Indicators Wanted?

Internationalisation of S&T and Policy-Making in a Turbulent Environment

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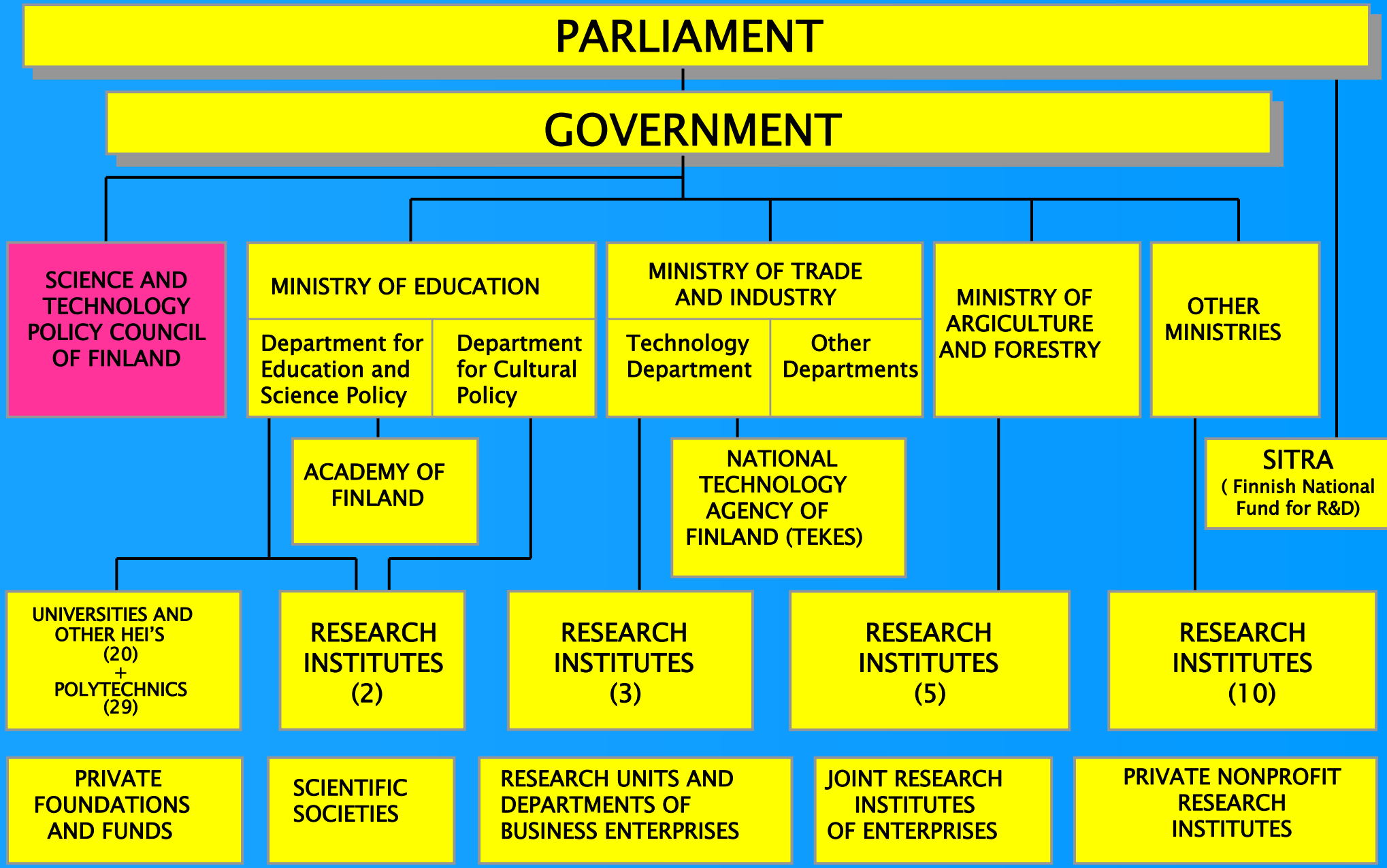
STRUCTURE OF PUBLIC R&D SYSTEM IN FINLAND



