NISTEP International Conference
The 3rd International Conference on Foresight
19–20 November 2007, Tokyo, Japan

Foresight in Innovation Policy-Making – Perspectives from Finland

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Business from technology

Outline

1. Glance on the national innovation system
2. Overview on recent development in foresight
3. Recent exercises
   - FinnSight 2015 - overview and assessments
   - TekBaro and performance of innovation systems
4. Towards more integrated impact assessment and foresight approach
5. Summing-up

-- perspectives from the research community --

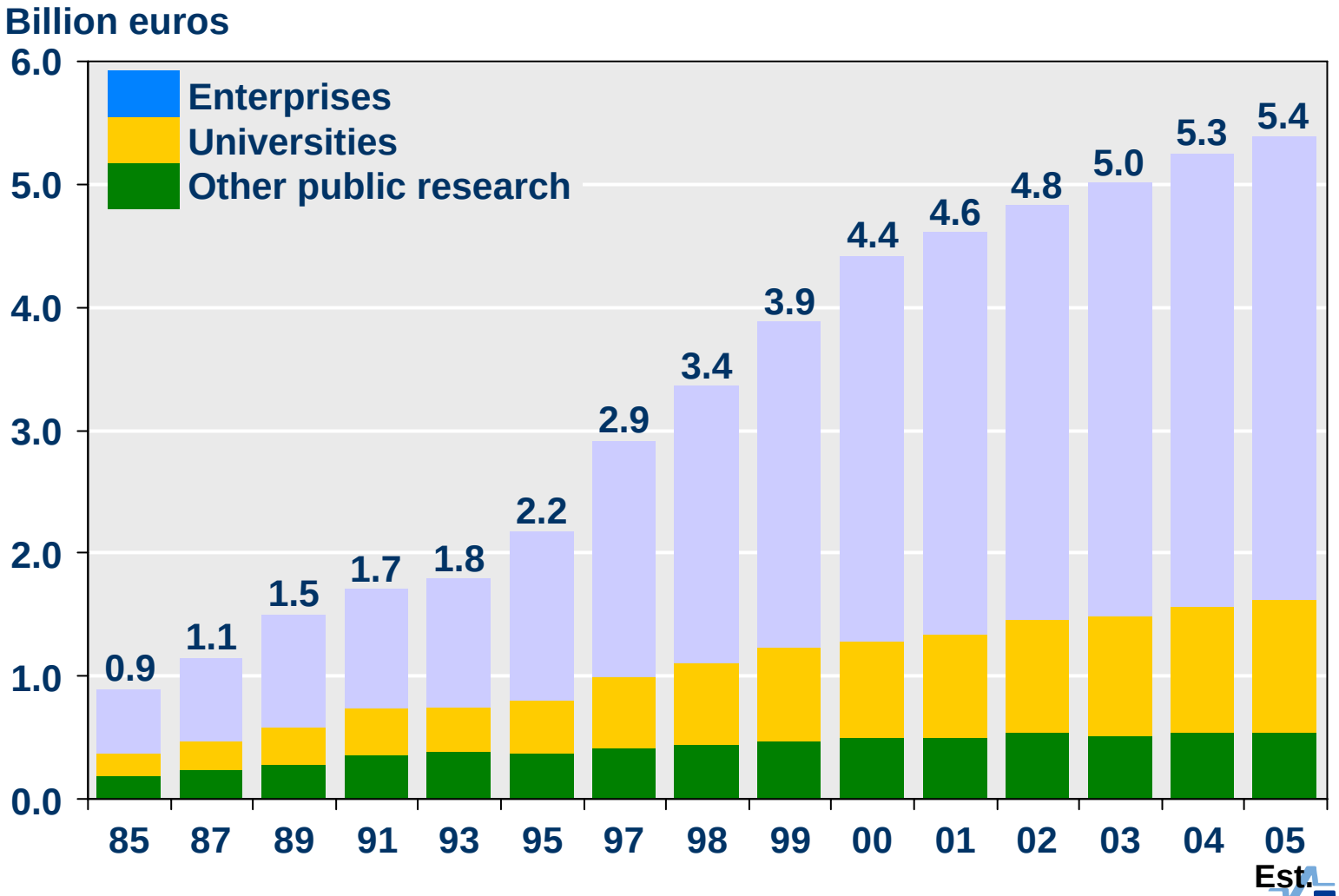
1. Glance on National Innovation System

Development of National Innovation System

- Finland - small open export dependent economy
- Structural change from primary production and industrial economy to knowledge based economy from 1940s to 2000s
- Towards systematic innovation policies since early 1980s (S&T Council, Tekes…)

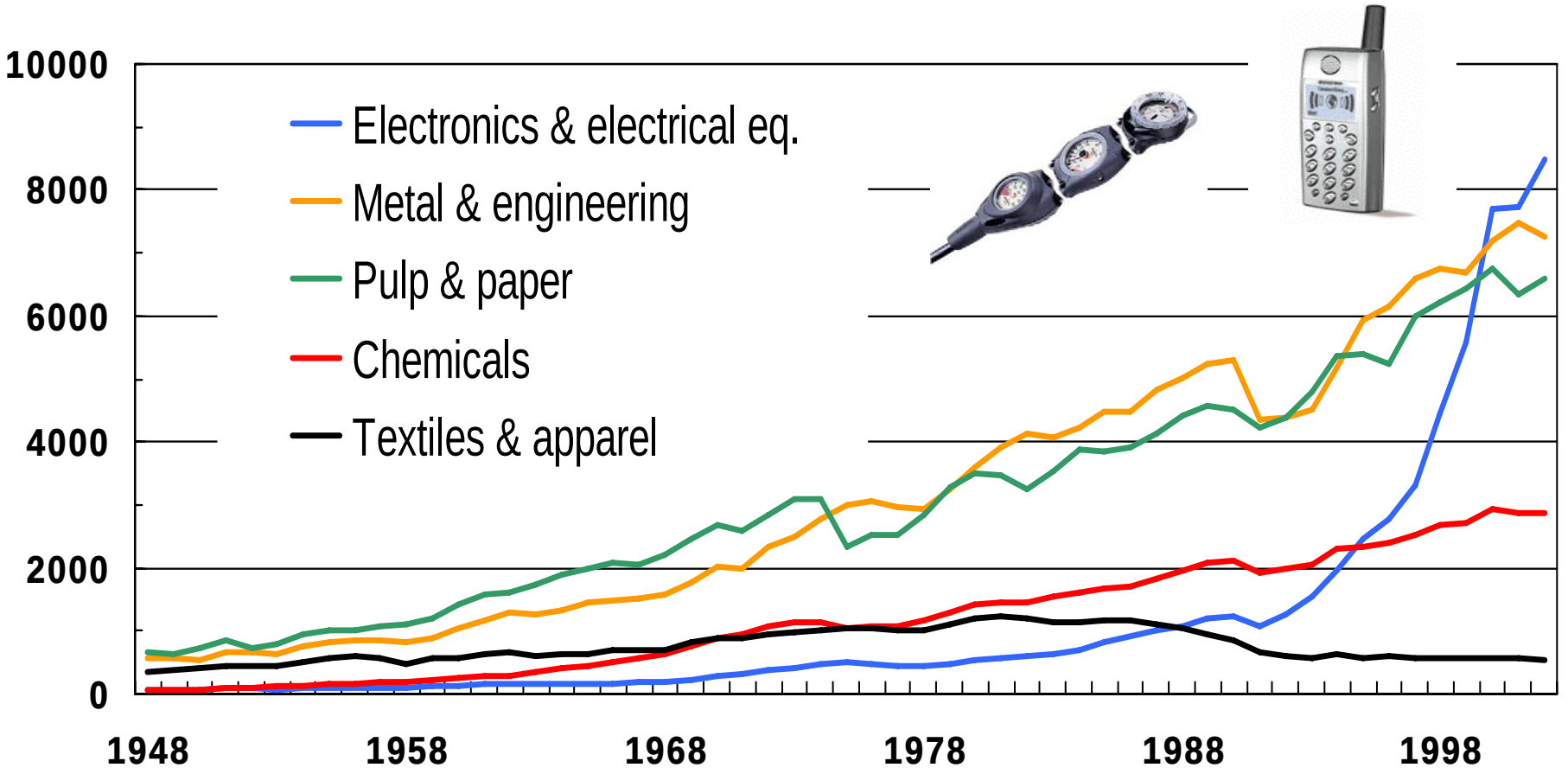
In 1991-93 major economic depression, followed by…

