from 2001.

Despite the recent success, there are some weak signals in the business community and society in general indicating that recent favourable development is harder to carry on with the same pace. Finland's rapid economic growth has slowed down during the past two years. Productivity growth in certain sectors has stopped and growth in the number of companies engaging in R&D appears to have stopped.

During the past decade, the ICT industry has become an important cornerstone of the Finnish economy along with the forest and engineering industries. Finland also gets high marks for the use and application of information and communications technologies (ICT). According to the EU S&T indicator report, information technology is used by companies, public authorities and the general public more in Finland than in any other country in the survey. On the other hand, it noted that Finnish companies were not especially active in e-business.

Long-term technology policy has played a central role in creating the conditions for knowledge-based economic growth. The upgrading of R&D funding has been the salient feature of Finnish technology and innovation policy since the mid-1990s. The share of GDP spent on R&D expenditure increased from 2.0 per cent in 1991 to 3.4 percent in 2001 and is now among the highest in the world. The expenditure on R&D increased significantly at the end of the 1990s, but in the year 2001 the increase came to a halt. In 2001 R&D expenditure grew in real terms by approximately 1.5 per cent from the year before.

The growth of R&D expenditure is chiefly explained by increased R&D investment in the business sector and almost exclusively in business enterprises in the electronics industry. In real terms, R&D spending in the electronics industry in 2001 was six times more than that of 1991, whereas in other manufacturing the increase was 1.3 times and in industries other than manufacturing, three times. R&D spending by business enterprise amounted to close to EUR 3.3 billion in 2001. In real terms, this expenditure grew by 1.7 per cent. The year earlier the rate of growth exceeded 15 per cent. The growth of R&D expenditure in the business sector

have continued in 2002, as business enterprises estimate that their R&D expenditure reached EUR 3.4 billion.

Public R&D funding showed particularly strong growth in the period 1997-1999. This was a direct consequence of the Government's 1996 decision to direct additional funding into research and development by the end of 1999. In recent years public financing for R&D has not developed in line with the target sets, but has remained roughly at the same level for a few years.

The new strategic visions for science, technology and innovation can be found in the recently published sixth triennial review of the Science and Technology Policy Council of Finland (http://www.minedu.fi/tiede_ja_teknologianeuvosto/eng/publications/Review_2003.html).
The Council pays special attention to the rapidly internationalising innovation environment and the ensuing pressures for structural and operational change in Finland. While the focus in Finnish technology policy has traditionally been on promoting the competitiveness of Finnish industries by technological means and the creation of new products for global markets, the new policy emphasises a more comprehensive approach, which takes societal aspects into account. The increased importance of innovation has also brought about a need to understand what circumstances are necessary to ensure the innovation activities of firms.

The Council believes that 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. As a consequence, it will not be possible to limit the development of innovation to the national environment and traditional international co-operation, but Finland will have to be able to internationalise its activities and its national science and technology institutions.

The Council also highlights the importance of securing welfare services in a situation of rapid ageing of the population and the related growing pressures on fiscal policy. The unemployment rate, which has remained high since the recession, must be lowered, and solutions must also be found for other problems related to human and social development. The employment rate must be raised, and regional development must be balanced.

The Council recommended that public funding should be increased faster than the estimated growth in the GDP. In the case of research, this would mean an increase of EUR 300 million from the 2002 level by 2007. In addition to increasing research funding, the Council proposes three main targets to develop innovation and ensure the successful future development of Finnish science and technology policy. These targets are (1) enhancing education, research careers and the utilisation of research findings, (2) boosting social and technological innovation, (3) ensuring flexible expert development of innovation funding. The major change in policy thinking is a growing awareness that social welfare is the condition for growth. The country must safeguard its welfare services in conditions where a rapidly ageing population is building up pressure to increase taxation and at the same time reduce high unemployment and resolve other problems relating to human and social development. Indeed, systematic emphasis on social innovation is needed to prevent societal and social development from diverging from economic and technological development. The new approach extends the policy perspective from technology and innovation orientation to other factors influencing economic and societal development. In the Council's view, an active and flexible innovation environment is crucial for future success.

The joint ProAct Programme of the Ministry of Trade and Industry and the National Technology Agency, Tekes (FI 16), which was launched in the beginning of 2002, has produced much information on the interaction between technology, research, technology policy, the economy and society. The topics examined in the 25 projects include important economic and social changes, the need to develop technology policy, the innovation process and the social challenges relating to technological competitiveness and technology application. The programme has substantially increased the volume of research and improved international visibility. It will continue until 2005.

In spring 2003, an evaluation study commissioned by the Ministry of Trade and Industry and focused on the general conditions for innovation was completed. According to the study, Finland's system can be considered competitive. In the recommendations, the evaluation group stresses that further emphasis should be focused on innovation and the integration of user perspectives into innovation projects. In addition, the system and its organisations should focus far more on entrepreneurship and on the promotion of entrepreneurs.

The importance of innovation activity in universities and polytechnics has grown rapidly. In the year under review, one of the main policy issues debated was how to include the duty to promote the utilisation of new knowledge in the Universities Act as the university's third mission. Policy measures to promote more efficient commercial exploitation of research results have continued along the lines laid down by the Government. The Ministry of Trade and Industry launched a legislative reform encompassing this issue in autumn 2002.

Innovation policy priorities table

Priority areas and sub-areas	July 2000	Sept 2001	Sept 2002	August 2003
I. Fostering an Innovation Culture				
I.1. Education and initial and further training	**3**	**3**	**3**	**3**
I.2. Mobility of students, research workers and teachers	**2**	**2**	**2**	**2**
I.3. Raising public awareness and involving those concerned	**2**	**2**	**1**	**1**
I.4. Innovation and management of enterprises	**1**	**2**	**3**	**3**
I.5. Public authorities	**1**	**1**	**1**	**1**
I.6. Promotion of clustering and co-operation for innovation	**4**	**4**	**4**	**3**
II. Establishing a Framework conducive to Innovation				
II.1. Competition	**3**	**3**	**3**	**3**
II.2. Protection of intellectual and industrial property	**2**	**2**	**4**	**3**
II.3. Administrative simplification	**2**	**2**	**1**	**2**
II.4. Legal and regulatory environment	**1**	**1**	**1**	**1**
II.5. Financing of innovation	**4**	**4**	**3**	**4**
II.6. Taxation	**1**	**1**	**1**	**1**
III. Gearing Research to Innovation				
III.1. Strategic vision of research and development	**1**	**1**	**3**	**2**
III.2. Strengthening research carried out by companies	**4**	**3**	**2**	**3**
III.3. Start-up of technology-based companies	**3**	**3**	**2**	**3**
III.4. Intensified co-operation between research, universities and companies	**4**	**4**	**4**	**3**
III.5. Strengthening the ability of SMEs to absorb technologies and know-how	**2**	**2**	**2**	**2**
Total points	**40**	**40**	**40**	**40**

Synopsis of New Measures in 'Country X'

The distribution of Finland's innovation measures, including those introduced in the current review period, is shown in Table 1.

Table 1. Classification of Finland's innovation policy measures by Innovation Action Plan Areas.

Action Plan priority areas and sub-themes	"Old" measures	New measures
I. Fostering an Innovation Culture		
I.1. Education and initial and further training	01	
I.2. Mobility of students, research workers and teachers		
I.3. Raising the awareness of the larger public and involving those concerned		
I.4. Fostering innovative organisational and management practices in enterprises	11, **14**	**18**
I.5. Public authorities and support to innovation policy makers	**16**	
I.6. Promotion of clustering and co-operation for innovation	**05**, 07, **08**	
II. Establishing a Framework conducive to Innovation		
II.1. Competition		
II.2. Protection of intellectual and industrial property	**09**, 10	
II.3. Administrative simplification	**15**	18
II.4. Amelioration of legal and regulatory environments	14	18
II.5. Innovation financing	**02**, **03**, **04**, 05, 06, **07**, 08, **12**, 13, 15, 17	
II.6. Taxation		
III. Gearing Research to Innovation		
III.1. Strategic vision of research and innovation	16	
III.2. Strengthening research carried out by companies	04, 07, 11, 12	
III.3. Start-up of technology based companies	**01**, 02, 03, 04, **06**, **13**, 17	
III.4. Intensified co-operation between research, universities and companies	05, 06, 07, **08**, 09, **10**, 12	
III.5. Strengthening the ability of companies, particularly SMEs, to absorb technologies and know-how	**11**, 12, **17**	

Key: **bold** = primary objective; normal = secondary objective(s). Completed or replaced measures have been omitted. "New" measures are those introduced within the relevant period covered by this report (i.e. 2002-2003).