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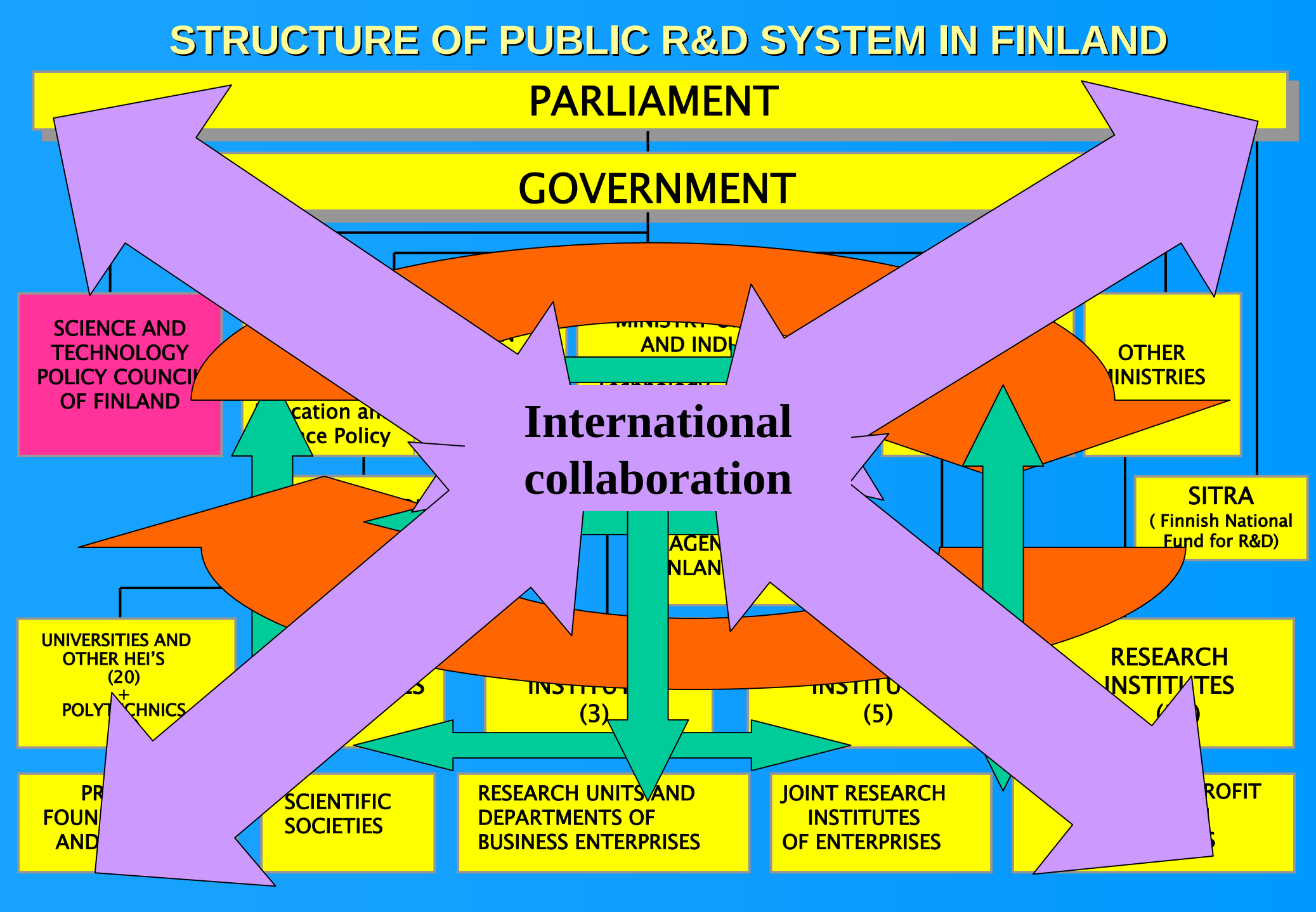


Science and Technology Policy Council

CHAIRMAN:	PRIME MINISTER
DEPUTY CHAIRMEN:	MINISTER OF EDUCATION MINISTER OF TRADE AND INDUSTRY MINISTER OF FINANCE + UP TO 4 OTHER MINISTERS
10 OTHER MEMBERS:	ACADEMY OF FINLAND NATIONAL TECHNOLOGY AGENCY (Tekes) INDUSTRY EMPLOYERS' ORGANISATIONS EMPLOYEES' ORGANISATIONS UNIVERSITIES + 4 OTHER MEMBERS
PERMANENT EXPERTS (5)	
SECRETARIAT (3)	

[SUBCOMMITTEES ON SCIENCE POLICY & TECHNOLOGY POLICY]