… strong policy response with essential private and public investments in research, followed by…



Source: Statistics Finland, TekesDM 36100 and 38065; 11-2005 Copyright © Tekes

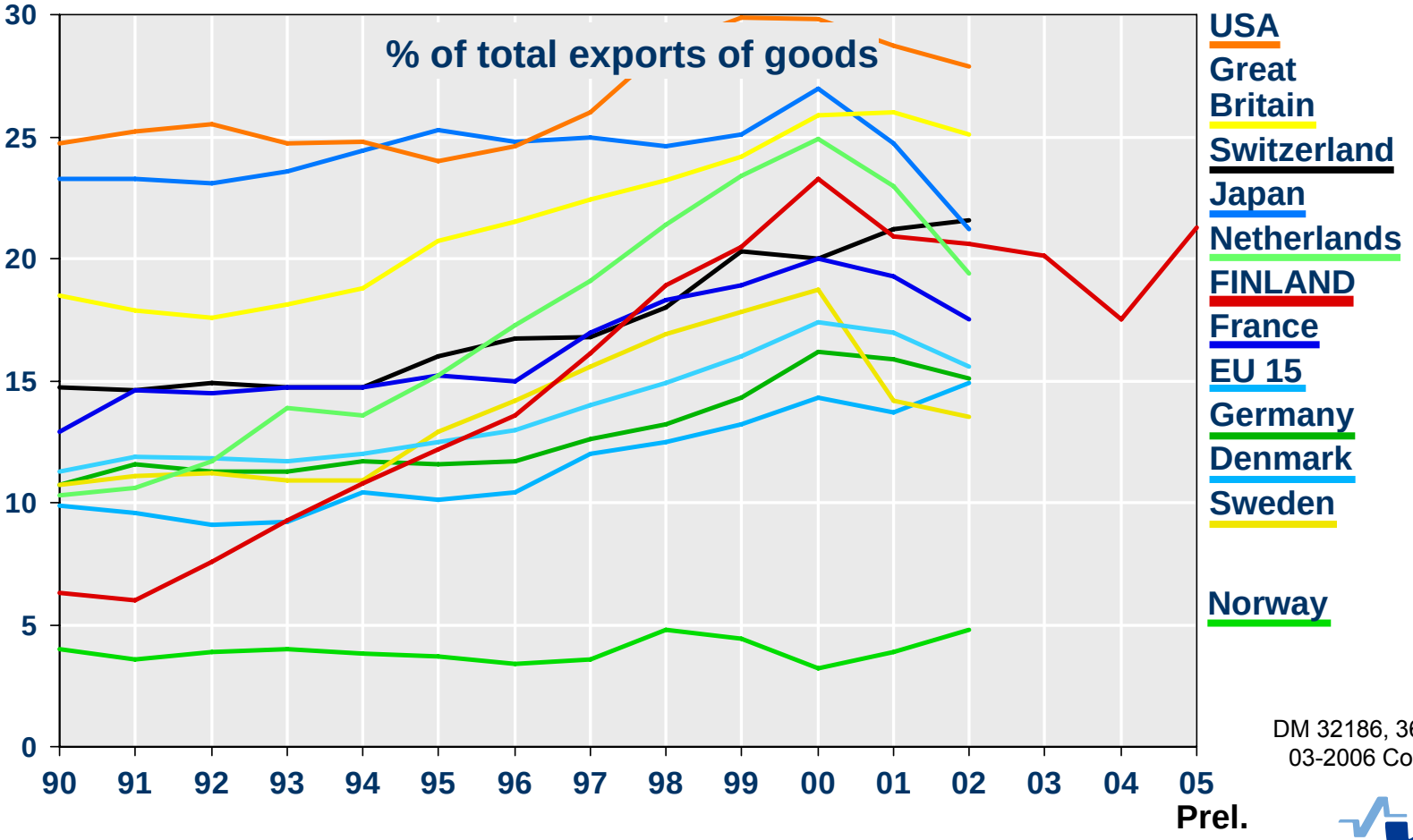
…rapid structural change of the economy and by…



(at 2002 prices)

…. increase of high-tech exports, and, gradually, by..

Exports of Finnish high tech products totalled 11.1 billion euros in 2005, i.e. 21.3 % of total exports of goods.

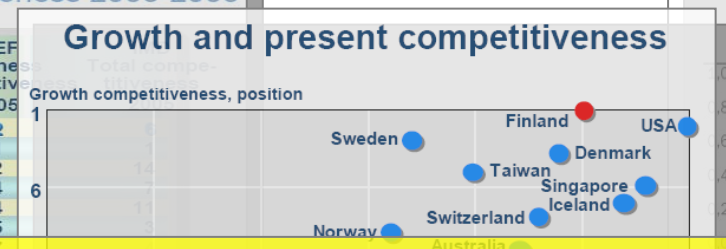


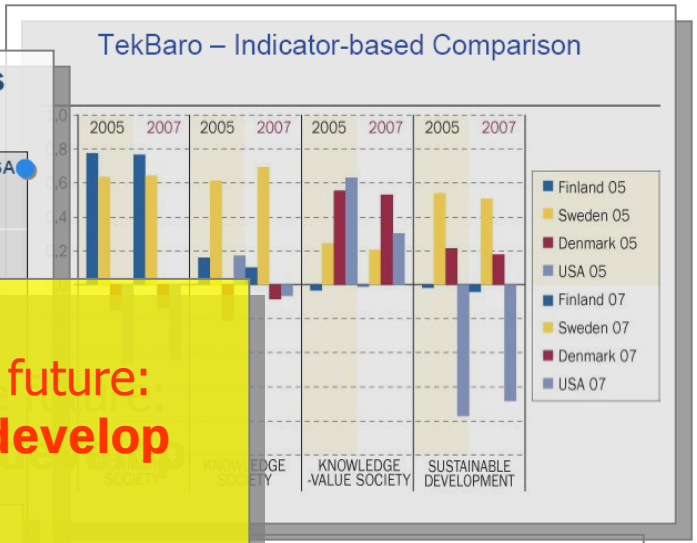
Source: Statistics Finland, according to the OECD product catalogue defined in 1995

…success of nation in performance comparisons of innovation systems

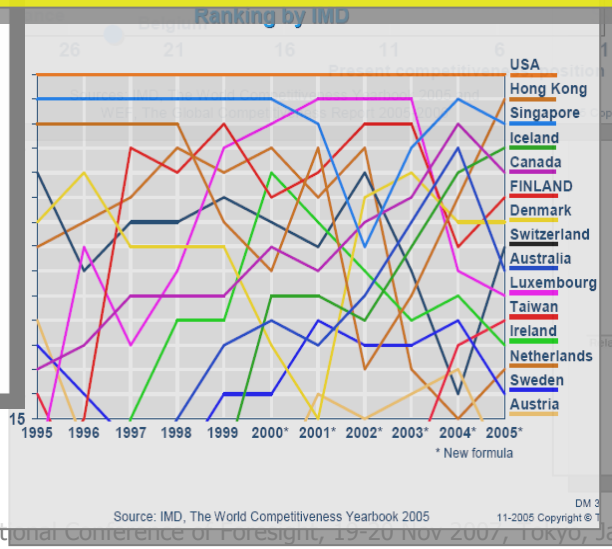
Comparisons: Total Ranking of Competitiveness 2003-2005

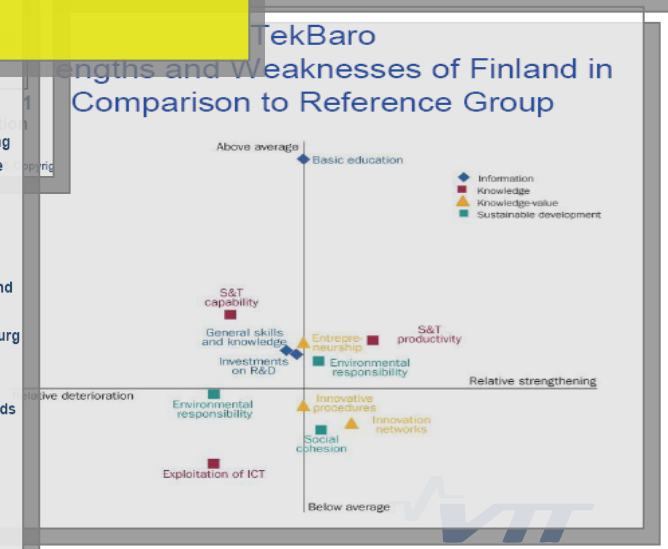
	WEF Growth competitiveness 2005	2004	2003	WEF Busine competitiv 2005
Finland	1	1	1	2
USA	2	2	2	1
Sweden	3	3	3	12
Denmark	4	5	4	4
Taiwan	5	4	5	14
Singapore	6	7	6	5
Iceland	7	10	8	17
Switzerland	8	8	7	7
Norway	9	6	9	21
Australia	10	14	10	16
Netherlands	11	12	12	11
Japan	12	9	11	6
Great Britain	13	11	15	26
Canada	14	15	16	21





…which raises a question for the future:
how to maintain and further develop innovation system?