0.3 Recent policy events & policy debate

During the year under review, the Finnish political climate and public debate were affected by the general elections held in March 2003. The main rivals in the election campaign were the Social Democratic Party (SDP) led by Prime Minister Paavo Lipponen and the largest opposition party, the Centre Party (Keskusta). The campaign ended in a narrow victory for the Centre party, which returned to power after eight years in opposition. Even though the Social Democrats won more votes than in the previous election and gained two additional seats in Parliament, they were still outnumbered by the Centre Party.

The two largest parties after the election, the Centre and Social Democratic parties, formed a new coalition Government led by the head of the Centre Party, Anneli Jäätteenmäki. However, just two months later in June 2003, she was forced to resign because of a political scandal related to some irregularities during the election campaign. After that, political calm

was restored and a new coalition government was swiftly formed between the Centre and Social Democratic parties with only minor changes in the list of ministers or in the Government programme. The new Government is led by Matti Vanhanen of the Centre Party.

With the exception of regional issues, there was little debate on science, technology and innovation policies in the run-up to the elections. The need for increased Government R&D expenditures was one of the few innovation policy questions to be taken up. But even that discussion did not arouse broad interest outside those circles with a stake in the development of public R&D funding. Concern for the impact of stagnating Government input in R&D was expressed mainly by people representing industry associations, or involved in science and technology administration, public funding agencies or research institutes.

It is possible that the low general interest in innovation policy issues in the election campaign reflects the "remoteness" of innovation policy from the everyday lives of voters compared with other more direct and pressing societal questions. Another explanation is that there is apparently a broad consensus and only minor differences in views concerning research, technology and innovation policies between the political parties in Finland.

There seems to be growing interest in discovering how well public incentives and the services supporting firms' innovation activities actually function. Several evaluation reports were published during the year under review, including those of Sitra (the Finnish National Fund for Research and Development), Finnish Industry Investment Ltd and Finnvera plc. In addition an expert group, set up by the Ministry of Trade and Industry, finished its work in the spring of 2003. The group was assigned to evaluate the resources that enterprises have for innovation activities in Finland and how well the public services for innovation function as a whole. The evaluation focused particularly on the core services and financing provided by organisations under the administration of the Ministry of Trade and Industry, i.e. Finpro, Finnvera, the Foundation for Finnish Inventions, the National Technology Agency Tekes, the Employment and Economic Development Centres (TE Centres) and Finnish Industry Investment Ltd.

A re-emergent theme in public discussion is the demand for more thorough regulatory reforms in relation to taxation, the size of the public sector and those parts of the economy that remain protected from competition. The issue was highlighted in the OECD's country report, *Regulatory Reform in Finland - A New Consensus for Change*, published in May 2003. According to the report, Finland's economy has changed significantly in the last 20 years and has strengthened. However, the OECD report argues that Finland needs further reforms in order to maintain its success in the future.

Some business representatives have also participated actively in the discussion on the need for more thorough reforms and expressed their concern about Finland's competitiveness as a location for business activities. Also the forthcoming enlargement of the EU in May 2004 has raised questions about its potential impact on the decisions of Finnish firms to move their business and production to the new EU member states. The cost level in the Baltic countries is far below that of Finland, for example. In the late summer of 2003 the Ministry of Trade and Industry commissioned a review with the specific aim of assessing the impact of the EU enlargement on companies.

In its review the Science and Technology Policy Council introduced a new term, 'social innovations', which still lacks a generally accepted definition. This has not prevented the

term from being adopted by politicians, administrators and researchers, however. For example, a former Minister of Trade and Industry noted that we have to critically assess how far we can meet societal challenges through technical development alone, and then asked whether it would be relevant in the future to invest more in developing social innovations. Sitra, the Finnish National Fund for Research and Development, has started a new research project called 'Social Innovations, Society's Ability to Reform Itself and Economic Success', which will be carried out in 2002-2004. The project aims to analyse, in the light of recent experience and case research abroad, the process by which social innovations come about and the structural processes of renewal in the economy and in society.

Sitra's strategy for Finland emphasises the encouragement and support of creativity, since it forms the key to developing Finnish innovations. Sitra argues that the best way to do this is to formulate a strategy that will back up creativity in the same way that technology has been encouraged in recent decades. The strategy report grew out of Sitra's Finland 2015 programme, which was attended by key Finnish decision-makers from the political arena, public administration, the mass media, interest organisations and culture.

0.4 Regional policy

In Finland, R&D policy has traditionally been made by central government. In contrast to many European countries, the regions in Finland have played a minor role politically, administratively and legally. There has not been much opportunity for the regions to develop an autonomous political role, because of the power of national and local bodies. At the national level, power is centred in the hands of central government and the ministries with strong impact on decision-making at various levels. At the sub-regional level, Finnish municipalities have substantial independence with regard to the central government. The municipalities with extensive autonomy and the right to levy taxes are in a position to decide on many issues. (cf. Mennola 1999)

However, the picture has changed gradually since the early 1990s. Several important changes influencing regional development and governance have taken place during the past decade. At the beginning of 1994, the Regional Development Act came into force. The main purpose of this Act is to guide national regional policy. The Regional Development Act has had significant effects on the structures of regional development and governance. The Act has increased the importance of local government in regional policy by delegating power from central government to the regions. Another key effect was the establishment of new regional governance. Moreover, a programme-based regional policy was introduced in order to co-ordinate the actions of diverse regional organisations and players.

Institutionally, a major reform was the establishment of new regional employment and economic development centres (TE-centres) (FI 13). These centres combine former state regional offices representing the Ministry of Trade and Industry, the Ministry of Labour and the Ministry of Forestry and Agriculture.

The main stakeholders in regional innovation environments include companies, the TE-Centres, Regional Councils, local higher educational institutions (universities and polytechnics), technology centres and science parks and government research institutes.

The regional dimension of innovation policy has been an important topic of public debate in Finland. R&D and innovation activities are seen as an important tool to promote regional development. This theme has been in the vanguard of policy debate and runs also through the programme of the Prime Minister Matti Vanhanen's government. The new government has undertaken, among others, to promote closer co-operation between the various organisations that support innovation and have a regional presence.

In late summer 2003, in line with the government's programme, the Ministry of Trade and industry has nominated a rappourteur to evaluate the regional exploitation of technology funding. The rappourteur will untangle better conditions for technology funding exploitation and the regional activities for funding institutions.

Overall, the regional impact of public funding, public measures and R&D institutions is emphasised at various levels of administration. For instance, to support "regional development through technology" has been included into the annual result agreements between the Ministry of Trade and Industry and Tekes (the National Technology Agency), and VTT (the Technical Research Centre of Finland). Both organisations have published reviews in 2003 dealing with the theme.[1] In recent years, Tekes has also strengthened its regional network by hiring new technology advisors for the TE-Centres around the country. In the spring of 2003 VTT launched a new pilot project aiming to strengthen links between itself and parties in those regions where VTT has no branch offices.

Regional technology strategy processes were carried out in several regions around the country in 2001-2002. Regional technology strategies are intended to be continuous processes, not time-limited projects. Strategy processes have been implemented concurrently with the updating of the national technology strategy, which was led by Tekes. The main idea behind the regional strategy work is to initiate open and critical discussion between regional parties about how to utilise technology in regional development in co-operation with industry and those responsible for regional development. The aim is to find a common view concerning the technologies into which investment should be directed regionally.