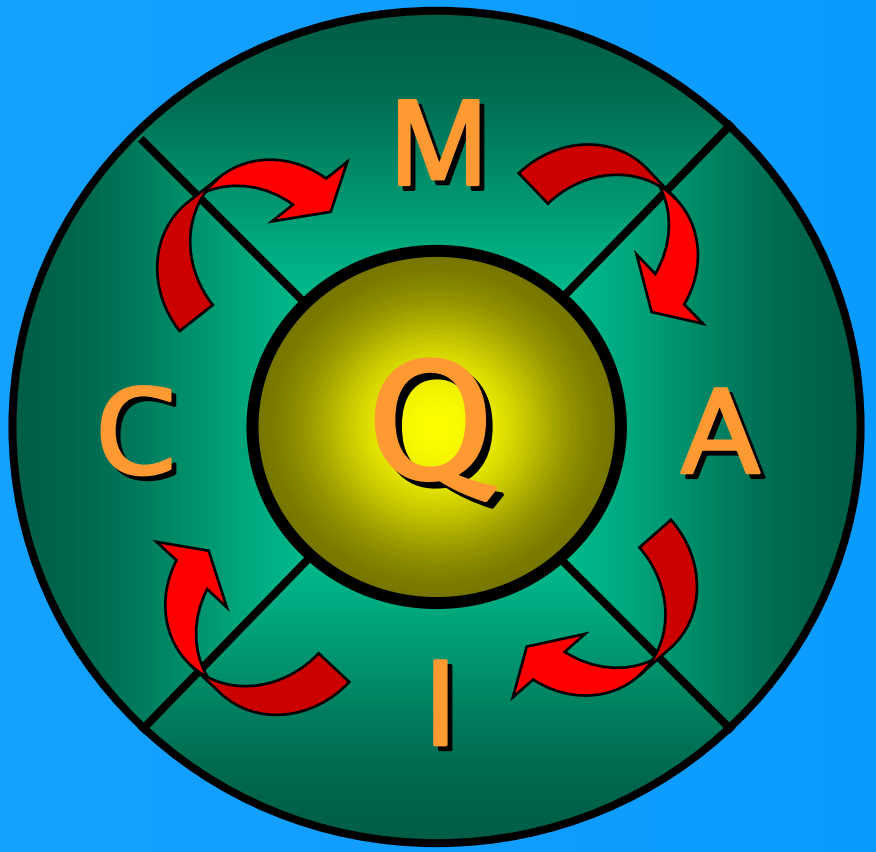
PERMANENT MAJOR TASKS OF THE COUNCIL:

1. Direction and steering of STI policies (incl. compatibility and governance issues)
2. Development of STI financing, its impacts effectiveness
3. Development of sectoral research (i.e. gov. R&D institutes) and inter-sectoral co-operation
4. International S&T co-operation

