

**Proposal for**

# **Finland's National Innovation Strategy**

**Initial release – this document will be published in its final form by the Ministry  
of Employment and the Economy once it has been passed by the Government**

## To the Ministry of Employment and the Economy

The preparation of the national innovation strategy was agreed in the programme of Matti Vanhanen's II Cabinet. The strategy aims at creating broad-based and multifaceted innovation policy and strengthening its implementation. Broad-based innovation policy facilitates the development and renewal of competence based competitiveness of industry, economy and the regions. It also advances the utilization of innovation activities in the public sector and society. The Ministry of Employment and the Economy (until 31.12.2008 the Ministry of Trade and Industry) was assigned with the practical preparation of the innovation strategy.

In strategy preparation, the aim was an open and participative working method. Eleven thematic workshops focussing on key challenges in innovation policy were arranged in the autumn of 2007, with a total of some 300 experts participating. An open consultation was implemented on the Internet, with the opinions of over 500 citizens, enterprises and organisations being heard. Material related to the preparation of the strategy is posted on the project's Internet site on [www.innovaatiostrategia.fi](http://www.innovaatiostrategia.fi). Workshop summaries published on the website, and an analysis of the results of the open consultation, were utilised in the preparation of the strategy.

On 28 September 2007, the Ministry of Trade and Industry appointed a steering group for the actual preparation of the innovation strategy. The steering group, chaired by *Esko Aho*, President of Sitra, comprised the following members: *Anne Brunila*, President & CEO, Finnish Forest Industries Federation, *Jarl-Thure Eriksson*, Rector, Tampere University of Technology, *Pirjo Harjunen*, Ministerial Adviser, Ministry of Employment and the Economy, *Riikka Heikinheimo*, Executive Director, Tekes, *Sakari Karjalainen*, Director General, Ministry of Education, *Timo Kekkonen*, Director, Confederation of Finnish Industries, EK, *Pekka Neittaanmäki*, Professor, University of Jyväskylä, *Erkki Ormala*, Director, Technology Policy, Nokia Group, *Petri Peltonen*, Director General, Ministry of Employment and the Economy, *Kaija Pöysti*, Partner, Blue White Venture, *Merja Strengell*, Chair of the Board, Finnish Association of Graduate Engineers, TEK, *Anne Stenros*, Vice President, Design, Kone Corporation, and *Juha Teperi*, Programme Director, Ministry of Social Affairs and Health. Steering Group Secretary was *Hannes Toivanen*, Senior Researcher, Ministry of Trade and Industry. In its work, the steering group consulted a number of experts in various fields.

Early in 2008, an international conference and national seminar were arranged to consider the basic choices and content of the strategy. In addition, the steering group has consulted leading international experts.

The basic choices of the national innovation strategy will steer the operations and development of the innovation environment in Finland. The strategy focuses on broad-based innovation policy, and the changes and reforms necessary for its implementation. On the other hand, the strategy does not consider questions related the allocation of innovation activities' resources between different content areas. The action plan of the strategy highlights key new or changing tasks and focal points. Together with the current strengths of the innovation environment, they form an entity enabling Finland, in the long term, to establish itself as a productive and attractive innovation environment.

Respectfully, the Steering Group hereby submits its proposal for a National Innovation Strategy to the Ministry of Employment and the Economy.

Helsinki, 12 June 2008

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## Part I: **Strategy**

## The position of a pioneer requires renewal

Finland has succeeded well in international comparisons of education, research and technology, being one of the leading countries in the world in terms of innovation and the quality of enterprises' operating environments. Finland's success has largely been based on its high-quality educational system, long-term investments by enterprises and the public sector in research & development, and its well-functioning, networked institutions.

However, rapidly intensifying competition in the open global operating environment of innovation activity is challenging Finland's competitive advantages. Hence, Finland's success in international comparisons evaluating competitive ability and the development of the information society has been on the decline. This forces us to consider, critically and without bias, our competitive position, while motivating us to pursue new opportunities opening up due to the changes in the economy, society and the global operating environment.

Finland's long-term investments in expertise and technological research & development have produced good results, and its successful science and technology policy has created a basis for many successful industries. This provides a good basis for constructing the future. However, the challenges of growth and competitiveness can no longer be tackled only by means of a sector-based, technology-oriented strategy. Instead, a demand-based innovation policy must be strengthened alongside a supply-based innovation policy.

As a concept, innovation has expanded and diversified considerably in the past few years. In terms of the related strategy, innovation is perceived as an exploited, competence-based competitive asset, which, in addition to the application of technology, can be founded on e.g. new service and business models, working and operating methods, or the management of product concepts and brands. Most typically, innovation emerges as a combination of many competencies. Broad-based innovation policy creates the preconditions for operating models combining the needs of users, consumers and citizens, alongside knowledge, creativity and competence.

A decisive factor as regards Finland's future success is how the EU succeeds in its economic and innovation policy, and Finland must therefore be an active participant and force in the development and targeting of the EU's research and innovation policy. By taking advantage of all instruments of EU innovation policy, Finland should be able to strengthen and diversify innovation activities and contribute to Europe's development to leading knowledge-based economy.

## Drivers of change

The economy and society are facing immense pressures for change. The basic precondition of a successful innovation policy is the recognition of such pressures and taking them into account. Key drivers of change include globalisation, sustainable development, new technologies and demographic changes in the population, all of which involve both threats and major opportunities for society and the economy.

- ***Globalisation.*** Today, industrial manufacturing is very flexibly placed in locations offering the most favourable operating conditions. Knowledge and competence are undergoing similar development. Operators in developing countries are striving to challenge those who are presently enjoying success throughout the world.
- ***Sustainable development.*** Increasing awareness of climate change and the related threats has created pressure to adopt ecologically sustainable production and consumption. The scarcity of energy and raw materials, and their soaring prices, are adding to this pressure.
- ***New technologies.*** Technological development continues at an accelerating pace. For instance, the fields of information and communication technology and bio- and nanotechnology are producing information and results on a continuous basis, creating huge potential for new applications and the renewal of former operations.
- ***Aging of the population.*** Finland is one of the first countries to face reducing workforce volumes. The rapidly changing population structure is forcing Finland to devise rapid solutions in order to enhance productivity and efficiency, while creating the preconditions for new innovations.

## Strategic goals

### *Innovation-based development of productivity*

In the target status, economic growth is combined with the wellbeing of people and the environment. Increasing wellbeing requires the innovation-based, sustainably targeted improvement of productivity extensively in enterprises and other communities. The target status sees Finnish enterprises succeeding and growing on the international market due to their competitive strength which is a consequence of expertise, and the enhancement of their productivity. The public sector in Finland is also reforming its service systems and operating methods actively, by developing innovations. With higher than present productivity Finland will be able to meet the challenges of declining workforce volumes and fairly high cost levels.

### *Pioneering in innovation activity*

In order to succeed, Finland must lead the way on a global scale in selected sectors of innovation activity. According to its target status, Finland must meet social challenges with a comprehensive, consistent innovation policy across administrative boundaries, paying close attention to both the technological and non-technological sectors of innovation activity. An attitudinal environment motivating creativity will support the broad-based development of innovation. Occupying the role of pioneer would ensure the competitive capability of trade and industry and the national economy in the face of intensifying international competition. Finland must be able to generate globally significant added value and attract both skilful experts and investments into the country. We must also actively influence the direction and goals of regional, national and international development. Finns must be activated to participate widely in various competence and knowledge networks.