Main Initiatives in Developing Innovation System and Policy

- Renewal of national innovation strategy (till March 2008)
- Renewal of sectoral research system
- New Min of Labor and Industry (1.1.08) -- broad scope for IP
- Strategic centers of excellence for S&T&I - new way of focusing and coordinating (too) dispersed R&D resources
  - Foci of 1st phase: energy and the environment; metal products and mechanical engineering; forest cluster; health and well-being; ICT industry and services
- Structural development of universities, “top university”...
- Development of impact assessment and foresight (STPC)

2. Overview of Recent Development in Foresight

Foresights and Future Oriented Exercises

Foresight Activities

- Foresight and future oriented thinking gaining ground
  -- spurred also by globalization
- Demand in industries and confederations increasing
- Activities of IP organizations -- MTI, Tekes, Academy, VTT, SITRA, national platform, etc.
- EU initiatives (7th FP, TPs, JITs) and networks (ESTO, ETEPS, ERAWATCH, FORERA, For-Learn…)
- Nordic initiatives -- NICE & NER (H_2, ICT…), Foresight forum
- Legitimacy of IP and public research funding topical issues
  -- spur to conceptual development of IA and foresight?
- Still: fragmented, not well-coordinated -- systematic -- well-established, inadequately resourced (service provider´s aspect)

3. Recent Exercises

FinnSight 2015 – National Foresight Exercise

ACADEMY OF FINLAND
RESEARCH FUNDING AND EXPERTISE

Funding agency for basic research

Tekes

Main public funding agency for R&D

Objectives of FinnSight 2015

- identify and explore the **drivers** expected to have impact on Finnish business and society
- identify **focus areas of competence** for the future S&T, society and business, and **establish** related **priorities**
- define **Strategic Centres of Excellence in S&T&I** (in line with Government decision-in-principle 7.4.2005 on the development of public research system)
- support **strategic work** of Academy and Tekes
- **deepen collaboration** between Academy and Tekes, and foster a climate of multidisciplinary debate
- Time span: 10 years

(Source: http://www.finnsight2015.fi/)

Execution of FinnSight 2015

- Steering group headed by DGs of Tekes and the Academy; Core managing group headed by Prof. Ahti Salo (HUT)
- 10 panels: **Learning and Learning Society**, **Services and Service Innovations,** Well-being and Health, Environment and Energy, Infrastructure and Security, Bio-expertise and Bio-society, Information and Communications, **Understanding and Human Interaction**, Materials, **Global economy**
- 120 panelists suggested by Tekes and Academy, 1/3 from industries
- Each panel (12 experts, headed by chair-pairs) debated in 3 meetings (4 hrs.) about **trends** and **drivers**, **focus areas** of competence, and **suggestions** and **recommendations** (with web-based consultation)
- Chair-pairs debated in 3 common meetings of **areas between panels**
- Main report: overview on possible choices of national S&T and related arguments; 10 reports by chair-pairs
- Foresight work executed in 6 months

(Source: http://www.finnsight2015.fi/)

FinnSight 2015 -- Lessons by Prof. Ahti Salo

Use multiple methodologies

- Solicit expert judgments
- Complement judgments with modeling
- Examine differences

Admit incomplete information

- Forecasts are often wrong, anyway
- We can work with incomplete information
- Uses in decision making

Promote participation

- Bring in multiple perspectives
- Build a well-defined process
- Provide ICT support

(http://www.finnsight2015.fi/)

FinnSight 2015
- Preliminary Assessment by O. Kuusi (*)

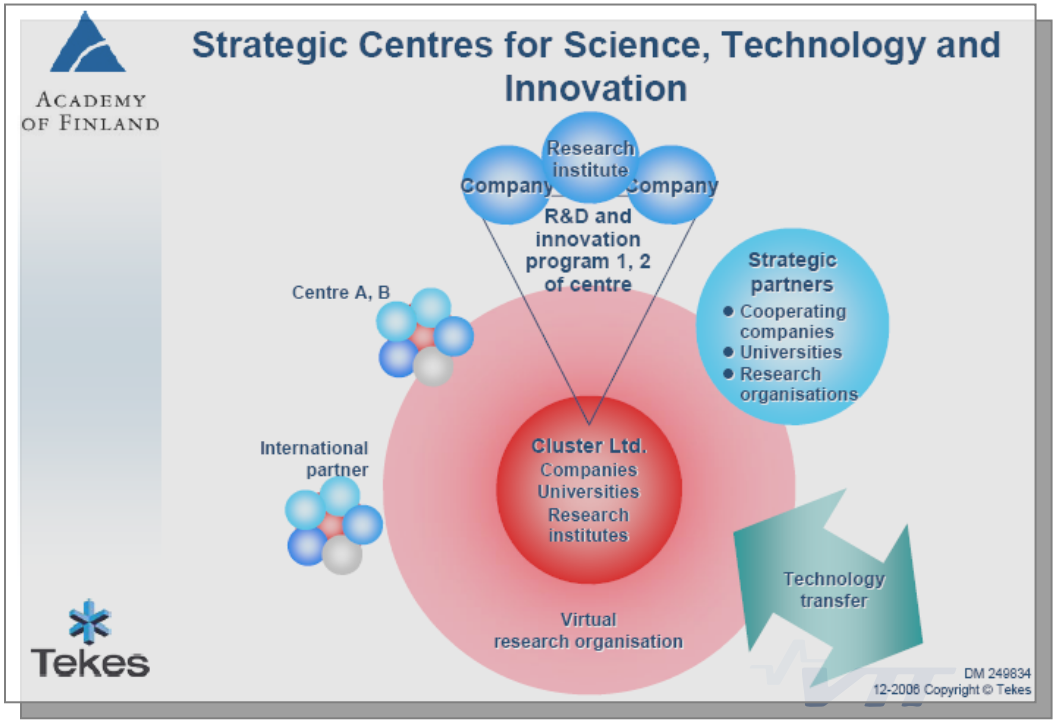
- Gives a **loose vision** for the development of Finnish S&T but **not development strategy** with **a way to action**
- No **prioritization** in strict sense (or not presented in reports)
- Summary Report
  - "**A list of appropriate R&D topics"**
  - **Dialogue not considered**, although debated by the panel of *Understanding and Human Interaction* in Main Report
- **Group discussions** reported by panel chairs not good practice to present opinions -- tends to lead to **quasi consensus** of issues in which panelists disagree
- **Prioritization** central objective but project meets well-known problem of foresight practitioners -- future opportunities of S&T can not be opened and prioritized effectively by the same methodology

(*) Source: Article of Osmo Kuusi´s article in Finnish in Futura, a journal of Finnish Future Society. Dr. Kuusi, senior researcher at VATT, is among the pioneers of researchers of future studies in Finland.