The Centre of Expertise Programme (FI_05) is a concrete example of an attempt to promote the development of regions through R&D and innovation. The second period of the programme started in 1999 and will run until 2006. The programme aims to enhance regional competitiveness and increase the number of high-tech products, companies and jobs. To achieve this goal, the programme will be used to implement projects that reflect the needs of industry, encourage co-operation between industry, research and training, ensure rapid transfer of the latest knowledge to companies and exploit local creativity and innovation.

Originally there were 14 regional Centres of Expertise and two nation-wide networks, entrusted to carry out the Centre of Expertise Programme for the period 1999 to 2006. In October 2002, the Government made a decision to include new Centres of Expertise in the programme and to revise the expertise areas of some of the old centres for the remainder of the period (2003-2006). Currently the national Centre of Expertise programme consists of 19 regional Centres of Expertise and three nation-wide expertise networks.

[1] Tekes (2003): Alueiden elinvoima syntyy innovaatioista. Osaaminen, erikoistuminen ja verkottuminen ratkaisevat menestyksen kansainvälisessä kilpailussa. (Innovations foster regional vitality. Know-how, specialisation and networking determine success in international competition, only in Finnish).
Oksanen J. (2003) Regional role and impact of VTT (only in Finnish). VTT Research Notes 2205.

A mid-term evaluation of the Centres of Expertise programme for the period 1999-2002 was published at the beginning of 2003. The evaluation focused on the development of the Centres and on their fields of expertise. Furthermore, special emphasis was given to regional and national networking. According to the evaluation, the Centres of Expertise have succeeded in mobilising a significant part of the network of innovation and regional development for their activities. The level of effectiveness was considered to be good in light of the level of basic and total funding available. The Centres of Expertise project profiles show that they concentrated on those fields that were also given priority in the programme itself. Most of the projects focused on developing businesses and transferring technology as well as on promoting co-operation and clusters. Increasingly, projects were also carried out to further internationalisation, to attract businesses to regions and to create new businesses. Strengthening expertise by means of research and development projects was also of great importance when implementing such projects.

The most important effects of the programme are generally felt to be an increase in the levels of knowledge and technology, and a readiness to utilise the research and development resources it generates. In addition, the impact of the Centres of Expertise Programme on regional development (including research and development activity) is among its greatest 'added value' assets. This impact is considered particularly important in making regions more attractive to business and in developing strategic planning. The parties involved considered the administrative sectors' commitment to the programme to be the weakest link in the whole process. In this respect, further measures are required at the national level at least. In addition, the various sectors seem to lack effective co-ordination in certain fields.

1. Fostering an innovation culture

Finland's commitment to fostering an innovation culture can be seen in the numerous cabinet-level decisions and policies aimed at improving the development of innovations in Finland. In 2002 special attention was paid to developing the operating environment for innovation-oriented companies. As a practical step, the Ministry of Trade and Industry commissioned an evaluation of the Finnish innovation environment in the summer of 2002. The evaluation, which was concluded in the spring of 2003, focused on how public services target the needs of different types of innovative companies: knowledge intensive start-ups, companies within traditional industries integrating new technologies in products and processes, small and medium-sized companies targeting international markets, and globally established R&D intensive companies.

1.1. Education and initial and further training

One of the main overall objectives of Finnish education policy has been to raise the general standard of education and promote educational equality. Efforts have been made to provide all population groups and regions in the country with equal educational opportunities. These are the basic tenets of the educational reforms carried out over the last decades. Also internationalisation of the educational system has been an integrated target of educational policy, especially since the end of 1980's.

The level of education in Finland has been rising significantly since the 1960s, and today particularly the younger generation is well-educated by international standards. The Finnish education system is considered as comprehensive and relatively well-resourced and has been commended in international comparisons of learning outcome and quality.

In the 1990s, Finnish educational policy paid special attention to the content and quality of education and the methods of instruction, as well as educational standards and equality. Increasing the overall flexibility and opportunities for individual choice were also considered important. An important institutional reform was establishing of a network of polytechnics in the middle 1990s. In 2002, circa 127,000 students were participating in degree programmes in polytechnics. In the same year the number of polytechnic graduates was circa 20,500 which is about 2,500 graduates more than the year before.

The latest statistics show that during the 1990s the number of people who completed tertiary education increased by three per cent a year on average. During the period 1989 to 1998, the proportion of women in the population who completed tertiary education rose from 52 to 56 per cent. At the same time, the number of doctoral degrees has been constantly increasing: from 524 completed degrees in the year 1991 to 1,224 in 2002.

The new Government bases its educational policy on the identified strengths of past educational policies, while it concurrently identifies certain areas in need of development and/or reform. In the new Government programme the educational policy issues are often considered in connection with other important societal targets, such as regional development, employment and entrepreneurship.

The Government aims to increase the attractiveness and status of vocational education. The Government also supports the development of on-the-job learning and the incorporation of

competence-based qualifications into basic vocational education in co-operation with educational institutes and workplaces. Closely related to the former is the goal of reinforcing apprenticeship training as a form of basic vocational education and additional training.

The Government further aims to improve the ability to anticipate education and training needs and to develop regional co-ordination in this area. The competence needs emerging in working life will be used as a basis for adjusting university degree requirements. According to the Government, the co-operation and division of labour between universities and polytechnics will be developed on the basis of a dual model. At the same time the Government emphasises the regional impact of universities and polytechnics. University funding will be secured by legislative means. The need to develop university operations will be re-assessed in connection with the amendment of the Universities Act.

A current reform proposal, in line with the new Government programme, deals with the development of the university degree structure. In October 2002, a committee set up by the Ministry of Education proposed that the two-tier university degree structure would be adopted in all study fields from 1 August 2005 and that the present credit system would be replaced by an ECTS-based system. The committee further proposed that the universities would develop specific master's programmes in response to the needs of research and the labour market. Students would be selected for these programmes in a separate application process. In addition, the committee proposed that universities arrange for degree programmes to be taught in foreign languages. The committee also proposed a simplification of legislation so that the present 20 Decrees governing university degrees be revoked and replaced by one Government Decree on university degrees. At the same time the statutes governing university degrees would be relaxed. In the opinion of the committee, the present division of responsibilities between universities should be retained.

In August 2003, the Ministry of Education circulated another proposal for comment concerning the education and research development plan for 2003-2008. The development plan will expand upon the notions on education and research in the current Government programme. According to the proposal, the current educational situation is favourable for Finland, although big challenges are anticipated in the near future. The demographic trend in Finland and the ageing of the workforce, combined with the concurrent effort to raise the employment rate, are challenges which demand that the educational system be flexible and adaptable. The following themes are identified in the proposal as key questions in the development of education and research in Finland: improved efficiency in the educational system, support and guidance for children and adolescents, and improved educational opportunities for adults. The proposal rates the current state of Finnish science and research as good, but recommends a further strengthening of university R&D. The most important challenges include the continued internationalisation of science and science administration, the strengthening of research training and the development of the whole research system.

With hindsight, it is possible to argue that one characteristic of Finnish educational policy is its adaptability to changes in the operating environment and in society in general. At various times, specific educational policy programmes and instruments are tailored in response to emerging challenges and needs. For example in 1998 the Ministry of Education initiated a programme to expand education and research to meet the growing and changing needs of the information industry (electrical and information technology, electronics, telecommunications and data processing technology). The programme was implemented during the years 1998-

2002. One of its goals was to increase the number of academic degrees in information industry fields by one third between 1999 and 2006.

In the programmes of Prime Minister Paavo Lipponen's first (1995-99) and second (1999-2003) governments, attention was paid to raising the level of mathematical and scientific knowledge in Finland to international standards. In 1995 the National Board of Education launched a development programme for mathematics and sciences for 1996-2002. The Ministry of Education expanded the programme to partners outside the school system and to this end devised the LUMA programme, whose aim was to improve and broaden Finnish know-how in mathematics and natural sciences.