Key elements in STPC policy planning

Information gathering and monitoring

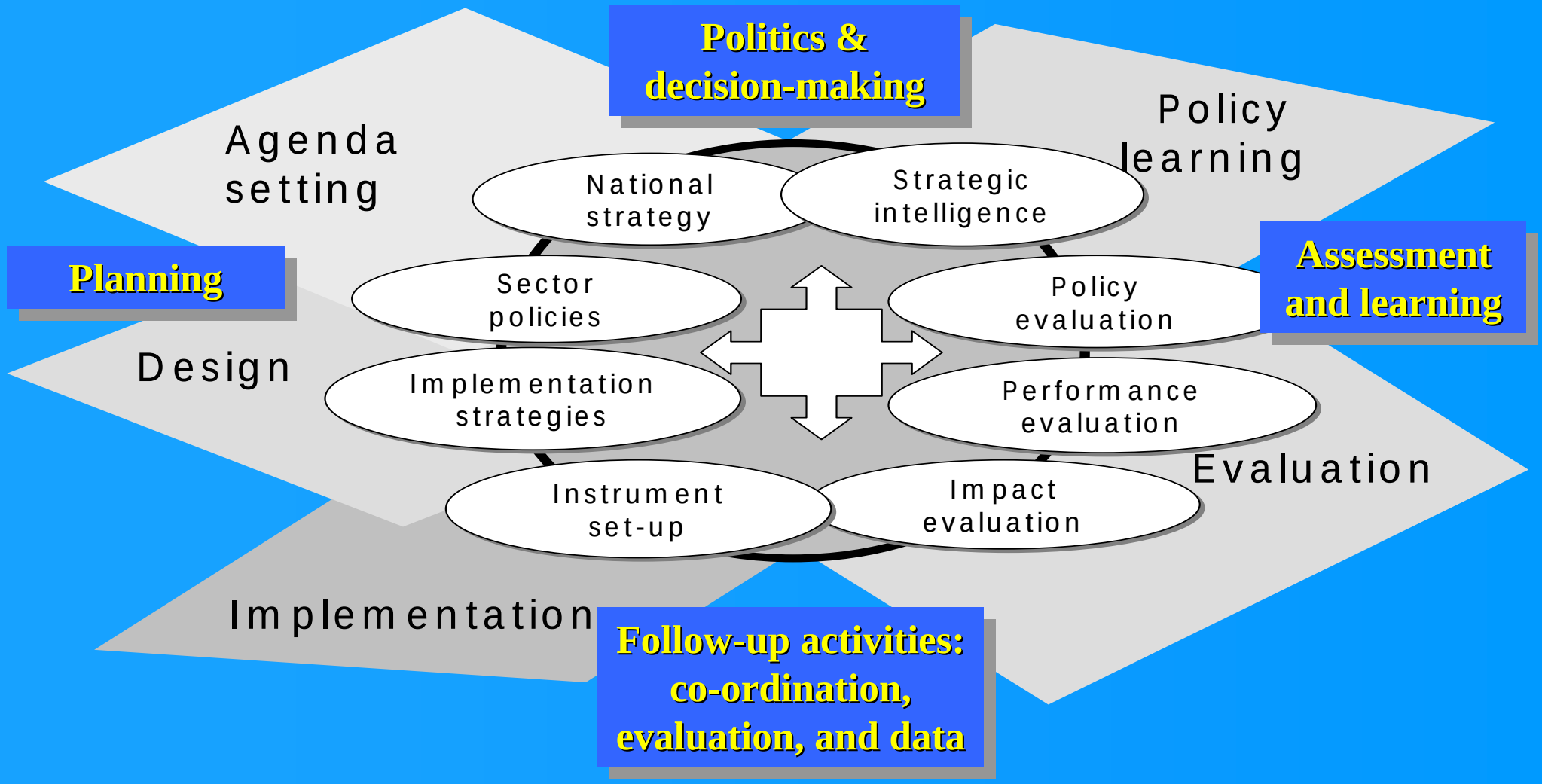
Communication of policies and statements



Analysis of trends and new developments

Generation and testing of ideas and improvements

The Innovation Policy Cycle:
Policy process is a continuum of interactions, co-ordination and decision-making



The Strengths, Weaknesses and Challenges of the Finnish Innovation System

FIS: International Performance and Specific Features

Strengths

- Favourable growth of GDP (since 1993)
- Diversified structure of the economy; 4 strong pillars (not just ICT)
- Total productivity growth (one of the highest in the OECD area since the mid-1990s)
- Economic returns of private sector R&D have been high
- R&D intensity high (4. in the World, 3.51%; strong contributions from both public & private sector)
- Effectiveness of R&D measured by patents high (EPO, USPTO, Triad)
- High share of competitive R&D funding
- Number of researchers and PhDs high (in relative terms)
- Volume of brain-drain comparatively low
- Intense co-operation within NIS and between PROs & firms

Finland's ranking in recent global comparisons

European Innovation Scoreboard 2005	3
Growth Competitiveness 2005–2006 (WEF)	1
Business Competitiveness 2005–2006 (WEF)	2
World Competitiveness Scoreboard 2005 (IMD)	6
Environmental Sustainability Index 2005 (Yale Univ; Columbia Univ; WEF; JRC/EC)	1
Corruption Perceptions Index 2005 (Transparency International)	2
KOF Index of Globalisation 2006 (Swiss Institute for Business Cycle Research)	14
The Lisbon review 2004 (WEF)	1

Weaknesses & Challenges

Despite the fact that there are world-class research system and innovation environments in Finland…

… volume of inward FDIs and numbers of foreign experts, researchers and students are low (negative balance of both investments & migration).

Furthermore, the volumes of international co-publications, patents with foreign co-inventors and foreign ownership of domestic inventions are extremely low. In addition, the volume of high-tech foreign trade and the extent of value added of trade products have decreased, among other not so gratifying features.