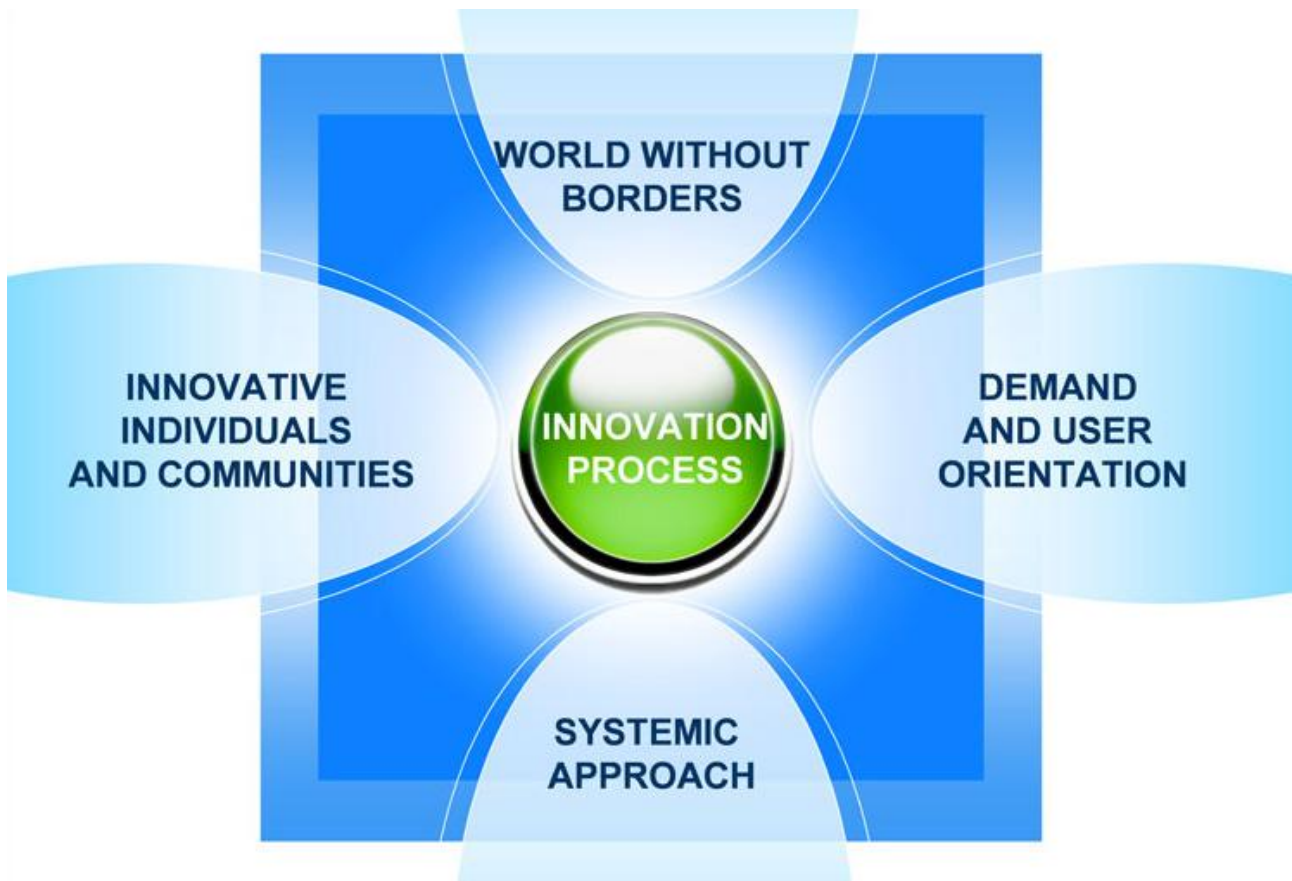


## Basic Strategic choices

Traditionally, Finland's competitive ability has been strong and Finland must continue to maintain quality education, sizeable investments by enterprises and the public sector in research & development, and well-functioning institutions. This solid competence basis, created by Finland through investing in education and research, must be preserved, and further reinforced. However, current strengths will not suffice to meet future challenges.

To attain Finnish strategic goals, the innovation environment must be able to create novelty and make choices. Therefore, this innovation strategy focuses on completely new topics and measures, or ones requiring a distinct change. The strategy reviews innovation activity and the required development measures via four basic choices, presented and justified in more detail as follows.

- ***Innovation activity in a world without borders:*** In order to join, and position itself within, global competence and value networks, Finland must actively participate and exert influence and be internationally mobile and attractive.
- ***Demand and user orientation:*** Innovation steered by demand, paying attention to the needs of customers, consumers and citizens in the operations of the public and private sector alike, requires a market with incentives and shared innovation processes between users and developers.
- ***Innovative individuals and communities:*** Individuals and close innovation communities play a key role in innovation processes. The ability of individuals and entrepreneurs to innovate, and the presence of incentives, are critical success factors of the future.
- ***Systemic approach:*** Exploitation of the results of innovation activities also require broad-based development activities aiming at structural renewal, and determined management of change.



**Figure I-1** Innovation strategy: basic choices and frame of reference

## *Innovation activity in a world without borders*

Globalisation manifests itself as supranational 'flows', where ideas, competencies, technology, products and services, financing and almost all other production factors flow regardless of national boundaries. Expertise and value networks connect different operators into global value chains. The success of enterprises and regions depends on their ability to position themselves in global networks and produce, in the role they have selected, more added value than others do. Only a company, region or community able to produce superior added value is a partner to be taken seriously, and is able to attract other operators throughout the world.

The basic question of innovation policy is: which areas of competence are the ones in which Finland is able to provide added value in global value networks and become a country in which it pays to invest in order to be able to share such competence. Finland must contribute to influencing global flows, and attract them. Incoming flows will add to the prosperity of Finland more than investments flowing out of it although these, too, build networks that benefit the nation. The success of Finnish innovation policy is measured by the quantity of investments, experts and enterprises entering Finland. Based on these indicators, the Finnish rating is poor in international comparisons.<sup>1</sup> Finland can only succeed in the global market for experts and investments by constructing a well-known, renowned *brand* based on strategic choices, state-of-the-art competence, and a competitive innovation environment.

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<sup>1</sup> As an example, the following information should be mentioned. The share of international R&D funding of corporate R&D investments in 2005 was 5.3% in Finland, whereas in other countries the figures are higher: 26.3% in Austria, 13.3% in Belgium, 10.4 % in Norway, and 8.1% in Sweden (Source: OECD Science, Technology and Industry Scoreboard 2007). The share of foreigners in the highly educated science and technology workforce was less than 3% in Finland in 2006 (cf. e.g. 13% in Sweden, 15% in Ireland, 16% in Estonia) (Source: Eurostat, OECD: Adjusting to the Global Competition for Talent, DSTI/STP/SFRI(2008)).

## *Demand and user orientation as a basis for innovation activity*

Innovation activity no longer abides by the traditional logic of invention. Instead of searching for customers for new products and inventions, new solutions are sought for customers in an increasing number of cases. In a world where the majority of technologies is available on the markets, competitive strength is often based on the ability to realise the needs of customers, consumers and citizens before competitors do, and to offer corresponding products and services. Around the world, leading edge companies are involving consumers and customers in product development. Enterprises are even processing previously unrecognised needs together with users, thus influencing the emergence of a completely new kind of market. Various forms of open and public innovation activity are gaining ground alongside traditional closed innovation activity. Policies must create the preconditions for the emergence of open innovation environments.

In Finland, innovative enterprises cooperate with customers to a greater extent than in many other EU countries on average.<sup>2</sup> Innovation activity involves market-based innovation seizing the opportunities opened up by the market. Value chains are being steered from customers and consumers towards producers and developers, not vice versa. Innovation policy must adapt to this change in innovation activity and accelerate its pace. Attention must be paid to the quality and depth of cooperation and the creation of markets for innovative solutions must be promoted.

Traditional innovation policy has focussed on the development and commercialisation of new technologies. Even the success of innovation policy has been measured primarily with the help of development investments and technological output.<sup>3</sup> Newer innovation policy will emphasise the development of products and services meeting the needs of customers and the strengthening of users' and developers' mutual development work. There is room for improvement in Finland, particularly as concerns the development and introduction of user-oriented service innovations.<sup>4</sup> For instance, particular attention is called for in order to enhance the productivity of the public sector through the development of services and service ability.

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<sup>2</sup> This is indicated by e.g. the fourth Community Innovation survey (2007). The average for EU27 countries is 14 per cent.

<sup>3</sup> For instance, by following the quantity of R&D investments and patents.

<sup>4</sup> In Finland, the service sector's R&D investments are extremely low on an international scale, in 2004 totalling only ca. 0.1% of the value added in the field, while in manufacturing industry, the corresponding figure is almost 3%, at top international level. (Source: J.Kuusisto, R&D in Services – Review and Case Studies, A Paper for the CREST – R&D in Services Working Group, 2008, OECD statistics). However, it should be noted that no generally accepted and extensively applied indicators exist, neither do comprehensive definitions for service sector R&D&I activities. Therefore, statistics describing operations are also defective. (Source: J.Kuusisto, R&D in Services – Review and Case Studies, A Paper for the CREST – R&D in Services Working Group, 2008.)