Preliminary Observable Impacts
(cf. objectives)

- Executed at the time of many changes on national IP agenda -- short term impacts? – attribution to FinnSight 2015?
- Supported establishment of Strategic Centres of Excellence in S&T&I by identifying focus areas of competence
- Deepens collaboration between the Academy and Tekes
- Supports strategic work of the Academy and Tekes
- Strengthens foresight culture among the Academy, Tekes and participating experts

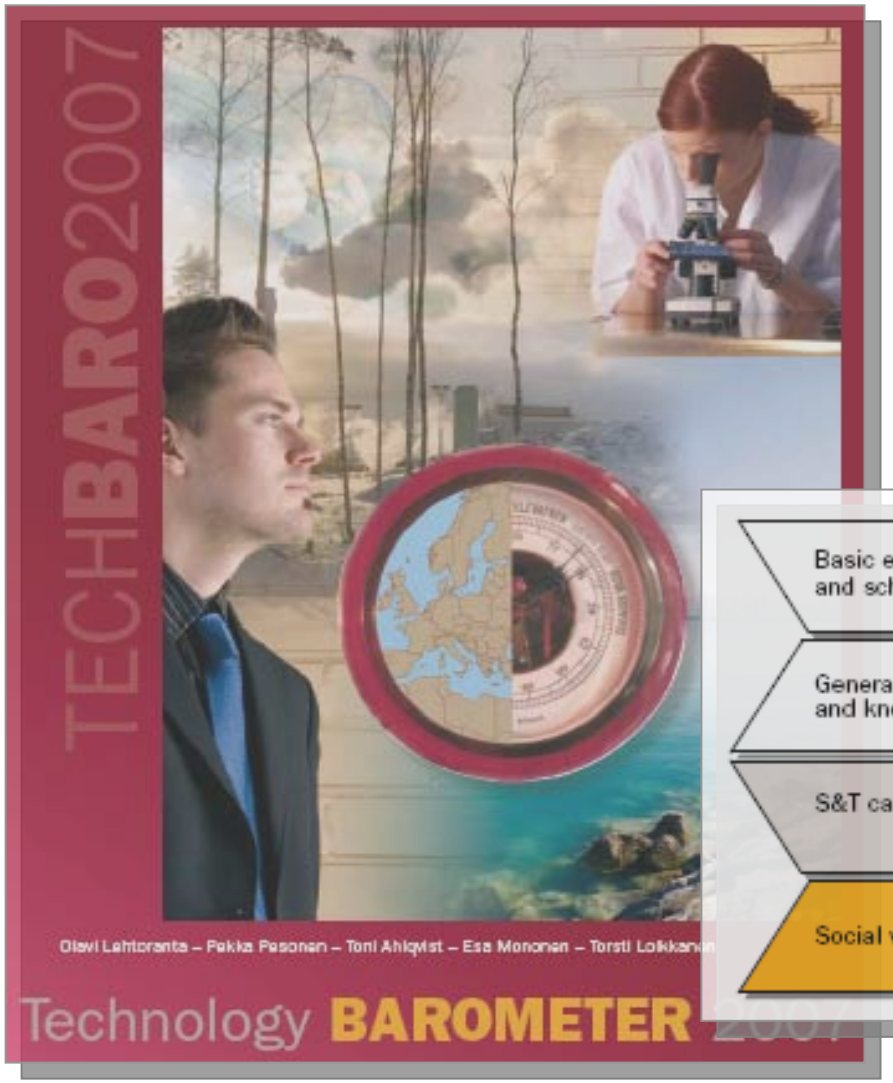
(http://www.finnsight2015.fi/)



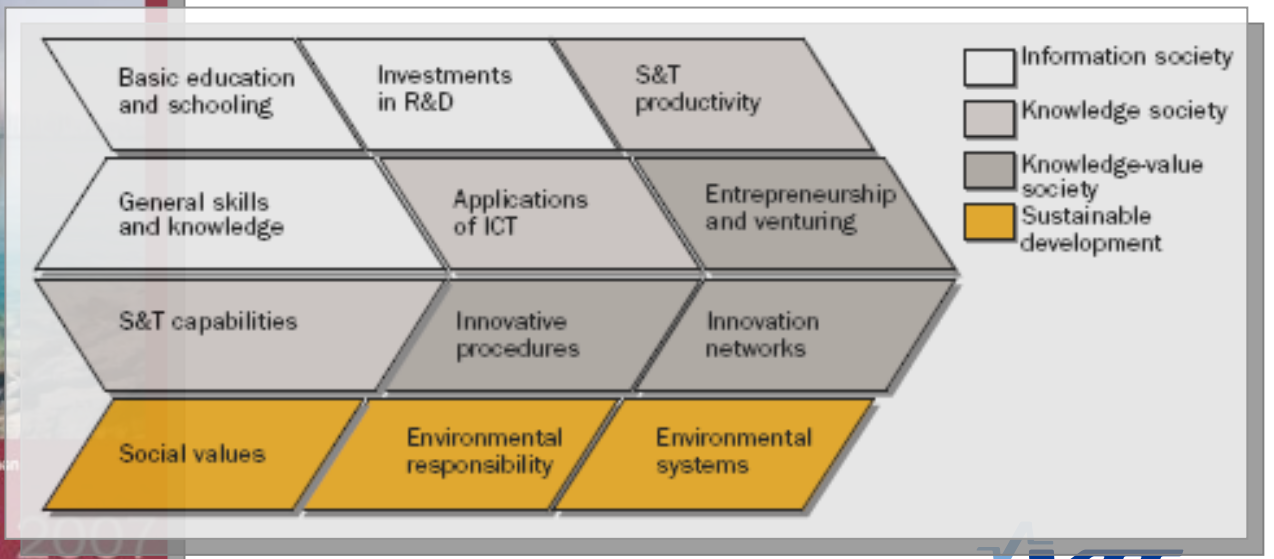
3. Technology Barometer (TechBARO) and Performance of Innovation Systems

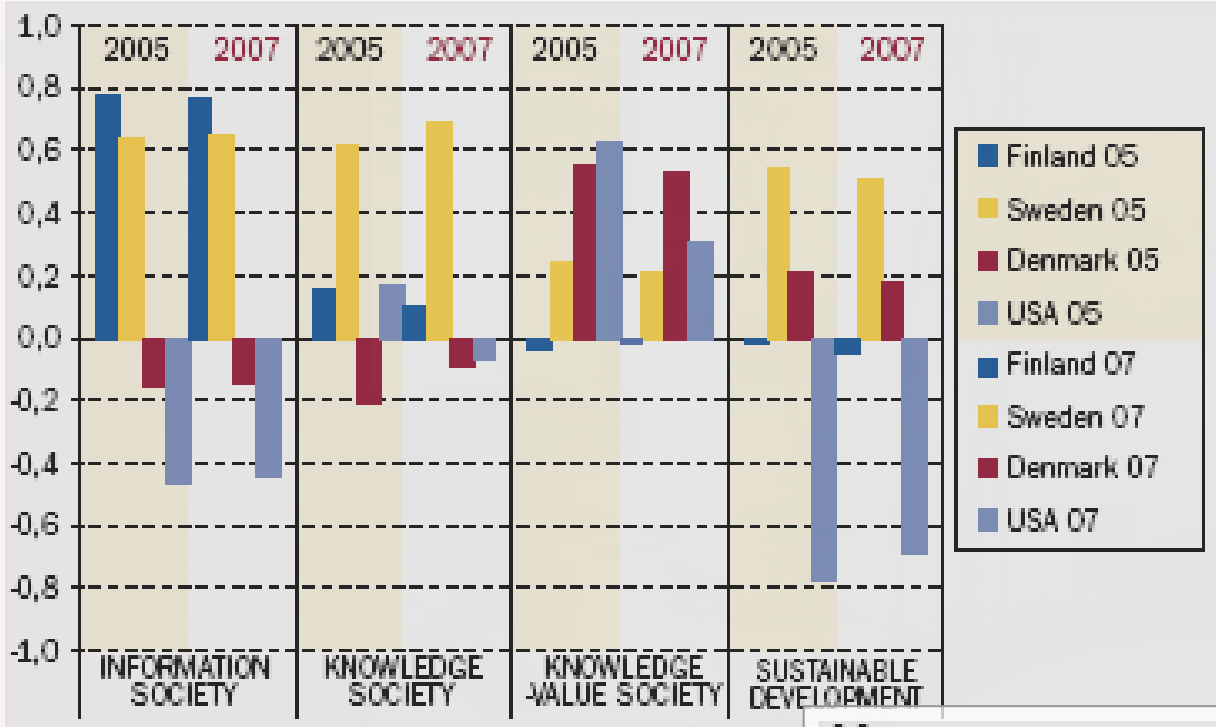
The background: critical national debate about the reliability of performance comparisons of innovation systems