In 2000 the Government decided to make an additional appropriation for universities in order to increase university funding to the targeted level. According to the Government plan the universities' core funding is to be gradually increased in 2001-2003, circa € 42 million in total. The financing is based on the Government's "future package", consisting of the income derived from the privatisation of state-owned companies.

Over the past two decades, adult education has become an increasingly important component in national educational policy. As a result of the structural change in industry and the labour market, lifelong learning has become an important principle underpinning education policy. The approach is also included in the new Government's programme, according to which, adult education will be developed on the basis of the proposals put forward by the Adult Education Committee. Among other initiatives, the new Government intends to increase apprenticeship training for adults, promote initiatives to shorten study times in adult education and lower the threshold for participating in education and training.

Lifelong learning was included already in the Development Plan for Education and University Research for the years 1999 to 2004. In the plan, lifelong learning was considered to be a process that covers all ages, all forms of learning, and all learning environments involved in the renewal of occupational and production structures. In addition, lifelong learning was seen as a way of enriching the lives of individuals in a more personal, less career-oriented sense.

The first National Strategy for Education, Training and Research in the Information Society, implemented in 1995-1999, aimed to promote promoting national competitiveness and employment opportunities by means of education. The second national strategy for education, training and research in the information society runs from 2000 to 2004. The strategy aims to raise the level of education in Finland to meet requirements of knowledge-based, interactive societies. Lifelong learning was emphasised in the strategy as means to strengthen the entire educational system to face the increasing flow of information.

At the beginning of 2003 a new national programme called NOSTE was launched for the period 2003-2007. The programme aims to improve the vocational skills of people lacking vocational training, advance their careers, lessen the impacts of the retirement of baby-boom generations and increase the employment rate. The Ministry of Education and the Ministry of Labour are responsible for implementation of the programme in the respective administrative fields. The activities of the Ministry of Education focus especially on upgrading the skills of the active workforce by improving the opportunities for employees to pursue studies or to complete interrupted studies. The programme is meant primarily for people aged between 30 and 54. Some 330,000 employees in Finland currently have education no higher than

secondary level. The programme's aim is to involve 50,000 participants in adult education over the next five years.

Elements of lifelong learning are also integrated in most of Tekes' technology programmes and in a joint programme of the Academy of Finland, the National Board of Education, the Ministry of Education, Tekes and the Finnish Work Environment Fund.

1.2 Mobility of students, research workers and teachers

Even though the mobility of personnel is considered to be one of the most important mechanisms of knowledge transfer, mobility between the universities and the business sector has been more modest than expected. Thus, in its 1996 review, the Science and Technology Policy Council recommended the promotion of expert mobility and the intensification of its monitoring (Science and Technology Policy Council of Finland 1996).

According to a recent survey on the significance of measures aimed at increasing personnel mobility between industry and science, the most significant factors have been long-term relations between companies and universities in graduate mobility, co-operation in graduate education between universities and industry (e.g. joint supervision of doctoral and master's theses), and co-ordinating structures for considering the requirements of industry in university education programmes. Additionally, many doctoral and master's theses have been funded by the industry sector in Finland.

It has been recognised that mobility of research staff between the public and private sectors is relatively minor. On the one hand there are structural barriers which do not encourage career moves to either directions, for example disparity in earnings. There are also factors that discourage researchers from creating new start-ups. In addition to financial risks, the founder may lose his/her professional reputation should the business fail.

Overall though, the mobility of highly educated personnel increased during the 1990s. In 1998, nearly one in four highly educated employees changed job (compared to 17 per cent in 1992). The mobility of educated research personnel was slightly higher, being clearly highest in the ICT sector. (Statistics Finland 2001).

1.3 Raising the awareness of the public and involving those concerned

The need to promote public awareness of inventive and innovative activities has been recognised in evaluations carried out in recent years.

One concrete measure aimed at raising the awareness of R&D and innovation among the public is the organisation of various competitions and prizes for successful, new and fast-growing firms, inventors or innovators. The INNOSUOMI initiative is one of the best known measures. The basic mission of INNOSUOMI is to promote an innovative culture, to promote innovations and the creation of new companies, and to improve co-operation between entrepreneurs, funding organisations and the public sector. The INNOSUOMI prize is awarded annually in recognition of exceptional innovation and entrepreneurship. The President of the Republic is the patron of the award, giving it high visibility and prestige (http://www.innosuomi.fi).

In 2003 a new prize, the Millennium Technology Prize, worth EUR 1 million has been established. Unlike the INNOSUOMI initiative, the search for potential recipients of the prize is conducted internationally. The Finnish Technology Award Foundation has established the prize to recognise outstanding technological achievements specifically directed at the advancement of society and its ability to sustain people's quality of life. The prize may be given to an individual, a group of individuals or a research team contributing to the same achievement. The Millennium Technology Prize will be awarded for a specific achievement in any of the following disciplines: Energy and the Environment, Communication and Information, New materials and Processes, Health Care and Life Sciences. The prize will be awarded for the first time on 15 June 2004, and after that every second year. The President of the Republic of Finland is the patron of the award (www.technologyawards.org).

During the current Trend Chart reporting period, new web-based information services have also been established to increase awareness of technology in Finland. The High Technology Finland 2003 service (http://www.hightechfinland.com) includes a book and web-site offering a cross-section of Finnish high-tech companies and organisations. The book and web-site have the following sections: A High-Tech Country, Communications & Information, Energy & The Environment, Health Care & Life Sciences, and New Materials & Processes. The material is published in co-operation with the Finnish Academies of Technology, Tekes, Sitra and Finpro.

Facts and figures on the Finnish Information Society have been gathered into the new site (http://e.finland.fi). The service primarily targets international businesses, R&D organisations and, in general, parties engaged and interested in the development of global and local information societies. The site has information on the following topics: eBusiness, eGovernment, Education & Culture, Mobility, Research and Development. The service is built and maintained in co-operation with the Ministry for Foreign Affairs, the Ministry of Finance, the Ministry of Transport and Communications, Tekes – the National Technology Agency, Sitra – the Finnish National Fund for Research and Development, and TIEKE – the Finnish Information Society Development Centre.

1.4 Fostering innovative organisational and management practices in enterprises

The promotion of innovative organisational and management practices in enterprises was taken into Prime Minister Paavo Lipponen's first Government programme in 1996. This resulted in the Finnish National Workplace Development Programme (1996-99), which was part of the national Cluster Programmes (FI_08). The second period of the programme covered the years 2000-2003. The new programme period is currently under preparation. The aim of the programme was to boost productivity and the quality of working life by furthering the full use and development of employee competencies and innovation in Finnish workplaces. The programme aimed to achieve this by developing human resources and helping the workforce reform their modes of operation.

The rationale for this initiative was the recognition that the development of organisational practices is an essential part of developing a national innovation system. In particular, the programme was established to help business enterprises better adapt to the ever-changing environment and therefore promote productivity and employment. The research-assisted

development programme aims to support workplace-initiated projects, speed up initiatives in workplaces, encourage the use of research in improving working life, create and maintain co-operation networks to disseminate and build up knowledge and competence and increase international information exchange

A lack of innovative small and medium-sized firms has been identified as a weak point in the Finnish innovation system. Finland overall remains relatively averse to risk-taking, and needs to do more to provide a supportive climate for entrepreneurship. According to the Global Entrepreneurship Monitor (GEM) report, the Finnish public attitude towards entrepreneurship is positive: people think there are many opportunities to start new businesses and believe they have the required skills and competence. However, the motivation to start new businesses is low.

At the beginning of 2000, the Ministry of Trade and Industry launched an Entrepreneurship Project (FI_14), which was included in the Government's programme. It set out to increase the establishment of new firms and increase the growth and competitiveness of existing enterprises. The project ran until the end of the term of Prime Minister Lipponen's 2nd Government in March 2003.