## *Individuals and communities create innovations*

Ultimately, the production of innovations depends on individuals. Innovativeness is based on the skills and creativity of individuals<sup>5</sup>, but is also linked to clear goals and problem-setting. Innovation requires systematic working with the problem and a sufficient quantity of information about the phenomenon, customers, technologies, patents, previous solutions and operating modes etc. Innovations also require a division of duties, and sufficient time and space reserved for innovators. This, in turn, presents a major challenge for management.

Innovations and entrepreneurship are closely connected. In many cases, entrepreneurs are the ones who are able to combine ideas, the ability to take risks and other required skills with a clear view of customers' needs. Innovation policy must be entrepreneurship policy - a key viewpoint to consider when reforming public services. In Finland, entrepreneurship activity has been found wanting, and its development calls for measures that also pay attention to the novel attitudes of new generations to entrepreneurship.<sup>6</sup>

An operating environment fruitful in terms of innovations is one where individuals with different backgrounds work with the same problems. Innovative communities can be close teams meeting on a daily basis, or more loosely coupled communities working as a network. The success of innovative communities is based on sharing competence and knowledge, and the ability to combine different perspectives and approaches. Increasingly often, innovations are created on the interfaces of various competence areas.

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<sup>5</sup> The promotion of creativity in Finland is handled in the Creativity Strategy prepared under the leadership of the Ministry of Education (MinEd publications 2005:35 and 2006:43).

<sup>6</sup> More Finns consider entrepreneurship less attractive than paid work than is the case for the citizens of any other country (Source: Pajarinen and Rouvinen, *Becoming an entrepreneur and entrepreneurship attitudes in Finland: Observations based on questionnaire surveys*, [Yrittäjäksi ryhtyminen ja yrittäjyysasenteet Suomessa: Havainnot ja kyselytutkimuksista, Kansantaloudellinen aikakauskirja 2/2005]). However, the willingness to become an entrepreneur varies between different age groups. In Finland, people in the age group of 18 – 34 years, are as willing to become entrepreneurs as their peers in other Nordic countries. (Source: GEM 2007 Global Report)

Innovation communities and centres are increasingly international. When knowledge and communication technology is utilised, global knowledge communities are formed with members from any part of the world. Enterprises, too, increasingly resort to open communities in innovation activity.

International examples indicate that innovation activity is being centralised and is finding its way to regions and localities offering sufficient preconditions for innovation activity. Instead of national innovation systems, innovation ecosystems and innovation centres are drawing attention, being locally and regionally fixed but globally networked at the same time. They combine, in a fruitful manner, needs and ideas with the abilities required to implement the latter. The dynamics of such ecosystems are based on communities where the prevailing culture favours cooperation, knowledge, the sharing of ideas and the willingness to take risks.

Finland must find a way, suitable for its conditions and capitalising on its strengths, to create globally networked innovation activity ecosystems. For instance, in international comparisons, the connections between producers and users of information are exceptionally close in Finland. Generally, Finland's innovative enterprises cooperate with other parties exceptionally often.<sup>7</sup> On the other hand, there are clear weaknesses too, in Finnish premises. For instance, we are lacking in premium services for establishing new enterprises required for the rapid commercialisation of ideas.

Capital investors who ensure the rapid growth of start-up firms with sufficiently large investments operate in successful ecosystems. Another group of significant operators are business angels, who place their wealth of experience and networks at entrepreneurs' disposal. In these areas, Finland is trailing behind international development.<sup>8</sup>

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<sup>7</sup> This is indicated e.g. by the Community Innovation Survey (Fourth Community Innovation Survey 2007), according to which 26% of companies engaged in innovation activity cooperate with public research institutions or institutes. The differences are major in comparison with other EU27 countries. No other European country included in the survey reaches a figure above 20%.

<sup>8</sup> In Finland, capital investment funding accounts for 0.1% of GDP, whereas e.g. in Sweden the figure is 0.3% of GDP and in Denmark 0.4% of GDP (Source: OECD Science, Technology and Industry Scoreboard 2007)

## ***Systemic approach – interdependence of success factors***

In order to meet global challenges, innovation policy must be broad-based and comprehensive. Individual and separate policy measures will not suffice to ensure a pioneering position in innovation activity, and thus growth in national productivity and competitive ability.

A *systemic* approach is the key concept in implementing a broad-based innovation policy. This refers, comprehensively, to the interconnection and mutual dependencies of various phenomena. In general, changing one process or functionality requires the corresponding development from other, related processes. For instance, full-scale exploitation of new IT systems is usually possible only through the renewal of operating methods. A comprehensive outlook is essential, for instance in solving environmental problems, enhancing the efficiency of public services, and constructing regional innovation centres.

Development efforts aiming at influential reforms on a broad spectrum must be implemented on the basis of nationally - or even globally - uniform standards. Standards that facilitate the extensive utilisation of innovations can develop either from the base up, via individual development projects and their rapid spread (so-called de-facto standards), or, traditionally, from the top downwards. Both cases call for close interaction on national and local level, and a clear division of duties. The achievement of de facto standards often requires supranational influence, whereas the validation of traditional standards requires attention to practical experiences gained from trial projects in the further development of the standard.

Instead of partial solutions, the comprehensive renewal and structural development of entire systems is called for. Deeper cooperation is also required from the administration and innovation policy. First and foremost, innovation policy is a policy that facilitates innovations, consisting of public development measures targeted at the prerequisites and incentives of innovation activity and the functionality of the innovation environment. Successful broad-based innovation policy requires the renewal of all political sectors, lower sector boundaries and closer cooperation. National level definitions of need and architecture (*top down*) and the customer-oriented activities of those implementing the policy (*bottom up*) must also be reconciled in a fruitful manner. All of this requires strategic management within the public administration.

## Implementation of strategy

All parties implementing innovation policy are responsible for the implementation of the national innovation strategy. They must pay extensive attention to the basic choices of the strategy in their operations. Previously acquired strengths must be fostered while new ones are developed. First and foremost, national choices steer the renewal of operations and changes of focus areas. Essential prerequisites for the implementation and success of strategy are a high quality national competence basis and long-term targeting of public resources at research, development and innovation.

The national innovation strategy does not attempt to describe all of the measures required in the Finnish innovation environment, but highlights ten key sets of measures derived from the basic choices of the strategy, those that are most important in terms of Finland's success. Furthermore, a separate action plan is related to the strategy, extensively presenting the most important sets of measures, with justifications.

## Resources

Implementation of the strategy requires intense long-term investments in the competence basis and renewing innovation activity by the public and private sectors. Public resources targeted at broad-based innovation activity must be increased at a pace exceeding that of general economic growth.

In Finland, the public financing of corporate R&D activities is at a clearly lower level than the average in OECD countries. Several studies indicate that financing increases corporate investment in R&D clearly more than public investments, and brings about significant external impacts e.g. by deepening cooperation and spreading new competence more widely. Financing systems proven to work well on the basis of assessments should still be strengthened while public investments are expanded into new sectors of innovation activity.

## Reinforcement of competence basis

High quality teaching, research and development activities have formed the basis for Finland's success. More rapid and freer movement of knowledge, skills and competence does not mean that this competence basis would lose its significance as a success factor in the innovation environment.

Rapid exploitation of new competence more often requires the position of a partner in networks that create knowledge and competence, while access to top networks requires one's own unique competence in exchange. Access is denied to free-riders, and those left outside networks fall behind. Buyers of competence will always be able to benefit from new competence later than developers of competence.



Outsiders do not have the possibility to recognise the competence and exploitation potential of matters under preparation.

Extensive own competence also forms the basis of the ability to receive knowledge and competence generated elsewhere, and the recognition of new opportunities. The fact that innovations often arise as new combinations of various competencies crossing disciplinary and industry boundaries only serves to emphasise the significance of an extensive competence base.

Knowledge and competence valuable for innovation is generated in many different ways and by many different factors. The knowledge and competence exploited may arise in a scientific community, but the broad-based innovation concept emphasises e.g. the significance of individuals, enterprises, public operators and user communities as producers of knowledge and competence, alongside the academic world of research. The arts and nature are also important sources of experiences and new ideas.