Technology Barometer: 3rd Round in 2007

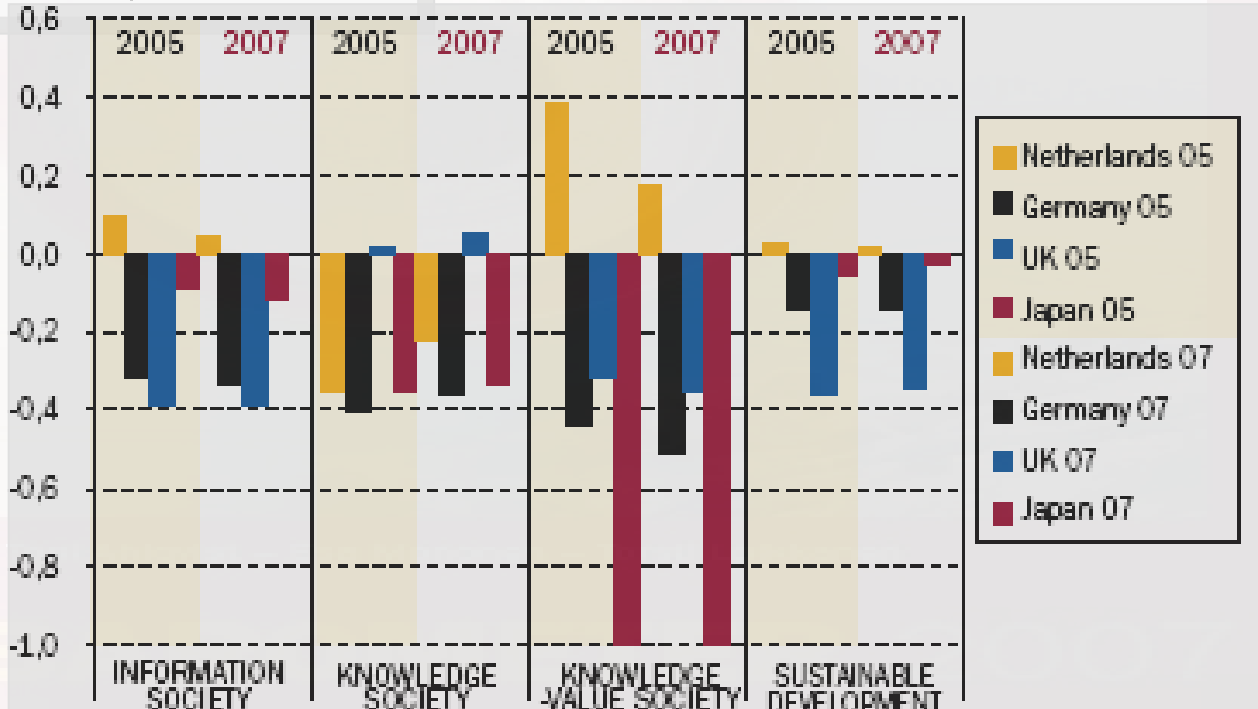


- Instrument for measuring nation´s orientation and citizens' attitudes towards a knowledge-based society
- Consists of indicator-based country comparisons and forward looking survey inquiry to stake-holders (incl. youth)
- Conducted by Finnish Association of Graduate Engineers (TEK) and VTT

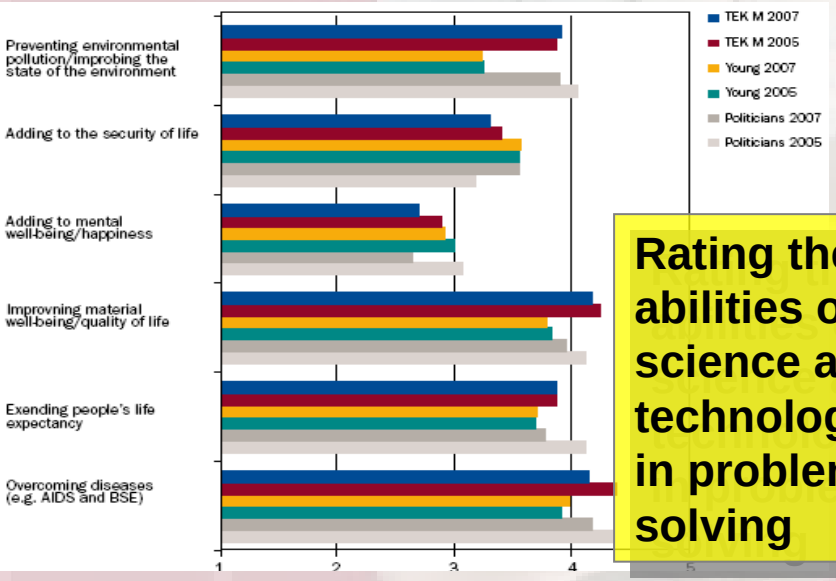




Indicator-based performance comparisons of selected countries



Forward Looking Survey Enquiry of Stake-Holders -- Examples

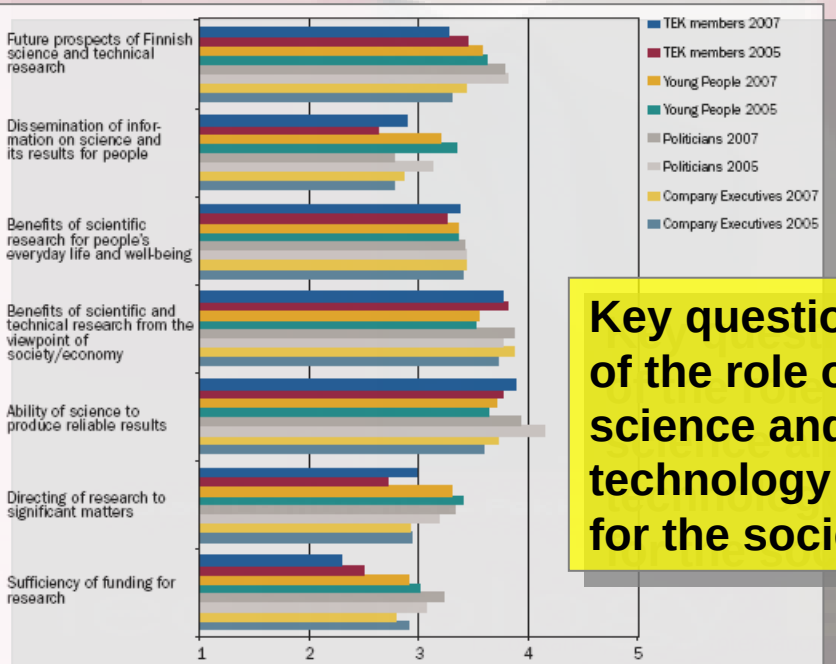


Rating the abilities of science and technology in problem solving

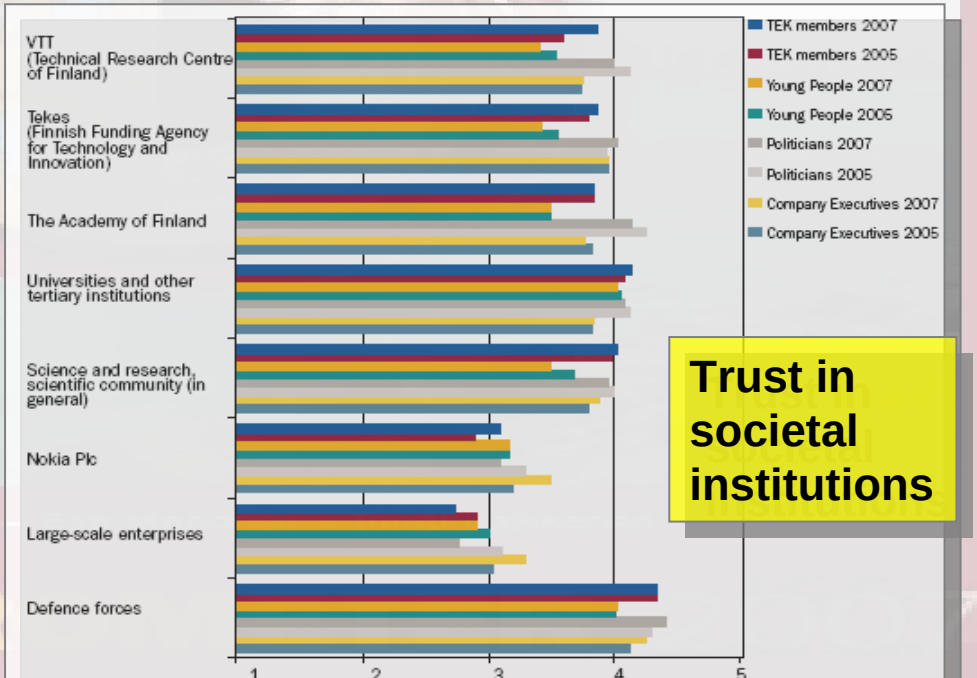
2007		Previous ranking	
1			Business man/woman
2			Solicitor (lawyer)
3	▼	(5)	Journalist
4			Doctor
5	▲	(3)	Athlete
6	▼	(7)	Engineer
7	▼	(9)	Artist
8			Scientist (Researcher)
9	▲	(6)	Judge
10			Politician

▼/▲= Appreciation of profession among young people has improved/declined since the spring of 2005.