Concurrently, there are two-way challenges in relation to internationalisation of STI

First, domestic actors have to increase their international activities and co-operate more intensively with foreign collaborators and sources of STI abroad

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Second, Finland has to become more international within its borders

→

Key challenge is to internationalise the entire NIS

THE CHALLENGES OF POLICY-MAKING TODAY:

Systemic development of STI policies and NIS requires updated knowledge stock on the innovation system structures, interactions and governance issues. Today, policy-makers and planners are faced with the following key challenges:

1. ***Increased speed of change*** **(-> policies often have to be adjusted already before sufficient knowledge of their effects is available)**
2. ***Increased complexity of the economy and society***
   (-> complexity of policy measures; different policies and policy measures have to be designed in co-ordination with each other)
3. ***More uncertainty*** **(linked to multidimensional nature of globalisation)**
4. ***Expanding system boundaries***

   (-> increasing co-operation and networking, new forms of public-private partnerships, etc. -> increasing set of stakeholders and framework conditions -> need for horizontal and multi-dimensional policies)

Same challenges and requirements at different levels of spatial system

While…

1. national innovation systems and all STI activities are becoming more international by nature.

… at the same time…

Globalisation & Internationalisation
Competitiveness & Productivity
Knowledge & Innovation
Co-operation & Competition
Specialisation & Priorisation

} **concern all regions.**

2. STI activities and policies are becoming more and more regionalised; things are happening within and between regional economies and innovation environments (regional decision-makers and other key stakeholders, technology centres, science parks, funding agencies, etc.)

→

There is an urgent need of regional data and S&T indicators because, in many cases,

→

Policy-planning and decision-making takes place under the circumstances of imperfect and missing information

S&T Indicators in the Policy Cycle

- In practical terms, the field of policy-relevant data and indicators is very wide; there are numerous producers of indicators. Planners and decision-makers cannot just follow one set of indicators provided by a given organisation (whether it is EC, OECD, national statistical offices, etc.).

- To get a comprehensive view on the situation, one has to monitor several (independent) data sources.

- Delays and time-lags always create problems and reduce the exploitability rate of indicators; politicians and experts always want up-to-date info. These difficulties are very valid especially in the case of international statistics.

S&T Indicators in the Policy Cycle

Hence, in order to evaluate the state of NIS and to set up forthcoming decisions, policy-makers have to go beyond S&T indicators.

That's why the STPC also follows various statistics on the economy, information society, labour market, education, immigration, mobility issues, etc.

From the point of view of central Council activities, most important indicators are derived from the following sources:

- R&D surveys & Gov. Budget Appropriations for R&D
- FDI surveys
- Surveys on trade in services
- Community Innovation Survey
- Statistics on patenting, high-tech foreign trade, PhDs
- myriad of single case-studies, evaluation reports…

S&T Indicators in the Policy Cycle

Key products on STI indicators for the STPC include:

- **'European Innovation Scoreboard'**
- **'Statistics in focus' series and 'Science and technology in Europe' by Eurostat**
- **'Key Figures'**
- **Reports based on the EU's Framework Programme data**
- **'OECD Main Science and Technology Indicators'**
- **'OECD Science, Technology and Industry Scoreboard' and 'Science, Technology and Industry Outlook'**
- **'Science and Engineering Indicators' by NSF/NSB**
- **Individual studies, such as 'European Report on S&T Indicators' and .**
- **Domestic products by the Statistics Finland and the Confederation of Finnish Industries, among others.**

S&T Indicators in the Policy Cycle

- However, there are numerous issues and phenomenon that cannot be captured with S&T or any other indicators.

- Policy-makers often have to go beyond the vast 'Ocean of Data & Indicators', where no statistician has gone before.

- After all, political decisions are not made on the basis of indicators; of course, there are always exceptions. Of course, indicators always help and are exploited in all different stages of policy cycle -- and in different ways.

- In the end, indicators often serve best when they point out:
  * new research questions and
  * the fields and themes where we should conduct further studies.

STI Policy: Examples of Needs of Indicators

- Currently, input indicators are mostly useful BUT…
  … especially the output and impact side is still lacking far behind the needs of policy-makers.
- Mobility of researchers, PhDs and HRST, in general terms. Data and indicators imperfect especially concerning international mobility and comparability.
- R&D receipts from abroad; more detailed data
- R&D extramural expenditure; more detailed data
- Flows of funds and IPRs within and between MNCs
- CIS; more frequent inquiries and more up-to-date date
- Data broken down by major field of science; R&D, researchers
- Composite indicators, further developments always welcome
- EU Articles 169 and 171 will create challenges → opening up national programmes and funding; new legal entities.