## Ten key sets of measures

**1) The central government's corporate steering will be renewed for the purpose of becoming a worldwide pioneer of systemic reforms.** The Cabinet Committee on Economic Policy will be expanded into a Cabinet Committee on Economic and Innovation Policy to act as the forum for the strategic management of the state consortium. Moreover, the Government Programme will be developed into a strategic document providing clearer support for systemic reforms. The Science and Technology Policy Council will be renewed, in terms of its tasks and composition, into a wider Research and Innovation Council that works more intensively than at present, including the provision of support for the preparation and implementation of the Government Programme. A transparent, extensively interactive process capitalising on the results of foresight will be created for the preparation and maintenance of national focus area choices.

**2) Content-oriented and regional centres of innovation driving renewal will be formed in Finland.** Financing and operating methods serving the intensification and impact of strategic centres of science, technology and innovation will be developed. On the basis of national content choices and the strategic strengths of regions, regional innovation centres will be created with world-class operating environments. Various financing programmes intended for innovation activity centres will be matched with each other. Centres of expertise will be used as the basis for international marketing and brand management measures enhancing the attractiveness of Finland.

**3) The financing and service system promoting growth entrepreneurship will be renewed into a clear entity, operating with entrepreneur and investor orientation.** Some business services and business incubator operations will be targeted at a select number of companies aiming at rapid growth. The service system for growth companies will be developed as a whole so that the roles and offerings of public operators form a clear entity. By means of taxation, experienced capital investors and business experts will be motivated to commit themselves to the development of enterprises aiming at rapid growth and internationalisation. New public and private sector cooperation models will be used to promote the targeting of employment pension institutes' and international investment companies' venture capital at Finnish, innovative start-up companies.

**4) *New competitive and market incentives activating enterprises and other communities in innovation on a broad basis will be created and exploited.***

Legislation and the architecture of the operating environment will be renewed so as to facilitate and motivate innovation activity. The principles and practices of public procurement will be developed in a direction that enhances demand for innovative solutions. Existing public forms of programme activity and financing will be developed and targeted at enhancing demand for innovative solutions.

**5) *The national ensemble of expert and financing services will be updated to meet the needs of demand- and user-oriented innovation activity.***

The system of research, development and innovation activity expert services and public financing incentives will be updated to meet the needs of a demand- and user-oriented approach. New operating forms and incentives will be created to support broad-based interaction required to provide genuine support for demand- and user-oriented innovation activity.

**6) *A learning environment motivating innovation on a broad basis will be developed for Finland.***

The Finnish educational system will be developed so as to strengthen the general level of competence and support the development of special talents. Internationality, interactive skills, entrepreneurship, creativity and innovation will be introduced at the core of teaching. An internationally top-level development environment for learning will be created in Finland. Incentives and opportunities for proactive individual schooling and continuous learning will be enhanced in working life.

**7) *Finnish research and higher education system will be developed into an internationally competitive development environment for expertise and innovations.***

The research capacity of universities and research institutions will be enhanced with respect to the focus areas of national innovation policy. The university reform underway will be implemented swiftly, organising research institutions and higher education establishments on a wider scale into considerably larger, modern entities in terms of size, management, the ability to change, resources and administration. Closer cooperation between universities and research institutions will be enhanced. The steering and financing system of universities will be renewed in order to support interaction between universities, trade and industry and other parts of society.

**8) *Personal taxation and other key factors essentially weakening Finland's attractiveness will be revised to a competitive level.*** Public and private operators will cooperate to identify and remedy, without delay, any defects in the operating environment that impede experts from finding their way to Finland on a large scale, and settling here. In order to expedite competence and employment based immigration, an active immigration policy in line with international best practices will be created.

**9) *Finnish management training will be developed to meet international top standards.*** Finnish management training will be developed alongside the management skills within Finnish enterprises and public organisations, particularly in terms of change management abilities, systematically and extensively towards the best international level.

**10) *The strategies and operations of parties implementing innovation policy will be adapted so as to be in line with the basic choices of the national innovation strategy.*** An international assessment will be implemented on the compatibility of current policy decisions, operating models, structures and resourcing with the key themes and goals of the national innovation strategy. The roles and strategies of operators will be renewed so as to form an entity supporting the basic choices of the national innovation strategy.



## Part II: **Strategic Action Plan**

## Starting points of the action plan

In future, the basic choices of the national innovation strategy will steer the operations and development of the innovation environment in Finland. The strategic action plan highlights key new or changing tasks and emphases. Together with the current strengths of the innovation environment, they form an entity seeking to enable Finland, in the long term, to establish itself as a productive and attractive innovation environment.

Strategic measures have been selected to support, in particular, the four basic choices:

- *Innovation activity in a borderless, global world,*
- *Demand and user orientation,*
- *Innovative individuals and communities, and*
- *A systemic approach.*

The basic choices of the strategy have been specified by defining, for each of them, two focal points for measures, alongside the target status and current key challenges. The national competence base is the main focal theme throughout the action plan. Focal points for basic choices are shown in **figure II-1**.

The purpose of the focal point choices is to ensure sufficient coverage for the action plan alongside natural links to the practical implementation of innovation policy. The action plan is powerfully linked to practical innovation activity via its preparation, too, since the contents of the programme were specified largely on the basis of the feedback from citizens collected during the strategic process, and extensive workgroup events arranged for experts.

The strategic action plan focuses primarily on strategic goals and ministry level responsibilities for implementation. Enterprises and the organisations that implement innovation policy will participate in the detailed preparation of various measures at the programme implementation stage. Only the commitment of these participants will ensure the successful implementation of the strategy, and its effectiveness.



**Figure II-1** The basic choices and focus points defining the structuring of the action plan.

## Competence base

The attractiveness and success of Finland's innovation environment require a broad, solid competence base that achieves the international top level in selected sectors. Furthermore, the maintenance and reinforcement of competencies required for innovation activity form the main focus throughout the action plan. Sets of measures that serve to strengthen the competence base are presented hereafter, in connection with a range of focal points. Alongside new and changing measures, the competencies and other abilities required for innovation activity must be developed by strengthening the current incentives for conducting challenging research and development: R&D projects efficiently generate both new competence, networks disseminating competence, and the infrastructure required for constructing the competence base.

**The target status** sees Finland with an internationally competitive, diversified competence base that develops and renews itself on a continuous basis. In the most vital sectors in terms of Finland's future success, international top level expertise will be maintained and developed. The operations and structures of the education and research system will correspond to the requirements of a modern top-level innovation environment, while the competence base is systematically developed alongside the public education and research system, even with the help of selective financial incentives that motivate enterprises to take giant steps in expertise.

**Special challenges** in the development of a Finnish competence base involve the fragmented nature of structures and steering. The structures and operating methods of higher education and sectoral research do not provide adequate support for the achievement of internationally competitive top-level centres of expertise. While the basic financing of universities does not facilitate adequate basic research and the construction of a competitive research infrastructure, the impacts of innovation policy goals on the targeting of basic research investments need to be strengthened. In future, the steering of education and research must accentuate proactive need and strategy orientation in other ways, too, while emphasising qualitative factors rather than quantitative ones. We must provide better support for the development of top talents.



# 1. Innovation activity in a world without borders

## 1.1 *Mobility and attractiveness*

**The target status** sees Finland as a renowned, attractive location for research, product development and innovation-oriented business. Finland would be a multicultural and pluralist residential and innovation environment that attracts the best experts. Its participation in international research and innovation cooperation will be at the European top level. Working life will appreciate the development of competence and professional skills abroad.

**Special challenges** for Finland involve e.g. increasing researchers' international mobility. International companies' research and development activity is minor in Finland, and this country does not attract enough international innovation investments in other respects. Not enough international experts find their way to Finland, nor are we sufficiently able to exploit the diversified expertise and multiculturalism of people with foreign backgrounds who reside here, in the development of Finnish innovation environment.