The Entrepreneurship Project was implemented by co-operation between nine ministries and the Association of Finnish Local and Regional Authorities. The Employment and Economic Development Centres and various interest groups in the business sector also played a key role in this project.

The focus of the project was on different phases in the life cycle of companies. Measures were directed at those stages which are most crucial in terms of the firm's success. About 130 concrete measures were applied throughout the project.

Regional inputs were emphasised. Public authorities met entrepreneurs and would-be entrepreneurs once a month on average in connection with the 36 regional Entrepreneurship Forums which covered the entire country. In addition, Finland's 15 regional Employment and Economic Development Centres implemented entrepreneurship projects of their own within their operating areas.

The new Government programme includes a new entrepreneurship policy programme (FI_18), administered by the Ministry of Trade and Industry and implemented horizontally. The entrepreneurship policy programme offers a common frame for studying possible incentives for entrepreneurship, ways of promoting the operations and expansion of SMEs in the start-up and growth stages, and support for women's entrepreneurship. As part of the programme the Government aims to adapt legislation to the needs of both small and large companies and to promote arrangements facilitating the generational change of entrepreneurs. The programme also aims to make entrepreneurship more attractive as a career.

1.5 Public authorities and support for innovation policy makers

An on-going task of the Science and Technology Policy Council is to enhance and develop sectoral research in Finland, the use of knowledge generated in public research organisations, and the links between the various organisations co-ordinating and funding such research

within the system of innovation (i.e. the universities, the Academy of Finland, the Technical Research Centre of Finland, other public research organisations, the ministries and Tekes, the National Technology Agency). This task has recently given rise to a number of evaluations of various research organisations and institutes, in line with a similar trend in other European countries. (Science and Technology Policy Council of Finland 1999, 2001a.)

In 2000, the Ministry of Trade and Industry took up the initiative of the Science and Technology Policy Council, concluding that there was a need to assess the present foresight practices in order to ensure that they will meet the future needs of society. The assessment report was completed in February 2001. The Ministry of Trade and Industry has created the secretariat for co-ordination of foresight exercises. The secretariat also co-ordinates research projects that support the implementation of coming foresight activities.

In the winter of 2002, the Ministry of Trade and Industry in collaboration with Tekes launched a new programme, named ProAct, to increase understanding and knowledge of the effects of technology, research and technology policy on society and the economy, and the effects of society on technological development. The results of the programme will be exploited in the development of technology policy-making. The programme will also promote researcher training in the field. The research will focus on significant socio-economic changes and phenomena, such as the development needs of technology policy, the renewal of innovation processes, the development needs of the research system in the internationalising research field, and the challenges of technological competitiveness in the new economy. The mid-term evaluation of the ProAct programme was started in the summer of 2003 and will be completed in autumn 2003.

In the late summer 2003 the Prime Minister Vanhanen's Government established a new Information Society Council, which will guide the development of the information society as a negotiation and co-ordination body. The Council is led by the Prime Minister and comprises members from the ministries of most relevance for development of the information society. In addition a large number of stakeholder groups and organisations is represented in the Council. The Government has also launched an information society policy programme, aim of which is to boost competitiveness and productivity and to promote social and regional equality through effective utilisation.

1.6 Promotion of clustering and co-operation for innovation

The extension and strengthening of network co-operation is seen as one of the key elements in the development of the Finnish innovation system. A number of projects and initiatives have been created to promote the transfer and utilisation of knowledge. Recently, there have been two major initiatives to promote cross and intra-sectoral collaboration in particular. The first initiative, the Centre of Expertise Programme (FI 5), is a national measure that aims to enhance regional competitiveness by strengthening innovation, renewing the production structure and creating new jobs within the expertise areas selected.

The second initiative, the cluster programmes (FI 8) initially funded through the programme for additional R&D funding (FI7), aims to support R&D activities that strengthen clusters and collaboration between industry and public organisations and company-to-company co-operation including user opinion. The Macro Pilot project, implemented between 1999 and 2001 under the Well-Being Cluster programme, is an example of an activity that aims to stimulate public demand for innovation. The goals of the project were to develop client-centred, seamless and effective services in the social and health care services sector by using and developing new technological solutions and devices.

The Finnish Environmental Cluster Research Programme is another example of a national cluster programme that brings together researchers, enterprises, authorities and funding organisations. The Finnish Environmental Cluster Research Programme's goal is to seek new ways to protect the environment, create innovations to enhance the welfare of people and the environment, and intensify the collaboration between researchers, industry and commerce, the authorities and finance providers. The main providers of finance are the Ministry of the Environment, the Ministry of Trade and Industry, the National Technology Agency (Tekes) and the Academy of Finland. The third phase of the research programme will be carried out during 2003-2005 under the theme "Ecoefficient society". The new phase of the programme supports environmental policy, satisfies the need for public information and supports enterprises in their environmental management. One goal of the programme is to improve the collaboration and distribution of work between different branches, parties and financing organisations. The aim is to impact environmental administration, other environmental players and various sectors of the economy.

The National Workplace Development Programme (the first period covering 1996-1999, the second 2000-2003) was also carried out under the umbrella of the cluster programmes. The National Workplace Development Programme strove to promote networking in labour administration internally, between the various projects of the programme and with scientific communities at the national and international levels. The programme also aimed to achieve close co-operation with the main bodies that fund research and workplace development in Finland, such as the Finnish Work Environment Fund, the European Social Fund, the Academy of Finland, and Tekes, the National Technology Agency.

In its assessment of the additional appropriation for research, the evaluation group found that the cluster programmes have succeeded in initiating a degree of productive co-operation. At the same time the group highlighted the development needs of the cluster programmes: more attention should be paid to the objectives, the co-ordination between finance providers should be improved, and the reporting requirements should be less complex. The evaluation group recommended that the clusters should be extended to new areas and that the existing clusters need to be more focused. (Prihti et al. 2000).

The promotion of clustering and co-operation for innovation are also interwoven into the Tekes technology programmes. Tekes takes a positive view of projects that involve networking with other companies, joint ventures, the contracting of services from Finnish research institutes and universities and the promotion of international co-operation. In the case of larger companies, one of the criteria for funding through technology programs is networking and the use of local SME subcontractors.

2. Establishing a framework conducive to innovation

There are many dimensions of public policy that affect the direction of innovation. Innovation can be promoted through competition policies, education policies and regulatory policies. The Finnish Government, in addition to setting the relevant policies, has established a range of instruments and organisations aimed at directly enhancing the performance of the Finnish innovation system.

During the year under review, an evaluation of the general conditions for innovation was carried out. The evaluation focused specifically on key policy organisations under the Ministry of Trade and Industry, exploring the functions they fulfil, their integration and co-ordination, and the extent to which they meet the innovation policy needs of Finland. It is to be noted that the efficiency and relevance of the Finnish innovation system was evaluated from the perspective of innovative firms. In addition, the study did not pursue new findings on the impacts of individual policy actions or the operations and efficiency of individual organisations, but rather assessed the context of innovation as a whole.

The evaluation showed that Finland's innovation system operates reasonably well with no obvious gaps and the different organisations are mostly performing well. Despite this, the emphasis should shift from technology to innovation, and there should be more emphasis on the integration of user perspectives into innovation projects. Another observation was that there is a partial overlap between the public and private sectors in the provision of services. According to the evaluation group there is a threat that public services may in some areas crowd out the private sector provision of services on a commercial basis. According to the evaluation group future success depends on how well the innovation system is able to respond to innovative opportunities that may be long-term or unexpected or disruptive in nature.

2.1 Competition

No specific new measures.

2.2 Protection of intellectual and industrial property

Agreement on a Community Patent applicable to all Member States was reached in March 2003, and the date for enforcement of the system was confirmed. The Community Design system will offer protection for industrial design (the outward appearance of the product). National legislation on design rights was also amended in this respect.