Appreciation of various professions by senior secondary level school students



Key questions of the role of science and technology for the society



Trust in societal institutions

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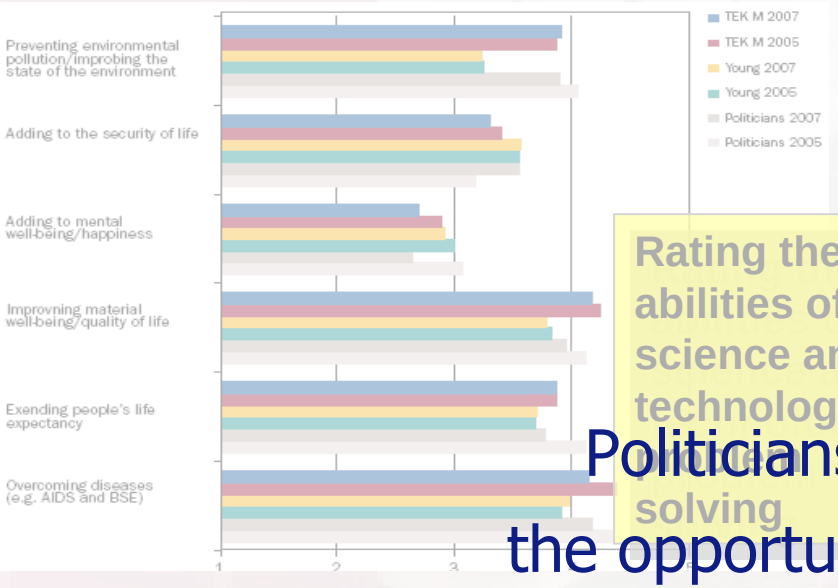

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Appreciation of various professions by senior secondary-level school students

Politicians most optimistic about the opportunities of S&T in the future

Key questions of the role of science and technology for the society

Trust in societal institutions

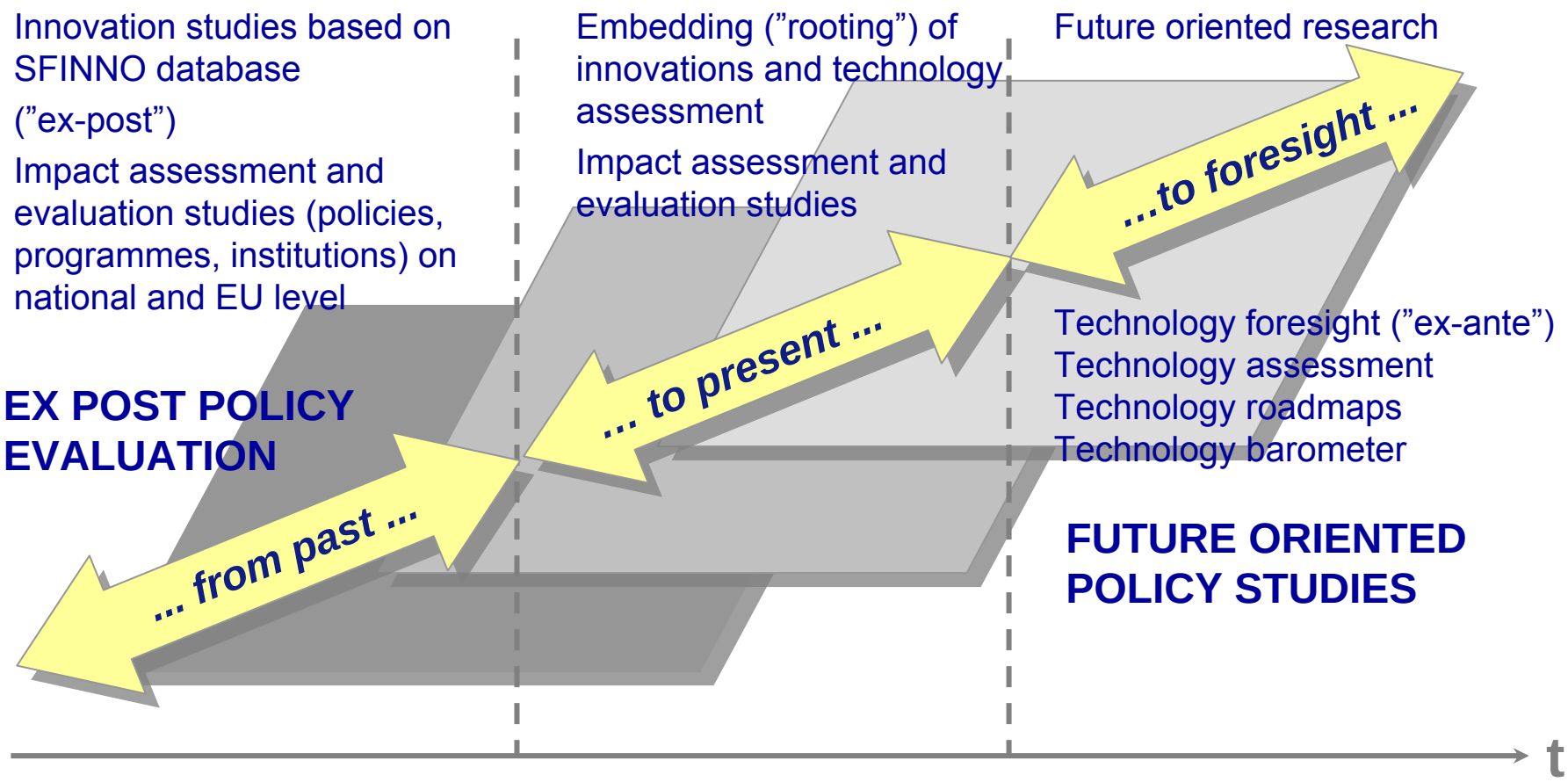
Technology Barometer - Conclusions

- Starting point: controversy of reliability of performance comparisons of innovation systems
- National response by TEK to the debate on performance of innovation systems
- Ex-post indicators reveal points of intervention -- forward looking survey enquires identifies areas of improving
- To be published once in 2-3 years -- will be further developed

(http://www.tek.fi/ci/pdf/teknologia/Technology_Barometer_2007.pdf)

4. Needs and Opportunities Towards More Integrated Impact Assessment and Foresight Approach

Research Agenda of VTT -- Towards Integrated Concept of Past, Current and Future in IP



… outlining the future development path on a basis of integrated analysis of the past, current and future...

Source : Loikkanen et al. 2006.

Rationale and Legitimacy of IP and Public Research Funding e.g.