### **1.1.1 The principles of public research, development and innovation financing will be developed so as to meet the demands of a borderless operating environment.**

- New incentives and operating models will be developed for the procurement of international expertise and participation in open innovation activities. (Ministry of Education, Ministry of Employment and the Economy, Academy of Finland, Tekes)
- Selectively, national research financing will be made available for foreign participants on a reciprocal basis in connection with international joint programmes and application processes. (Ministry of Education, Ministry of Employment and the Economy, Academy of Finland, Tekes)
- The costs of research, development and innovation activity implemented abroad will be approved as eligible for national financing more extensively if there is a strategic justification for this. (Ministry of Education, Ministry of Employment and the Economy, Academy of Finland, Tekes)
- More comprehensive assessment procedures for national interests will be developed to support financial decisions. (Ministry of Employment and the Economy, Tekes)

There is no point in redeveloping technologies and competencies in Finland which are easily available in the outside world. It is important that companies and other organisations are quickly and easily able to acquire up-to-date information, competent resources and technology across geographical, discipline-based, technological and industrial borders.

The targeting and terms of public financing have a crucial impact on the benefits gained from international cooperation. The mobility of operations, enterprises and capital is creating increasing uncertainty over the location in which the immediate benefits of innovation activity will materialise, while the consequential benefits of internationalisation are hard to measure. In an uncertain situation, the national interest is very easily interpreted in too narrow a sense, delaying the necessary internationalisation of the innovation environment.

#### **1.1.2 Personal taxation and other key factors essentially weakening Finland's attractiveness will be revised to a competitive level.**

- Public and private operators will cooperate to recognise and remedy, without delay, any defects in the operating environment that impede experts from finding their way into Finland on a large scale, and settling here. (Ministry of Finance, Ministry of Employment and the Economy, Ministry of Education, Ministry of the Interior, Ministry of Social Affairs and Health, enterprises)
- In order to expedite competence and employment based immigration, an active immigration policy in line with international best practices will be created. (Ministry of Employment and the Economy, Ministry of the Interior)

As the population ages, employment and competence based immigration is becoming an increasingly important success factor for innovation activity in Finland. Finland's attractiveness as an immigration target could be improved, above all by revising personal taxation to a competitive level in comparison with competing countries. The development of the attitudinal environment in the residential and operating environment is also vital. Multiculturalism and pluralism enhance the attractiveness of the innovation environment and the creation of innovations.

#### **1.1.3 The incentives for international mobility, and the related targets, of researchers and teaching staff at universities, other higher education institutions and research institutions will be strengthened.**

- The internationalisation strategy of higher education institutions should define ambitious goals and measures for enhancing the international mobility of researchers and teaching staff. (Ministry of Education)

- The financing possibilities of researcher exchange will be reinforced. (Ministry of Education, Ministry of Employment and the Economy, Academy of Finland, Tekes)

A confidential interaction and cooperation relationship that best enriches innovation activity can often be established only after long-term personal acquaintances and working together. On the other hand, innovativeness increases when individuals challenge the limits of their thinking by seeking to interact with many different experts. A successful innovation environment supports such interaction by promoting the mobility of experts. In terms of the development of the innovation environment, it is particularly important that researchers and teaching staff with a crucial influence on the competence base and attitudinal environment build up their personal competence and outlook by working in different countries and working communities.

## 1.2 Participation and influence

**Based on the target status,** Finnish enterprises and research units will develop and exploit competence and cooperation networks worldwide in their research, development and innovation activities, and in selected sectors, Finland will be an active pioneer, director and force in international research, development and innovation policy. In networking, Finns will exploit Nordic and European cooperation efficiently.

**Special challenges** in reinforcing participation and influence are related to e.g. research, development and innovation cooperation in the EU. While Finland is a preferred partner that participates actively in various forms of cooperation, it is not profiling itself sufficiently as an influential force or in taking the initiative. Cooperation initiatives exist with operators outside Europe but operations are fragmented and on a small scale.

### **1.2.1 The ability of public financing and service organisations supporting innovation activity to exert an influence in international innovation networks will be reinforced.**

- An action plan to develop public financing and service organisations supporting innovation activity into more active forces in key international networks in each industry will be planned and implemented. (The Ministry of Employment and the Economy, Ministry of Education)
- Strategic cooperation and partnerships will be reinforced in the areas of emerging economies and innovation most interesting to Finland (for instance, government conventions on scientific and technological cooperation and the FinNode network). (The Ministry of Employment and the Economy, Ministry of Education)

The international networking of public financing and service organisations supporting innovation activity is not an end in itself, but a tool for promoting the success of innovative enterprises and other communities in markets and networks vital for their operations. Public expert organisations can challenge enterprises and other communities to think globally, and offer them special expertise in having an international influence.

In a global operating environment, having an influence on a European scale is not enough. Partnerships and cooperation frameworks are essential alongside leading innovation activity hubs and pioneering markets, regardless of their location.

### **1.2.2 Proactive and target-oriented influence will be exerted on the formation of an international operating environment for enterprises and research groups.**

- The development of the European Research and Innovation Area (ERIA) will be influenced in a manner supporting Finnish innovation activity. (The Ministry of Employment and the Economy, Ministry of Education)

Public operators shall, proactively and in a target-oriented way, influence the development of the *European Research and Innovation Area*, ERIA, so that it will be established as a European home market for research, development and innovation activity to reinforce and complement the Finnish innovation environment. Alongside the participation of public operators themselves, it is vital to motivate enterprises in becoming active forces in European decision-making forums. Enterprises aiming at significant market shares in European markets must be actively involved in forums for standardisation and the development of regulations, based on which decisions shaping future European markets are made.

## 2. Innovative individuals and communities

### 2.1 Hubs and communities

**The target status** sees Finland, in selected areas, as one of the world's leading countries in innovation activity. Innovation hubs crossing business boundaries will be preferred partners in international networks and play a key role as the basis for Finland's international visibility, attractiveness and fruitful innovation activity.

Finland faces **special challenges** in reconciling various regional, national and international initiatives regarding hubs. Finland has only made minor national choices of emphasis binding on various operators and, for the time being, these choices have played too insignificant a role as criteria for targeting resources. Interactive innovative communities have not been exploited sufficiently, nor has Finland interacted closely enough with top-level international hubs in the EU and other parts of the world.

In Finland, research activity is broad-based and, on average, of high quality, but research yields too few top results that would function as special competitive assets. Furthermore, too few experts willing and able to establish themselves as major forces in global innovation networks are emerging in strategic fields of research in Finland.

### **2.1.1 Content-oriented and regional centres of innovation driving renewal will be formed in Finland.**

- Financing and operating methods supporting the intensification and impact of strategic centres of science, technology and innovation will be developed. (Ministry of Employment and the Economy, Tekes, Ministry of Education, Academy of Finland)
- On the basis of national content choices and the strategic strengths of regions, a select number of powerful regional innovation hubs will be created with world-class operating environments. (Ministry of Employment and the Economy, Ministry of Education, Tekes, Academy of Finland)
- Various financing programmes intended for centres of innovation activity will be reconciled with each other. (Ministry of Employment and the Economy, Ministry of Education, Tekes, Academy of Finland)

The future attractiveness of Finnish innovation environment will largely depend on the success of strategic centres of top expertise, which must pay special attention to the development of cooperation administration and infrastructure, user-oriented innovation activity, networking with international top players, interaction between various research sectors and industries, the exploitation and development of new forms of innovation activity and interaction environments (*open innovation, lablet, living lab, lead market etc.*), and a thoroughgoing renewal of Finnish trade and industry, and society. Via financing principles, financiers have a major impact on the development of hubs.

The specialisation of regions in their strengths will increase their critical mass of expertise and improve their ability to link with expertise and value networks vital to their own development. Regionally decentralised research, development and innovation activity will become a national resource when pooled into networked innovation communities. A country of Finland's size can only host a few diversified, internationally competitive centres of innovation.