2.3 Administrative simplification

Recent international comparisons regard the higher-level co-ordination of innovation policy in Finland as a viable model. The Science and Technology Policy Council of Finland has a visible role in the co-ordination of innovation policy activities at the national level. This Committee is led by the Prime Minister and includes members from both the Government and key stakeholder organisations. In addition, the key innovation policy agencies, Tekes and the Academy of Finland, have close ties and co-ordinate their activities continuously.

Co-ordination between the national and regional levels has emerged as a topic in innovation policy debate. It is however difficult to draw any definite conclusions how well the co-operation works between different levels. Many of the programmes with regional importance are governed at the national level. For example, technology programmes and research programmes are co-ordinated nationally. Another example is the national Centre of Expertise Programme, which supports regional specialisation and co-operation between different Centres.

There are also more indirect ways of co-ordinating innovation policy activities between the national and regional levels, as well as between administrative sectors. The fact that many key policy makers participate in various working groups that deal with innovation policy issues ensures the flow of information between the different players. This, in turn, facilitates the matching of activities in different organisations.

A major initiative aimed at administrative simplification was launched in 1997 by merging the regional units of three ministries (the Ministry of Trade and Industry, the Ministry of Labour and the Ministry of Agriculture and Forestry) into Employment and Economic Development Centres, or so-called TE Centres (FI 14). Altogether there are 15 TE centres, covering the whole country. Their main task, in relation to innovation policy, is to provide support and advice to SMEs in the different phases of their life cycles (http://www.te-keskus.fi/).

In order to facilitate the use of public innovation services, two significant new web portals, Research.fi and Yrityssuomi.fi, were launched in 2001-2002. Research.fi contains material and data about different parties in the Finnish innovation system. This information service is designed to cater for the needs of decision-making, monitoring and evaluation of Finnish science and technology. Links to the most important documents, publications, statistics, etc. are given in all areas. The overall aim of Research.fi is to build up the knowledge base of Finnish science and technology as well as related indicators, especially impact indicators.

Another web portal, the Yrityssuomi.fi (Business Finland) network service, was opened in February 2002. This new service is a significant and concrete step in the collaboration between public providers of corporate finance and service organisations, i.e. Finnvera plc, Finpro, the Finnish National Fund for Research and Development (Sitra), Finnish Industry Investment Ltd, the National Technology Agency (Tekes) and the Employment and Economic Development Centres (TE Centres). This network aims at assisting small and medium-sized enterprises, entrepreneurs and would-be entrepreneurs to find the relevant public services for starting up an enterprise, as well as those related to growth, development and internationalisation.

2.4 Amelioration of legal and regulatory environments

The discussion of measures to improve the legislative environment for commercial utilisation of university research has continued. The University Inventions Working Committee set up jointly by the Ministry of Trade and Industry and the Ministry of Education to consider the commercialisation of research results found it important to improve the conditions for innovation in universities and polytechnics and also to provide effective support services.

The committee concluded that current legislation neither supports an increase in the utilisation of university inventions nor provides the clear definition of rights to inventions that is necessary for their commercialisation. The committee recommended amendments to the Act governing in-company inventions and to the Universities and Polytechnic Act, and proposed the enactment of totally new legislation. The reform would mean a revision of the researcher and teacher exception rule - i.e. university researchers would be in the same position as any employee. However, the new Act would not cover intellectual property rights in free academic research, where the inventor has the right to primacy of publishing and utilisation of his/her invention. The Act would also be contractual - the regulations would be applied if not contracted otherwise. The proposal for the new Act regarding the protection of intellectual property rights in universities would change the current incoherence within universities and other public research organisations. The amendment would also bring the IPR practice in Finland closer to the prevailing practice in other member states of the European Union, the US and Japan. The Ministry of Trade and Industry launched a legislative reform encompassing these issues in autumn 2002, and it is expected to be submitted to the Government in the late 2003.

2.5 Innovation financing

One of the most prominent trends in Finland during the last decade has been the rapid increase in R&D funding. Measured in terms of its proportion of GDP, investment in R&D is among the highest in the world. In 1991 R&D expenditure accounted for 2.1 per cent of GDP, whereas in 2002 the figure was estimated to be 3.4 per cent. The increase is mainly explained by increased R&D investment in the business sector. Even though public investment in real terms has grown substantially during the last decade, its share of Finland's total R&D expenditure has dropped to less than 30 per cent.

Public R&D funding showed particularly strong growth in 1997-1999. This was a direct consequence of the Government's decision in 1996 to raise the national research input to 2.9 per cent by the end of 1999. This increase was realised through the programme for additional R&D funding (FI 7). The additional appropriation was targeted mainly at activities initiated by Tekes and the Academy of Finland. The goal of 2.9 per cent was achieved and even exceeded in 1999. The Science and Technology Policy Council has suggested in their new review 2003 that public funding must be increased faster than the estimated growth in the GDP. In the case of research, this would mean an increase of EUR 300 million from the 2002 level by 2007.

In Finland, Tekes is the most important public provider of finance for technical R&D. In addition to Tekes' activities in the field, there are other public agencies supporting technical R&D. For instance, Finnvera has several financing instruments (loans, guarantees, export credit guarantees) which can be utilised by innovative companies. Other important agencies are Finnish Industry Investment Ltd and Sitra.

At the beginning of 2003, the division of labour between public special financing agencies was reassessed and reformed. After an audit of state special financing and an evaluation of Finnish Industry Investment Ltd, the Ministry of Trade and Industry decided to redefine the division of duties between the public financing agencies in regional capital investments administered by the Ministry. Accordingly, Finnish Industry Investment now focuses on the capitalisation and development of limited partnership regional funds, while the specialised

financing company, Finnvera plc, assumes responsibility for all corporate regional funds on behalf of the State. Therefore in June 2003 Finnvera plc established Veraventure Oy, an investment company responsible for capitalising and developing corporate regional investment funds. All Finnvera holdings in regional investment companies will be amalgamated into Veraventure Oy, a subsidiary of Finnvera plc.

2.6 Taxation

Like Sweden and Italy, Finland does not apply preferential tax treatment to R&D. It is believed that tax-based R&D support does not give the opportunity to direct business R&D into areas with potentially high social returns. Overall the legal and fiscal environment in Finland is relatively favourable to private equity and venture capital companies. The new Government's programme contains a plan to revise the tax law so as to ensure the equality of foreign and domestic investors in Finnish venture capital funds, which will promote foreign investment.

3. Gearing research to innovation

Investment in education and research is seen as a key to achieving national success based on knowledge and know-how. Finland's strengths are its internationally high level of education and high standards of research. Finland is already at the forefront of progress in many technology sectors. Education and training and high-level basic research are, however, merely some of the prerequisites for effectively utilising innovations and abroad-derived technology. Full utilisation of the fruits of research and development constitutes a significant challenge for the Finnish innovation system. Strengthening business know-how, protecting intellectual property and ensuring venture capital investment in start-up companies are also seen as key activities.

The recommendations made in 2003 by the Science and Technology Policy Council of Finland concerning the funding of the innovation system pave the way for a significant development effort. In particular, ensuring the adequate supply of competent researchers and the creation of an internationally competitive research environment are of great importance to economic development.

The new Government promises to provide a considerable increase in the amount of public financing available for research and development. In addition to this increase, the focus of the R&D funding of Tekes, the National Technology Agency of Finland, will be increasingly shifted from R&D loans to research funding for public organisations and to R&D grants for companies.

The Government has decided to draw up an indicative and operational programme for the allocation of R&D funding and the development of the innovation environment. Funding will be allocated to areas such as branding, commercialisation and R&D in the service and new technology sectors and to know-how and innovation that support sustainable consumption and production. The quality assessment and performance monitoring of projects seeking public R&D funding will be more rigorous to ensure that the finance available is used as effectively as possible.

The Government has also promised to continue to enhance the capacity of the regions to benefit from public R&D funding. There will be closer co-operation between the various organisations that support innovation and have a regional presence. The regional availability of their services will also be improved.