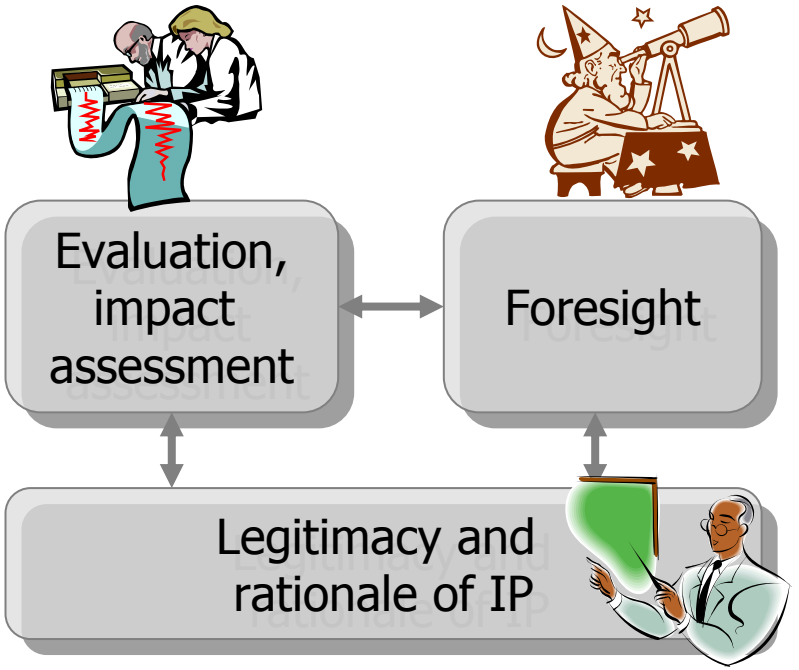
- **Areas of imperfect markets:** … areas with socio-economic importance in which markets function imperfectly (public / common goods, e.g. health care, environmental protection, defense, education, science and research, and…
- **…respective infrastructure areas:** … socially important infrastructures and public good areas, such as transportation, energy, but also…
- **…education, science and innovation infrastructure:** … creation, maintenance and financing of education and research infrastructure or "innovation system" supporting education, basic research, (re)training…
- **R&D areas requiring long time horizon:** …areas of imperfect markets such as environmental protection...
- **Areas requiring critical R&D mass and expenses:** …critical mass and big size of R&D facilities such as aeronautical, space and energy research (e.g. CERN, EBML, ITER)…
- **Welfare through competitiveness:** Government R&D funding can be justified for boosting economic growth in order to enhance national competitiveness and consequent improvements to economic and social welfare in through income and wealth creation, improved employment, etc…
- **R&D schemes for SMEs:** … most companies are SMEs with limited R&D resources but important for economy and employment giving legitimacy to public R&D funding schemes
- **System failures etc.:** … networking of key actors, coordination, avoiding doubling innovation efforts, et.

Source: Loikkanen et al. 2006.

Roles of Impact Assessment and Foresight in Justifying IP

Expert communities of their own? -- More intensive co-operation for creating synergist policy intelligence?

2. How far evaluation and impact assessment tell about IP outcomes & impacts for justifying public research investments?



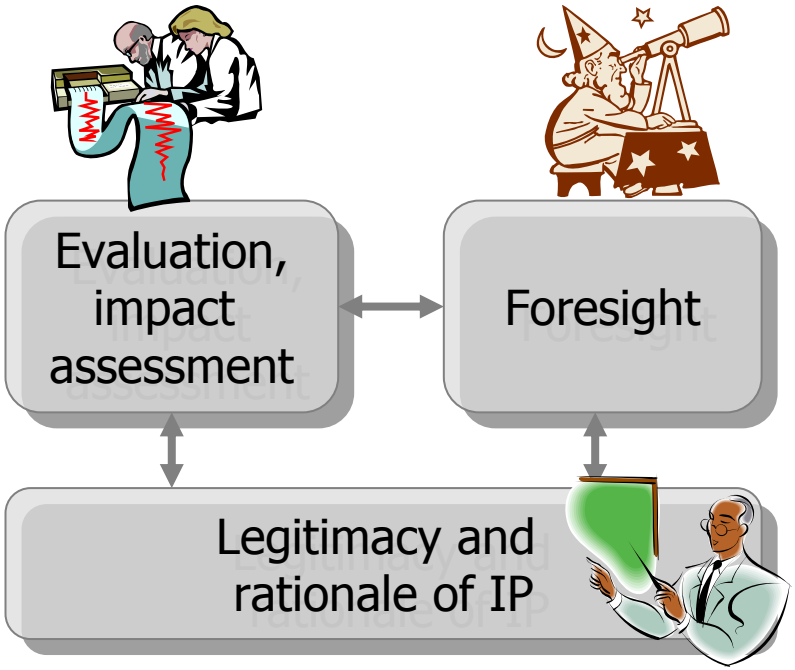
3. How far foresight supports objectives of future IP and related allocation of public research investments?

1. Why tax-payers´ money in IP and research funding?

Changes Since ASTPP Network*?

ASTPP-TSER: Strategic Intelligence combining evaluation, technology foresight and technology assessment tools

Due e.g. to legitimacy of IP, policy-makers are used and experienced in impact assessment tools, and understand their merits, as compared to foresight



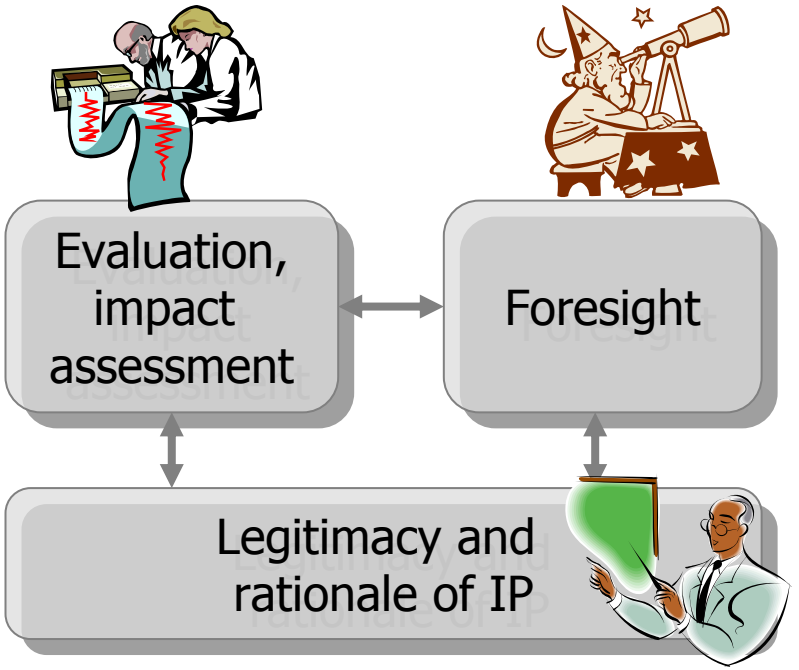
Foresight, although recognized, not well-established tool so far; used on different levels with varying expectations, and not well coordinated

Technology assessment increasingly recognized aspect in impact assessment and foresight

(*) Advanced S&T Policy Planning Network, cf. S. Kuhlmann, et al., Improving distributed intelligence in complex innovation systems. Final report of the, Karlsruhe/Brussels 1999 (ISI/ European Commission).

"Converging" Characteristics of Impact Assessment and Foresight?

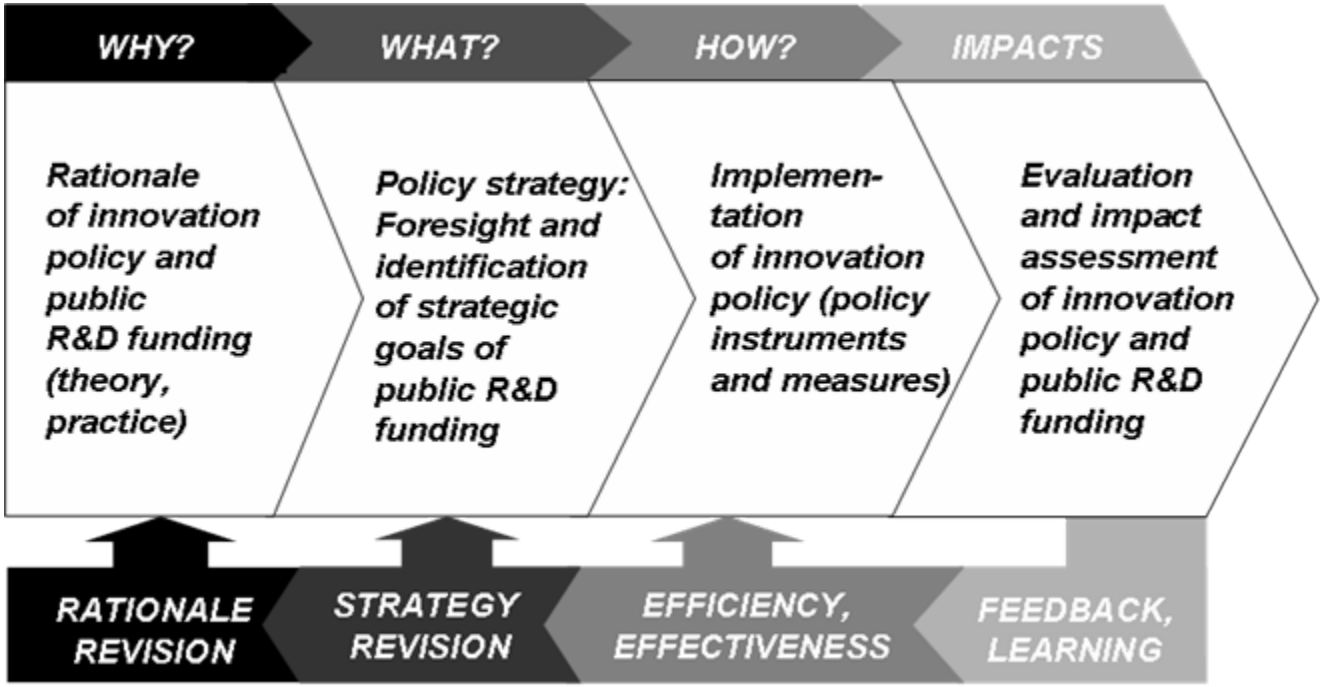
From ex-post evaluation exercise towards interactive learning which supports strategic orientation for the future



Foresight is interactive learning process, determined by path-dependence and accumulation and sharing of future oriented knowledge

Elements for enhancing strategic policy intelligence by integrating the tools among decision-makers and experts?