STI Policy Documents

Two recent and important policy documents that draw general lines of development of Finnish STI policies and R&D in the near future are:

1) **Internationalisation of Finnish Science and Technology** (November 2004)

2) **Government Resolution on the Structural Development of the Public Research System**

(April 2005)

Both documents were prepared within the Science and Technology Policy Council

In November 2004, the Science and Technology Policy Council of Finland adopted a strategic policy document that draws general guidelines for developing Finland's international S&T co-operation. The document is called…

INTERNATIONALISATION OF FINNISH SCIENCE AND TECHNOLOGY

Why a strategy?

- Globalisation of business and STI activities
- New international division of labour, production and investments (incl. FDIs)
- International STI competition and co-operation are increasing simultaneously and side by side

The document defines:

- Strategic policy guidelines
- Development of S&T co-operation (globally, in the EU, and in the Northern Europe)
- Development needs within Finland
- Administration and finances of international S&T co-operation
- Follow-up of co-operation and impact assessment

Internationalisation of Finnish S&T

Basic principle 1:
The enhancement and other promotion of international S&T co-operation concern all levels and all players within the NIS, as well as all forms of co-operation: official and informal, multilateral and bilateral. The question is about internationalisation of the entire innovation system. However…

International S&T co-operation is not an end in itself.

Basic principle 2:
Development of co-operation with leading global partners requires that Finland has a high standard of knowledge and know-how.

Systematic actions need to be taken to develop a world-class national knowledge base and to anticipate new opportunities.

Selected recommendations:

- **Active, strategically sound international collaboration**: looking for competence where it is best (globally, going beyond the EU)
- **Increasing public R&D funding** on a long term basis; new investments allocated to the most important targets
- **Removing obstacles to and restrictions** in international co-operation:
  - * amendments to legislation (e.g. internationalisation of universities and educational services, immigration and work permits, taxation…)
  - * reformulating recruitment policies;
  - * developing researcher careers and increasing mobility
- **National research and technology programmes** must engage in efficient international networking (incl. EU Article 169, opening up national programmes and funding).
- The Academy of Finland and Tekes have a specific task in producing and developing reliable impact assessment and evaluation.

Government Resolution on the Structural Development of the Public Research System (April 2005)

The Resolution outlines the development of the organisations, which steer, finance and conduct R&D in the near future

Basic principles and objectives **of the development measures:**

- **Prioritisation of STI activities.**
- **Profiling of R&D organisations (specialisation in the fields of strength).**
- **Selective decision-making, strategic choices.**
- ***Internationalisation*** **of education, research and innovation**

A specific feature: a *national strategy* for creating and reinforcing internationally competitive *S&T clusters and competence centres* will be devised under the direction of the STPC.

STI Policy:
Central Challenges and Development Areas

Finland is ranked high in international competitiveness comparisons. However,

- **Service sector** productivity is rather low and a great growth potential might be available e.g. through increased use of ICT
- Number of **growth-oriented entrepreneurs and innovative firms** is low by international standards
- **Exploitation of R&D results** should be intensified.
  1) Transfer of technology and know-how;
  2) IPR in universities, university companies, universities and VC;
  3) Availability of venture capital (market failure in the start-up phase);
  4) More intense networking of intermediary organisations.
- **Fragmented activities**: resources allocated to a large number of small units -> prioritised pooling of limited resources
- Volume of inward **FDIs** and numbers of **foreign experts and students** – as well as foreigners as a whole - are very low

Development of Innovation Dynamics: Challenges 2004-2006

- Internationalisation & globalisation ←→ proactive measures
- Priorities and selectivity in STI and in desicion-making
- Continuous development of national competences
- Development of both technological and social innovations
- More intense co-operation between science and industry
- Foresight activities and evaluation
- Building up creative innovation environments and framework conditions (CoEs in R&D, researcher careers, IPR, etc.)
- Further increase in (public) financing of R&D and innovation
- Matching of education and labour market demand

Decentralised HEI system, fragmented activities and resources, and complex public business service system

→ *R&D will be assembled into larger entities with a view to increase synergy, critical mass, multidisciplinary research, co-operation, efficiency and units' abilities to participate in resource-demanding international activities.*

→ *Renewal and rationalisation of the public support system for innovative start-up companies is currently in progress.*