3.1 Strategic vision of research and development

The strategic visions for R&D are spelled out in the triennial review of the Science and Technology Policy Council. The latest review (2002) places strong emphasis on speeding up the internationalisation of the innovation system and on promoting favourable conditions for innovation. Apart from increasing the funding of research, further action will be taken towards enhancing research careers and the utilisation of research findings. An important change in policy thinking is the increased stress on boosting social and technological innovation. A major target is to ensure the flexible expert development of innovation funding.

The Academy of Finland has an important role in strategy formulation for basic research, research training and science policy, as is illustrated in its newly published strategy (2003).

The Academy's strategy underlines the importance of investing in education and research as a key to achieving national success. According to its new strategy, the Academy is committed to promoting the development of Finnish society, to implementing the European Research Area and to strengthening global co-operation in such a way that it supports the developing information and education society.

The strategy of Tekes (2002) emphasises the versatile use of technology and expertise and the utilisation of international and regional technological co-operation as the foundation of Finnish prosperity. Tekes' technology strategy outlines eight thematic areas, of which three are key generic areas (information and communications technology, biotechnology and material technology), four are key application areas (welfare, knowledge-intensive services, sustainable development and intelligent products, processes and systems), and one is competence in a networked economy, as the main targets of technology policy. The strategy was based on wide-ranging discussions with private companies, research units, industrial organisations and makers of technology policies. The technology strategy influences the allocation of Tekes' funding and decisions on launching new technology programmes.

Technology foresight and assessment is considered to be a crucial focus area in the national innovation policy. The Ministry of Trade and Industry started a four-year foresight development and co-ordination project in 2001. Besides strengthening horizontal collaboration between the different parties, it has initiated studies within the area. The most recent published studies concern sustainable development and the development of key technologies and their societal impacts. The key technologies were information and communications technology, biotechnology and material and nano technology (see Lievonen 2003 and Ahlqvist 2003). A pilot study related to population ageing is also ongoing.

A salient feature of Finland's innovation and technology policy has been the active tradition of evaluation and benchmarking exercises. The many evaluations of the programmes and agencies within the Finnish science and innovation system have provided important information on the implementation of policy measures and the weaknesses of the system and have resulted in proposals for improvement.

3.2 Strengthening research carried out by companies

This theme has been thoroughly discussed in Section 2.5, since innovation financing and the strengthening of research carried out by companies are not really regarded as separate issues in Finland. In particular, this holds true with SMEs. The cluster programme, discussed in more detail in Section 3.4 below, can also be considered relevant in this context.

3.3 Start-up of technology-based companies

Initiatives aimed at the start-up of technology-based companies primarily relate to the venture capital industry and various incubator schemes. The Finnish private equity and venture capital market has experienced significant growth in terms of both investors and operations. This growth has also resulted in an increase in the number of members of the Finnish Venture Capital Association (FVCA) (http://www.fvca.fi). Today the membership covers 50 private equity houses and venture capitalists. The association has 63 associate members. The real growth of the association began in the latter half of the 1990s. Despite a downturn in international economics, the Finnish private equity industry has remained vital.

Governmental agencies have pioneered Finnish private equity investing. At the end of the 1990s many private management firms had become prominent players. Today, the private sector accounts for most of the markets. The public sector focuses mainly on seed financing and rescue or turn-around.

The Finnish private equity market is becoming more international. For example, some Finnish venture capitalists and private equity houses have penetrated Scandinavian markets. On the other hand, international private equity houses have discovered Finland and have established themselves in the Finnish markets.

The most significant public venture capital organisations are Sitra and Finnvera. According to a recent study, Government funding, directly or indirectly, is still a main contributor to the Finnish seed capital segment (seed capital investment in Nordic countries). Sitra played a significant role in the establishment of the Venture Capital Association in 1990. Sitra's own activities include technology transfer and venture capital investments in emerging and technology-based start-up companies, as well as spin-offs from large companies. Sitra's PreSeed service package (FI_03) has been created to accelerate the emergence of new technology-based businesses, improve capital management and introduce companies to the providers of further funding, including private venture capitalists. The PreSeed service consists of two measures: LIKSA and INTRO (FI_13).

LIKSA is a joint funding service operated by Sitra and Tekes that can be used to obtain information and services related to the commercialisation of technology and the development of relevant business plans. The INTRO service takes care of the efficient presentation of start-up enterprises so that they can find both institutional and private investors who might be prepared to provide simple, straightforward funding in the future.

LIKSA and INTRO are closely related to the Tekes TULI programme (FI_06) which was modified before the start of a new programme period in April 2002. The main goal of the TULI programme is to promote new, technology-based businesses arising out of applied research in Finland. The scheme focuses on R&D activities at universities and research institutes. In practical terms, the aim is to realise the commercial potential of research projects by forming new ventures.

Finnvera's domestic development and financing solutions are geared particularly towards SMEs, but help to promote regional policy objectives as well (http://www.finnvera.fi).

Incubator schemes have been established in close association with the regional technology parks and universities since the late 1980s. The more significant include the Spinno scheme (FI_01) in the Helsinki region and the technology or company centres in the larger cities of Tampere, Turku and Jyväskylä.

The Government's Entrepreneurship project (FI_14), started at the beginning of 2000, was completed in early 2003. It was implemented by co-operation between nine ministries and the Association of Finnish Local Authorities. Most of the over one hundred actions included in the project have been implemented. The project included various measures designed to increase the establishment of new firms and increase the growth and competitiveness of existing firms. The project focused on different phases in company life cycles. Measures taken to improve the environment for entrepreneurship focused on the administrative obligations involved in running a business, financing, competition, social security for the entrepreneur, counselling and development services for businesses, and further on improving the operating environment in terms of social welfare and health care services, the transfer of business ownership to successors and bankruptcy regulations.

To continue the former Government's Entrepreneurship project (FI_14), the new Government launched a new Entrepeurship programme (FI_18) to foster company start-ups, growth and internationalisation. The most important goals are to secure economic growth, reasonable and stable interest rates and a low level of inflation, as these enable companies to invest and employ people in the long term. Efforts will be made to make entrepreneurship more attractive as a career. Legislation will be adapted to suit the needs of small and large companies. Administrative obstacles to entrepreneurship will be abolished and services for companies improved on the 'one stop service' principle.

3.4 Intensified co-operation between research, universities and companies

Close co-operation between companies, research organisations and universities is considered a specific strength of the Finnish system of innovation. The single most important ongoing activity in this field has been Tekes' technology programmes (FI 12). In 2002, about 45 large national technology programmes were under way. Participating in them were some 2,200 companies and 790 research institutes. Approximately 52 per cent of the financing for company projects and 58 per cent of the financing for public sector research projects was channelled through technology programmes, totalling EUR 204 million.

Tekes' technology programmes are used to promote practical co-operation and encourage networking between companies and research institutes, while also strengthening technology transfer and supporting international expansion. The technology programmes are demand-oriented in the sense that they have been planned with the needs of companies in mind, and have been implemented in collaboration with companies. The planning takes place in workgroups and seminars involving firms, universities and research organisations, and the explicit aim of the programmes is to promote collaboration between these parties. Each programme has a steering group, a co-ordinator and a representative from Tekes. The universities of technology and the Technical Research Centre of Finland (VTT) have led most of the programmes. Their duration ranges from three to five years (average 4.5 years) and their average budget is approximately EUR 33 million. Tekes usually finances about half of the costs. The technology programmes have also functioned as a good framework for international R&D co-operation, e.g. within the EU's framework programmes.

The achievement of programme objectives and the success of projects are systematically evaluated both during their implementation and after their completion. Interim evaluations help in steering the programmes more effectively and in achieving better results. They help in evaluating the profitability of the programmes and support the overall strategic development of programme activities and the activities of Tekes in general.