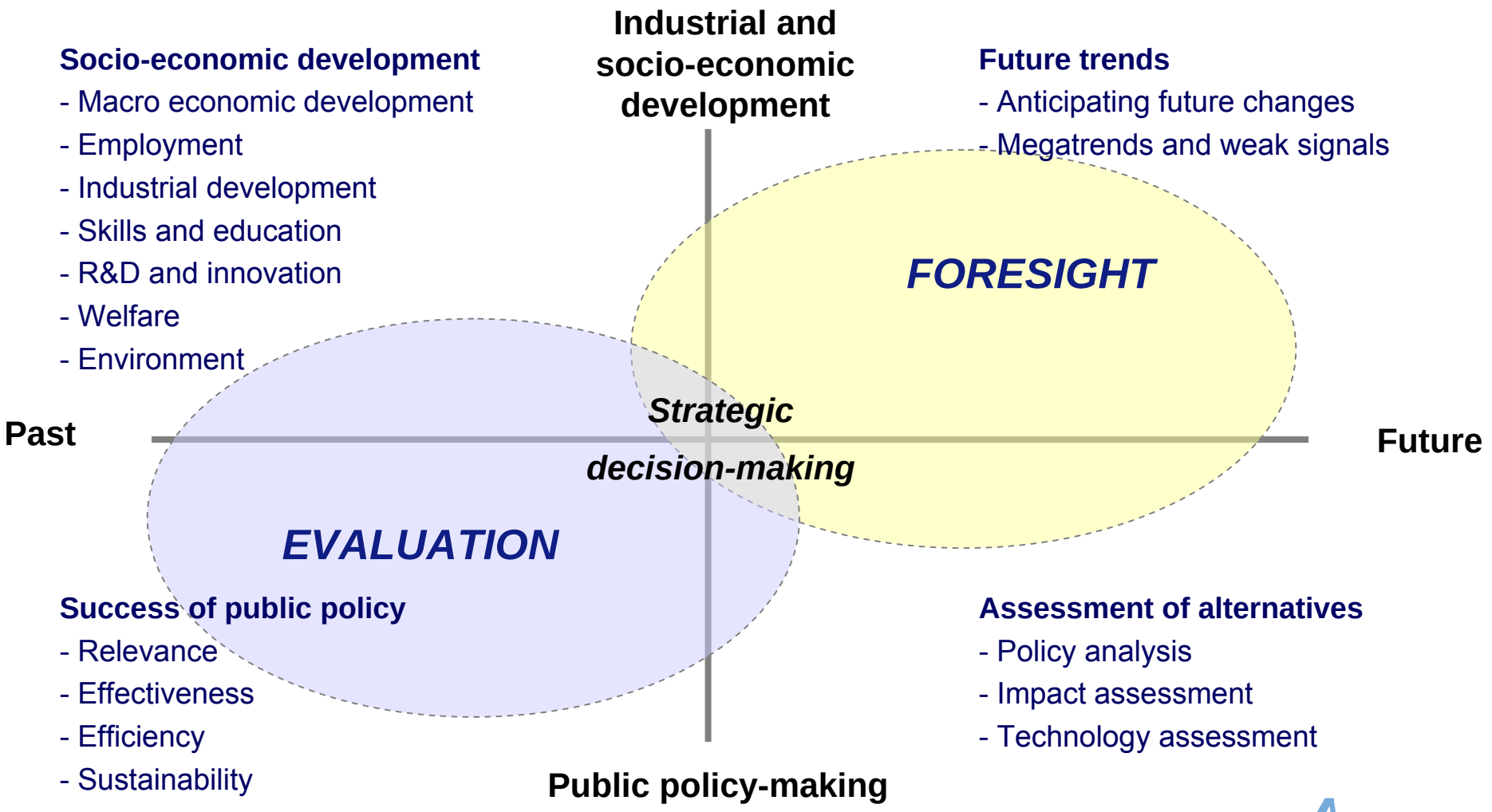
Comprehensive IP Framework Combing Main Elements of Policy-Making



Continuous learning process of policy-makers towards strategic policy intelligence

Source (with slight revisions): Loikkanen, Kutinlahti and Eerola 2006.

Towards Linking of Past - Current - Future in Policy-Making



Source: Valovirta and Hjelt, 2006

Cons and Pros of Integrated Approach of Impact Assessment and Foresight

- More aware solutions for complex decision-making, and distributed strategic intelligence (ASTPP)?

  -- e.g. impacts of globalization on strategy and rationale of national innovation policy
- More coherent, comprehensive and systemic policy?
- Cooperation opportunity to enrich separate cultures -- mutual learning and un-learning

  -- benefits emerge through collaboration
- Practical orientation of expert and policy-making communities?
- Variations between cultures - context dependence

Source: Loikkanen et al. 2006.

5. Summing-Up

Summing-Up

- Foresight as IP instrument recognized but not well-established
  -- elements of 2nd, 3rd and 4th generation foresight model
  -- towards well-established and adequately resourced practices
- Integration of impact assessment and foresight -- towards broader IP scope, integrated framework, and more coherent policies
- Globalization -- *the* key challenge for IP and underlying policy rationale -- a spur to foresight within a systemic IP framework

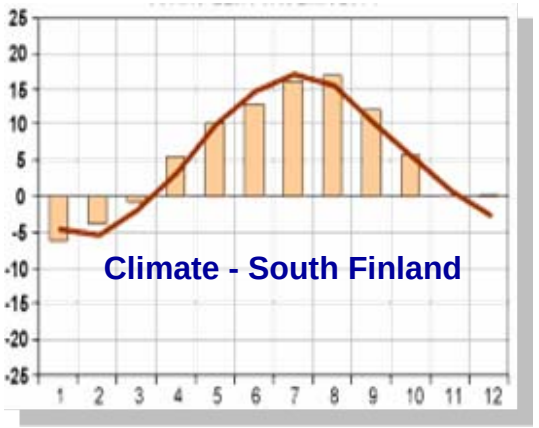
"Foresight is complicated because technological change is inherently uncertain, innovations relate to information asymmetries between present and future, and innovation process is not only influenced by future uncertainties but also generates them" (S. Metcalfe 1995)

Republic of Finland

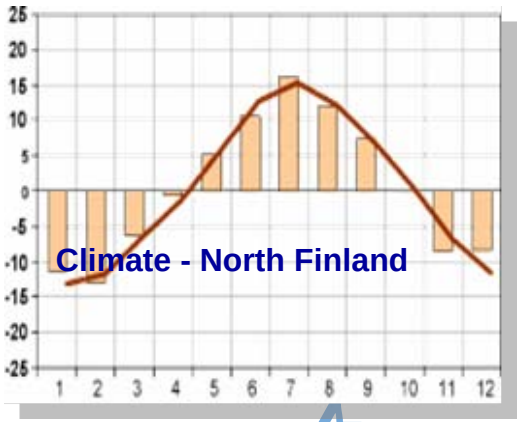
Population (2005) 5,238,460
GDP (2004) 149,7 EUR billion
GDP per capita (2004) (EUR) 28,643 / inhabitant
Total labor force (2004) 2,4 million
Area in km² 338,145
Member of EU since 1995
In 2003 the mean age of

- **46 males**
- **291 females**

THANK YOU!



Climate - South Finland



Climate - North Finland