### **2.1.2 Systematic marketing and brand management measures regarding the special strengths of Finnish innovation activity will be launched.**

- Marketing of Finnish centres and areas of excellence will be launched alongside brand management measures in order to intensify Finland's image as an attractive pioneering environment for selected innovation activity sectors. (Ministry of Trade and Industry, IIF, Finpro, Tekes, Ministry of Education, the Academy of Finland, Sitra, Ministry for Foreign Affairs)
- Factors in support of the placement of international innovation investments in Finland will be analysed and resources for attracting investments targeted at the most promising targets in terms of national interests. (Ministry of Trade and Industry, IIF, Finpro, Tekes, Ministry of Education, the Academy of Finland, Sitra, Ministry for Foreign Affairs)

International recognition and attractiveness as a host for innovation activity does not arise at random. Finland's excellence as an innovation environment for selected sectors calls for determined worldwide marketing. Systematic brand management is necessary in order to enable national selections of focal points and hubs, and in order to attract competence and investment flows into Finland. Parallel to nationwide marketing and brand management, the regions will engage independently in valuable measures to attract innovation investments. In order to avoid unnecessary competition that wastes resources, the targeting of resources must be a topic of continuous nationwide discussion.

### **2.1.3 Finland's research and university system will be developed into an internationally competitive development environment for expertise and innovations.**

- The position of foresight in the targeting of university education will be reinforced. (Ministry of Education)
- Opportunities, incentives and study requirements promoting the international mobility of students will be increased. (Ministry of Education)
- The university reform underway will be implemented swiftly, organising research institutions and higher education establishments on a wider scale into larger, modern entities in terms of administration and management, and cooperation between these units will be made closer. (Ministry of Education, Ministry of Employment and the Economy, ministries steering sectoral research)
- The research capacity of universities and research institutions will be enhanced with respect to the focal points of the national innovation policy. (Ministry of Education, the Academy of Finland, ministries steering sectoral research)
- The steering and financing system of universities will be renewed in order to support interaction between universities, trade and industry and other parts of society. (Ministry of Finance, Ministry of Education)



Agile reforms of universities, polytechnics and research institutions require modern management and administration alongside broader economic independence. Dramatically intensifying competition is forcing higher education and research units to implement reforms, since the most talented students, enterprises' research acquisitions and financing will seek the best targets in terms of their own goals, regardless of geographical boundaries. Such opening up will both constitute a necessity and generate major potential for Finland's innovation environment.

The increase in resources for research and higher education over the past few years has been justified, above all, with reference to innovation policy reasons. However, the role of research and researcher education in a modern innovation environment is not limited to the production of high-quality experts and publications, measured using traditional academic qualitative indicators. The targeting of research investments and the functionality of mechanisms for exploiting results are also crucial to the productivity of innovation activity. Research groups and units must enjoy better financing than at present, and must be markedly larger in order to become sustainable drivers of reform and productivity development in Finnish business life and society. A significant part of research investments must be targeted at research sectors supporting national focal-point choices. However, the emphases should not be defined on too detailed a level, restricting the novelty value of research.

## **2.2 Individuals and entrepreneurship**

**According to the target status**, a clearly higher number of growth companies will emerge in Finland, and will grow in the best possible way. Finland will be a thriving living and operating environment comprehensively motivating individuals towards innovativeness and entrepreneurship, offering innovative individuals and entrepreneurs sound preconditions for success. The financing and expertise of private investors will be efficiently capitalised on, in establishing new growth companies. Furthermore, the operating environment will be able to adapt flexibly to changing success factors in innovation and business activities. Those who work will be able to enjoy success.

Finland is facing **special challenges** in reconciling the policy measures of various sectors in support of the development of individuals and enterprises alike. The nation is in particular need of measures to strengthen its culture of growth entrepreneurship comprehensively because, on average, Finnish enterprises are more reluctant to take risks and grow rapidly than their international competitors. We must also strike a new balance between general development measures and special measures targeted at particularly promising enterprises and individuals, since Finnish education, research and innovation policy has emphasised equality, failing to provide sufficient incentives to top individuals and units. Therefore, innovation policy has not utilised the potential residing in the development of working life, to a sufficient extent.

### **2.2.1 A learning environment motivating innovation on a broad basis will be developed for Finland.**

- Finnish educational system will be developed in a direction that strengthens general competence levels but which also supports the development of special talents. (Ministry of Education)
- The development of interactive skills and encouragement of entrepreneurship, creativity and innovation will be included in the curricula of all stages of education. (Ministry of Education)
- The opportunities and incentives for developing expertise abroad will be intensified. (Ministry of Education, Ministry of Employment and the Economy)
- Proactive training and continuous learning in working life will be enhanced via incentives targeted at enterprises and individuals. (The Ministry of Employment and the Economy, Ministry of Education)
- A top level development environment for learning will be established, with the aim of becoming an international pioneer both in terms of developing content-related teaching methods and technical tools. (Ministry of Education, enterprises)

The expertise, work contribution and commitment of individuals are often revealed in the background of successful innovations. The educational system provides key basic abilities for individuals, but continuous learning at work and an active approach by individuals are also playing an increasingly significant role in the broad-based development of expertise. Traditionally, enterprises or individuals have not been offered powerful incentives for developing expertise proactively in view of the needs of future work assignments.

An educational policy that supports innovation activity would enhance top expertise and extensive competence simultaneously, regarding them as parallel targets. Alongside theoretical competence, innovation activity needs many other abilities created by the educational system, including interactive skills, professional expertise, art and cultural competence and manual skills. On the basis of foresight results, education must undergo continuous re-targeting in order to correspond with the changing needs of competence requirements.

### **2.2.2 Development of working life will be closely integrated as part of innovation policy planning and implementation.**

- The perspective of working life development will be included as part of innovation activity financing, and the development of expert services and a broad-based innovation policy. (Government, Ministry of Employment and the Economy, Ministry of Education, Science and Technology Policy Council/Research and Innovation Council, Tekes, Academy of Finland)
- Special financial incentives will be increased for research, development and innovation activities that support the reforms of organisational environments, taking new forms of work into consideration. (Ministry of Employment and the Economy, Tekes, Ministry of Education, Academy of Finland, universities)
- New methods for spreading innovations that develop working life will be developed extensively for the use of enterprises and other communities. (Ministry of Employment and the Economy, Tekes)

The innovation-based development of productivity and wellbeing requires a competent and motivated workforce willing and able to develop further at work. The quality of working life emerges as one of the critical success factors of the innovation environment, with a direct influence on the efficiency, productivity and quality of operations. Innovation activity, like other competence-based high added value tasks, is based on the employees' and working communities' enthusiasm, commitment and enjoyment of work.

Systematic development of working life would enhance the productivity of operations alongside the quality of working life. Working life can develop further via the utilisation of innovations. In addition, innovations targeted at the formation and organisation of work assignments and processes, the rewarding of staff, working hours, occupational health and safety and participation systems and operations, and methods and tools that support the development of staff, can have a major impact on the development of the economy and society.

### **2.2.3 The financing and service system promoting growth entrepreneurship will be renewed into a clear entity, operating with a focus on entrepreneurs and investors.**

- A financing and service system corresponding to the needs of growth companies in particular will be developed so that the roles and offerings of various operators form a clear entity (Ministry of Employment and the Economy, Tekes, Finnvera/Avera, Finpro, Finnish Industry Investment Ltd.)
- By means of taxation, experienced capital investors and business experts will be motivated to commit themselves to the development of enterprises aiming at rapid growth and internationalisation. (Ministry of Finance)
- An operating model will be created to encourage employment pension institutes to invest in the initial stage growth of enterprises (Ministry of Employment and the Economy, Ministry of Finance, Ministry of Social Affairs and Health, employment pension institutes).
- New forms of operation to encourage international venture capital and expertise to find its way to Finland will be established (Ministry of Employment and the Economy, Tekes, Finnish Industry Investment Ltd, Finnvera/Avera, private financiers, international partners).
- The competitive ability of the regulatory environment of growth entrepreneurship will be ensured so as to be at top level internationally. If necessary, the national legislative environment will be revised to encourage growth entrepreneurship more effectively. (Ministries)

Comprehensive innovation and growth company policy is the best way to support the growth and internationalisation of innovative companies. However, special justification is always required in order for the public sector to interfere with the workings of the market. Public operators must, for instance, follow the development of the financing markets and withdraw from areas where they are no longer needed. Market mechanisms cannot solve all systemic defects of the innovation environment.

In most cases, an experienced capital investor committed to the development of the enterprise by means of money and expertise is best able to support a small innovative growth company. Partial public funding plays a key role in risk sharing in such a way that the ratio of expected profit and risk related to the investment becomes acceptable for a private investor. In a successful innovation environment, private investors and investors with a public background work as partners. Public operators must be able to offer growth companies comprehensive business financing, integrated service products and flexible cooperation between parties in the service chain. The EnterpriseFinland business service cooperation develops growth enterprise services as a nationwide entity, based on need.