The main benefits of the technology programmes lie in the close co-operation established between research institutes and industry, the widespread involvement of small and medium-sized companies, and the high level of international co-operation. Technology programmes have been criticised for being too technology-oriented and too fragmented, and not allowing room for unconventional approaches (Tuomaala et al. 2001).

The cluster programmes (FI 8) are also an example of major public support for collaboration. They aim to support R&D that strengthens industrial clusters by promoting co-operation in certain fields of industry, or around certain themes.

In addition, there are various initiatives and schemes that concern the establishment of framework conditions conducive to innovation at the regional level, most notably the Centre of Expertise Programme (FI 5). Part of the R&D funds channelled through the TE centres, for example, finance co-operative R&D projects. The EU's Structural Funds - in particular the objective 2 RTDI funds and measures - also play an important role since they are typically integrated into regional projects of domestic origin.

3.5 Strengthening the ability of companies, particularly SMEs, to absorb technologies and know-how

The Finnish Government has been keen to provide funding to enterprises, and especially to small and medium-sized enterprises. In an assessment of the additional appropriation for research, an international evaluation group recommended that priority be put on encouraging SMEs operating in conventional sectors to take up new technology (Prihti et al. 2000).

Funding SME projects and encouraging companies to invest in R&D are two of Tekes' priorities. Half the funding for company projects was allocated to SMEs, and over two-thirds to companies with fewer than 500 employees. SMEs' share of Tekes' funding for companies has grown consistently, from 34 per cent in 1994 to around 50 per cent in 2002. Financing for companies with fewer than 500 employees has almost tripled, from 28 per cent in 1984 to around 70 per cent in recent years.

Tekes' Technology Clinic Initiative (FI 11) helps SMEs to utilise new technology-based methods and research services. The clinics offer SMEs a flexible way of using the services of research institutes and universities. They promote the adaptation of specified technologies for problem solving in SMEs in order to introduce new technological possibilities and raise their awareness of external R&D resources. In 2002, the technology clinics carried out 53 projects in nine generic types of clinics. Typically the projects last from a few weeks to a few months.

To help companies develop and apply new technologies, Tekes provides grants and expertise for the preparation of technology and business strategies for SMEs. The LIKSA service (FI

13), jointly operated by Sitra and Tekes, can be used to obtain business plans. LIKSA is targeted at start-up companies, whereas Tekes grants can also apply to established companies.

4. List of TREND CHART measures

Code	Title	Start/end dates	Action plan area(s)	New/modified/ extended etc.
FI_01	SPINNO - Business Development Centre	1990/continuous	I.1, **III.3**	Ongoing
FI_02	FINNVERA Small Loan Programme	1996/continuous	**II.5**, III.3	Ongoing
FI_03	Matching Service	1996/2001	**II.5**, III.3	Ended
FI_04	Capital loans for R&D in companies	1996/continuous	**II.5**, III.2, III.3	Ongoing
FI_05	Centre of Expertise Programme	1994/2006	**I.6**, II.5, **III.4**	Ongoing, revised in the early 2003
FI_06	TULI - programme	1993/continuous	II.5, **III.3**, III.4	Ongoing
FI_07	Programme for additional appropriation for research	1997/1999	I.6, **II.5**, III.2, III.4	Ended
FI_08	Cluster Programmes	1997/2004	**I.6**, II.5, III.4	Ongoing
FI_09	Improving the use of research results at universities	1999/2001	**II.2**, III.4	Ended
FI_10	Technology transfer from universities and research institutions	1999/2002	II.2, **III.4**	Ongoing
FI_11	Technology Clinic initiative	1992/continuous	I.4, III.2, **III.5**	Ongoing
FI_12	Tekes Technology Programmes	1984/continuous	**II.5**, III.2, III.4, III.5	Ongoing
FI_13	PreSeed Finance/LIKSA & INTRO programmes	2001/2003	**III.3**, II.5	Ongoing
FI_14	Government's Entrepreneurship Project	2000/2003	**I.4**, II.4	Ended
FI_15	Employment and Economic Development Centres - TE-keskukset	1997/continuous	**II.3**, II.5	Ongoing
FI_16	ProACT - Research Programme for Advanced Technology Policy	2002/2005	**I.5**, III,1	Ongoing
FI_17	Tekes Funding for Feasibility Studies - VARA	1999/continuous	II.5, III.3, **III.5**	Ongoing
FI_18	Government's Entrepreneurship policy programme	2003	**I.4**, II.3, II.4	New

[2] Note – because the extranet datasheet entry system automatically allocates new code numbers, it is recommended that new measures are first entered as datasheets. The allocated codes may then be used in the report and any tables.

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6. New Policy documents

Policy Document Summary

Name:

Review 2003: Knowledge, Innovation and Internationalisation

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Produced by/primary agency responsible:

The Science and Technology Policy Council of Finland

Presentation of Analysis – main national strengths/weaknesses, problems addressed

The Review examines the development challenges facing science and technology policy in the coming years and outlines relevant policy. Special attention is paid to the rapidly internationalising innovation environment and the ensuing pressures for structural and operational change in Finland.

According to the Council, recent economic and societal development in Finland has largely been built on developing high technology, its effective utilisation and determined efforts to increase exports. This has significantly improved Finland's position in international competition. This is reflected in both economic development and the success achieved in combining economic development with sustainable environmental policy. A major future challenge is to keep Finland sufficiently attractive for business and jobs and as a living environment in circumstances of ever growing global competition.

The Council believes it is not possible to limit the development of innovations to the national environment and traditional international co-operation. Internationalisation must permeate the whole innovation system. Finland must be able to internationalise its activities and its national science and technology institutions. The challenge is to make the most of globalisation by exploiting the positive aspects of development trends.

Systematic input is needed in social innovation as well as in technological innovation, in order to prevent societal and social development from diverging from economic and technological development. This extensive set of measures will form the core of the national strategy in the near future.

A successful national strategy will require systematic development. The major knowledge and know-how assets – the national competencies – must be further developed. The particular strengths of Finnish business and industry are the information and communications cluster, the forest cluster and the metal cluster. In addition, it is especially important to invest in promising research fields and to achieve sufficient volume and good quality.

The renewal of traditional industries must be accelerated through the exploitation of technological and social innovation in enterprises. Ministries will assume greater responsibility as strategic development organisations and social innovation users.

Measures must be taken to promote favourable conditions for innovation. The capacity of the Academy of Finland and the National Technology Agency to ensure the development of new growth areas, research-based innovation and innovation environments must be strengthened.

Research organisations must be developed into active and dynamic partners for business and industry. University legislation must be amended to encourage universities to actively develop education, researcher training and research and to promote the utilisation of research findings. The Science and Technology Policy Council will evaluate the structures of the public research system by the end of 2004.

Further input is needed to improve basic information society skills. Mathematical and scientific knowledge must be enhanced. Researchers' career prospects must be developed on the basis of ongoing evaluations and reviews.

The Review points out that regions face the same internationalisation challenges that the nation as a whole faces. A successful response requires that the regions enhance their own conditions for development. Higher education institutes and research institutes' units must contribute to regional knowledge capital, and must intensify national and international networking in the regions.

According to the Council, public funding must be increased faster than the estimated growth in GDP. In the case of research, this will mean an increase of EUR 300 million from the 2002 level by 2007. This is also the Council's recommendation for the negotiations on the new Government programme in spring 2003.

There are three main development targets: (1) to enhance education, research careers and the utilisation of research findings, (2) to boost social and technological innovation and (3) to ensure flexible expert development of innovation funding. Research and funding organisations must also constantly develop their own decision-making and increasingly prioritise important and promising fields.

Indicators – figures used, sources and benchmarks

The Review synthesises and builds on the conclusions and results of numerous recent policy documents, studies, statistics, etc.

Objectives, time horizon, relationship to EU Action Plan (if any)

The recommendations and identified future development needs cover the coming years in general and the period 2003-2007 in particular.

Implementation approach

See “the presentation of analysis" above.

Reference/location/URL

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