## 3. Demand and user orientation

### 3.1 *Market driven incentives*

**According to the target status**, Finland will extensively and systematically exploit competitive and market incentives in promoting innovation activity. In a positive sense, innovative public procurement maintains and strengthens a competitive pro-innovative culture and operating methods.

The fact that there is practically no experience of the comprehensive development of an innovative market presents **special challenges** for creating a market incentives in Finland, which has not systematically exploited competitive and market incentives as part of the portfolio of methods for innovation policy, neither has innovation policy determinedly supported the development of operations within the public sector.

### **3.1.1 New competitive and market incentives activating enterprises and other communities in innovation on a broad basis will be created and exploited.**

- Legislation and the operating environment's architecture will be renewed so as to facilitate and motivate innovation activity. For instance, the obligation to follow the principles defined for public procurement in acquisitions related to research, development and innovation will be lifted from enterprises, even if over one half of the value of the acquisition has been received as subsidies. (Ministry of Employment and the Economy, other ministries)
- The operating methods of public procurement will be developed so that they offer opportunities and provide the motivation for the performance of innovative acquisitions. A steering group for public innovative procurement will be established to assume responsibility for the development and expansion of operations. (Ministry of Employment and the Economy, Ministry of Finance, Ministry of the Environment, Ministry of Social Affairs and Health)
- Financing models for the demand-based promotion of innovative solutions will be developed and targeted (Ministry of Employment and the Economy, Tekes)

Even on an international scale, the use of competitive and market incentives as a tool for innovation policy is a relatively new phenomenon. Therefore, no tried and tested complete models for implementing such incentives are easily available. This situation also offers the opportunity to develop the Finnish operating environment into a pioneering one worldwide in terms of competitive and market incentives. Because Finnish enterprises, financiers and authorities are networked and possess innovative competence, they offer an internationally interesting platform for cooperation requiring a systemic approach.

### **3.1.2 In selected areas, pioneering lead markets will be created to promote Finnish innovation activity.**

- The potential will be analysed and national measures, in compliance with the principles agreed in the EU, will be launched in order to establish pioneering lead markets in selected areas. (Ministry of Employment and the Economy, other ministries)

Ultimately, pioneering lead markets will be created on the basis of market players' own decisions, but their hoped-for development can be promoted by methodically implementing measures to support innovative demand. On the national level, particularly interesting starting points for the preparation of pioneering lead markets exist, for instance, in the sectors highlighted by the 'Paras' project, launched for the reform of Finland's municipal and service structure. However, the majority of marginal terms influencing the exploitation of Finnish innovations are defined on EU level, with determined efforts underway in Europe to establish pioneering lead markets in selected sectors. European pioneering lead markets are one way of influencing the small size of the home market, cited as one of Finland's weaknesses in comparisons of competitive ability.

## **3.2 Engaging innovation activity**

**In the target status**, innovation activity will fruitfully exploit new and diversified innovation activity models and development platforms. The creators, developers and users of expertise engage in rich interaction, while the needs of customers, users and citizens will steer the reform of the public sector, thanks to which the service ability of the public sector is at international top level. Innovation policy, defined from the perspective of users and demand for innovations, will have been established as part of the national innovation policy entity, alongside policy defined from the providers' viewpoint.

**Special challenges** for the breakthrough of engaging innovation activity will be posed by the fact that innovation models and communities combining different types of competencies in a diverse way are rare in Finland, and undeveloped to a certain extent at present. Innovation policy measures, largely focussing on science and technology based operating models, have not yet reached users, customers and citizens as active parties to the innovation processes.



### **3.2.1 The national supply of expert and financing services will be updated to meet the needs of demand and user oriented innovation activity.**

- New operating forms and incentives will be created to support the broad-based interaction required for genuinely demand and user-oriented innovation activity. (Ministry of Employment and the Economy, Ministry of Education, other ministries, Tekes, universities, research institutions, Sitra)
- The system of research, development and innovation activity expert services and public financing incentives will be updated to meet the needs of a demand and user-oriented approach. (Ministry of Employment and the Economy, Tekes)

Even at present, public financing incentives for innovation activity are targeted at enterprises and communities that are thought to operate in the manner required for success, i.e. based on a demand and user focus. However, user orientation is becoming increasingly important in the steering of innovation activity, while the European regulatory framework, guiding the use of incentives, is becoming more permissive, which is facilitating the development of incentive systems. Current incentive systems must be evaluated and charted to ensure that they serve, in the best possible way, the development of demand and user-oriented innovation activity. New incentives accelerate changes of perspective in the innovation processes, bringing individuals as end users into the core of innovation activity. Therefore, the innovation potential of citizens, which previously remained partly hidden, can now be capitalised on as the driver of development in the national economy and society.

### **3.2.2 The exploitation of intangible assets will be developed, securing the incentive-based division of benefit generated by the value network between different operators and users.**

- Practices for protecting and utilising intangible assets will be revised in a manner compliant with the needs of diversifying innovation activity and a global operating environment. (Ministry of Employment and the Economy, Ministry of Education)
- The abilities of SMEs in particular, in protecting and exploiting expertise and intangible capital, will be promoted in a manner that supports open, communal and user-oriented innovation activity (Ministry of Employment and the Economy, Tekes, Ministry of Education).

The expertise in intellectual and industrial property rights of an enterprise or other community, particularly as regards the protection of strategically important know-how, is one of the key success factors in business. Success in rapidly changing international innovation communities calls for a greater ability to select a suitable exploitation model and protect one's own intangible expertise, than that currently held by SMEs.

Regulations pertaining to the protection of intellectual and industrial property rights have a major influence on how well the operating environment is able to support innovativeness. The Government's new strategy on intellectual and industrial property rights, due for completion towards the end of the year 2008, will review several issues, including the national and international development needs of the system of intellectual and industrial property rights, and will present the measures that have to be taken in order to enhance the level of competence within enterprises concerning these rights.

## 4. Systemic approach

### 4.1 *Broad-based approach*

**Based on the target status**, innovation activity will be extensively utilised throughout the development of business life and the public sector. Finland will be an experimental society, able to produce, through its sound cooperation and innovation environment, internationally competitive innovations leading to extensive reforms. The public sector itself will be an active developer of innovations, equally active in applying and introducing them. Innovation activity will be based on combining and utilising diversified - both technological and non-technological - information, skills and competence.

**Special challenges** in terms of the broad-based innovation activity in Finland are involved, in that a number of low productivity branches of trade and industry and the public sector have not yet systematically utilised innovation activity in the development of operations and productivity. Therefore, Finnish innovation activity has largely been concentrated on industrial sectors and focussed too narrowly on the exploitation of scientific-technological expertise.

#### **4.1.1 The innovation perspective will be introduced as a leading idea throughout the steering and operations of all public sector fields.**

- Strategic cooperation in assessment, foresight and strategic work across administrative fields will be intensified and precipitated. (Science and Technology Policy Council/Research and Innovation Council, ministries)
- The knowledge base of based on broad-based innovation policy will be intensified to support decision-making related to innovation policy and as part of the coordinated development of sectoral research (Ministries)
- An implementation process for extensive and innovative public sector cooperation programmes of particular national significance will be established in Finland. (Government, ministries)
- In support of public sector innovation activity, clear incentives linked to the Government's performance management and a system of central government transfers to local government will be created. (Ministry of Finance)
- As a standard part of legislative drafting, a review assessing the impacts of reforms on entrepreneurship and other prerequisites of innovation activity will be introduced. (Ministries)

Innovations of the highest social significance involve many different operators and administrative branches. In order to achieve such innovations, a national level definition of needs (*top down*) and operator-level customer-oriented preparation of implementation (*bottom up*) must be combined in an interactive way. Financial steering has a crucial impact on whether organisations launch innovative reforms in order to enhance their productivity and influence. Generally speaking, public sector steering and management systems do not include incentives for innovation activity that involves risks, nor for broad-based innovative cooperation.

A national cooperation process to clarify the roles of various players in the reconciliation of assessment, foresight and strategic work in innovation activity would generate synergy benefits for organisations involved in such activity. Moreover, a significantly more solid research-based knowledge base relating to the success factors of a broad-based innovation activity is needed to serve in the background of policy decisions. Because public sector operations influence the prerequisites of innovation activity in a multitude of ways, the preparation of legislation and other key decisions must pay special attention to the analysis of these impacts.

#### **4.1.2 Incentives to enhance the extensiveness of innovation activity will be strengthened.**

- Incentives targeted at business, management, operating method, design, creative content and service and social innovations will be strengthened (Ministry of Employment and the Economy, Tekes).
- New incentives will be examined, and, if necessary, created in order to launch innovation activity in enterprises in all sectors where innovation activity could play a key role in enhancing performance and productivity (Ministry of Employment and the Economy, Ministry of Finance).

Successful innovations are usually based on the unbiased combination of various competencies, while too narrow a concept of innovation activity results in part of innovation potential remaining untapped. Incentives enhancing the broad-based nature of innovation activity will help this latent potential emerge, and various innovation activity incentives must be targeted so that, combined, they facilitate the achievement of the highest possible long-term benefits for the national economy and society.

A systematic analysis of internationally best performing incentives for the launch of innovation activity (e.g. tax incentives, incentives targeted at hiring research and development personnel, or incentives for the transfer of expertise) could offer new opportunities for complementing the portfolio of measures used in Finland in an appropriate manner. It is important to limit the development of prospective new instruments to options that can be ascertained as bringing added value to the totality of former incentives.

#### **4.1.3 The counselling and service system supporting innovation activity will be renewed to become an active instigator of latent innovation potential.**

- The counselling and service system encouraging enterprises to engage in innovation activity will be clarified by developing it into an entity operating on market terms that reaches enterprises more comprehensively and is steered by the needs of enterprises, wherein public support is primarily targeted at the users of the service. (Ministry of Employment and the Economy)
- The network of intermediary organisations, primarily financed with public funds, will be clarified and developed as an entity coordinated on national level. (Ministry of Employment and the Economy)

A prerequisite for recognising the entire innovation potential of Finnish enterprises would be a review of the Finnish enterprise field, carried out comprehensively and regularly based on clear responsibilities. An incentive counselling and service system is also needed to provide support for persons considering the founding of a new enterprise, to promote the establishment of new innovative enterprises. In the service sector, for instance, and in many low productivity sectors, untapped innovation potential of national significance remains.

The targeting of incentives at the end users of expert services instead of service providers will promote the development of the service market. Public support should mainly be targeted at service users who acquire the services they need on market terms (support, service voucher etc.) Subsidised or free services are still required for start-up companies.

## 4.2 Management of change

**Based on the target status**, the effectiveness of a broad-based innovation policy will be ensured through a well-functioning, competent central government corporate management that is capable of change. Finland will be an international role model in developing an experimental society and managing innovation activity, making and maintaining clear choices in the targeting of resources, based on foresight results, and exploiting networked operating models based on strategic partnerships.

Public sector operations in particular involve **special challenges** in making the comprehensive innovation and management of change more common because, in the public sector, innovation activity has fragmented into a number of measures specific to each administrative branch and government agency, making these measures difficult to manage. The organisational structures and management systems of the public sector do not provide support for the change required for the exploitation of innovations, since the ability to change and capacity for innovation activity required to achieve systemic changes with a broad impact in particular, is lacking.

#### **4.2.1 The central government's corporate steering will be renewed in order to make it a worldwide pioneer of systemic reforms.**

- The Cabinet Committee on Economic Policy will be expanded into a Cabinet Committee on Economic and Innovation Policy that acts as the forum for the state consortium's strategic management. (Government)
- The Government Programme will be developed more clearly into a strategic document emphasising the needs for systemic reforms which are most vital in terms of Finland's future success. (Government)
- For the purpose of supporting the targeting, monitoring, assessment and reconciliation of science, technology and innovation policy, a Research and Innovation Council will be established to replace the former Science and Technology Policy Council, the tasks and composition of which have been narrower. (Government)
- A transparent, extensively interactive process capitalising on the results of foresight will be created for the preparation and maintenance of national focal point choices. (Government, the Science and Technology Policy Council/Research and Innovation Council)

In order to be able to meet systemic challenges critical to Finland, and for Finland to develop into an experimental society, central government measures must be managed with determination and a strategic orientation, in the form of a consortium. The Government Programme must be a strategy that provides clearer guidelines for operations and development, emphasising key systemic needs for reform as regards Finland's future.

To support the preparation of the Government programme and broad-based innovation policy decision-making, an expert body, the Research and Innovation Council, comprising key influential forces in the sector, is necessary. The Council should manage duties related to the monitoring, assessment, targeting and reconciliation of science, technology and innovation policy, playing an advisory and preparatory role in support of the Government and its ministries. The new Council would need an expert secretariat with ample resources. The Research and Innovation Council would replace the current Science and Technology Policy Council.

The state consortium must have a strategic management forum able to take rapid and flexible decisions. This forum, meeting the needs of broad-based innovation policy, could be formed by expanding the tasks and composition of the Cabinet Committee on Economic Policy so as to provide extensive cover for issues pertaining to the promotion of the exploitation of innovation activity. Moreover, the Minister of Education must be included in the Committee.

As the global competitive situation and operating environment changes, national choices must undergo continuous critical assessment and updating whenever necessary. On the other hand, choices must be



made with a long-term focus in order to enable enterprises and other organisations to plan innovation investments in sufficiently predictable conditions. A long-term approach is also necessary as regards the targeting of strategic research. The definition of focal points must pay attention to the general view of the opportunities afforded by various areas, and their innovation potential.

#### **4.2.2 Finland will be made one of the leading nations in information society development.**

- The information society policy's measures, set in accordance with the decision-in-principle by the Government, will be implemented swiftly and efficiently. (Ministry of Finance, Ministry of Education, Ministry of Transport and Communications, Ministry of Social Affairs and Health, Ministry of Employment and the Economy, Ministry of Justice)

Controlled and efficient influencing of the complex systemic phenomena of the economy and society requires the support of determined information society development. The preparation, implementation and embedding of changes with a broad impact will be largely based on electronic communications and information technology. In order to accelerate the pace of development of the information society, sufficient resources must be targeted at the rapid and efficient implementation of the national information society strategy, paying particular attention to measures supporting the introduction, embedding and spread of new solutions developed on the basis of the strategy.

The significance of virtual communities and electronic interaction in innovation activity is increasing rapidly, with information society development opening up new channels of influence for innovative individuals and communities, alongside opportunities to developing one's own innovation capabilities. Alongside information society development, latent innovation potential can be highlighted and exploited more effectively than before.

#### **4.2.3 Finnish management training will be developed to meet top international standards.**

- Finnish management training will be developed alongside management skills within Finnish enterprises and public organisations, particularly in terms of change management capabilities, systematically and extensively towards the best international level. (Ministries, government agencies, enterprises)

To facilitate Finland's development into an international pioneering environment for systemic development, Finnish management expertise must be at top level internationally. Particular attention should be paid to the development of management skills both in competence management within enterprises and public organisations, and the development of management training. Finnish management training must be capable of pooling the best resources in the field nationwide, forming networks with the best educational institutions in the field internationally, and attracting pioneers in management skills as instructors, on a global basis.

#### **4.2.4 The strategies and operations of parties implementing innovation policy will be adapted so as to fall into line with the basic choices of the national innovation strategy.**

- An international assessment will be implemented on the compatibility of current policy decisions, operating models, structures and resourcing with the key themes and goals of the national innovation strategy. (Ministry of Employment and the Economy, Ministry of Education, the Science and Technology Policy Council/Research and Innovation Council)
- The roles and strategies of parties implementing innovation policy will be renewed so as to form an entity serving the basic choices of the national innovation strategy. (Science and Technology Policy Council/Research and Innovation Council, ministries)

Continuous monitoring of dynamics in the Finnish innovation environment, and reacting to them, is one of the basic duties of corporate steering and development within ministries. Development must pay attention both to the topical needs of innovation activity and the requirement of predictability, one of the key success factors of innovation environment. As the starting point in the preparation of reforms of principle made in operating methods, structures and the resourcing of the innovation environment, a careful assessment is always needed of the abilities of innovation environment operators to implement the strategy in the initial reform situation.