Swedish Research & Innovation System and VINNOVA Policies and lessons learnt

Visit at NACI
South Africa

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Knowledge Based Economy and Global Competitiveness

- **The economy is becoming more and more knowledge based and global**
- **The European Union has set the goal to become the world's most dynamic knowledge based economy**
- **This makes R&D very important, but R&D has to be strongly linked to business needs, needs-driven R&D**
- **International cooperation in R&D more important**

Triple Helix

Interdepending Actor Groups

Knowledge based economy

**From PPP, Public Private Partnership,
To Public Private Univ. Partnership,
i.e. Triple Helix**

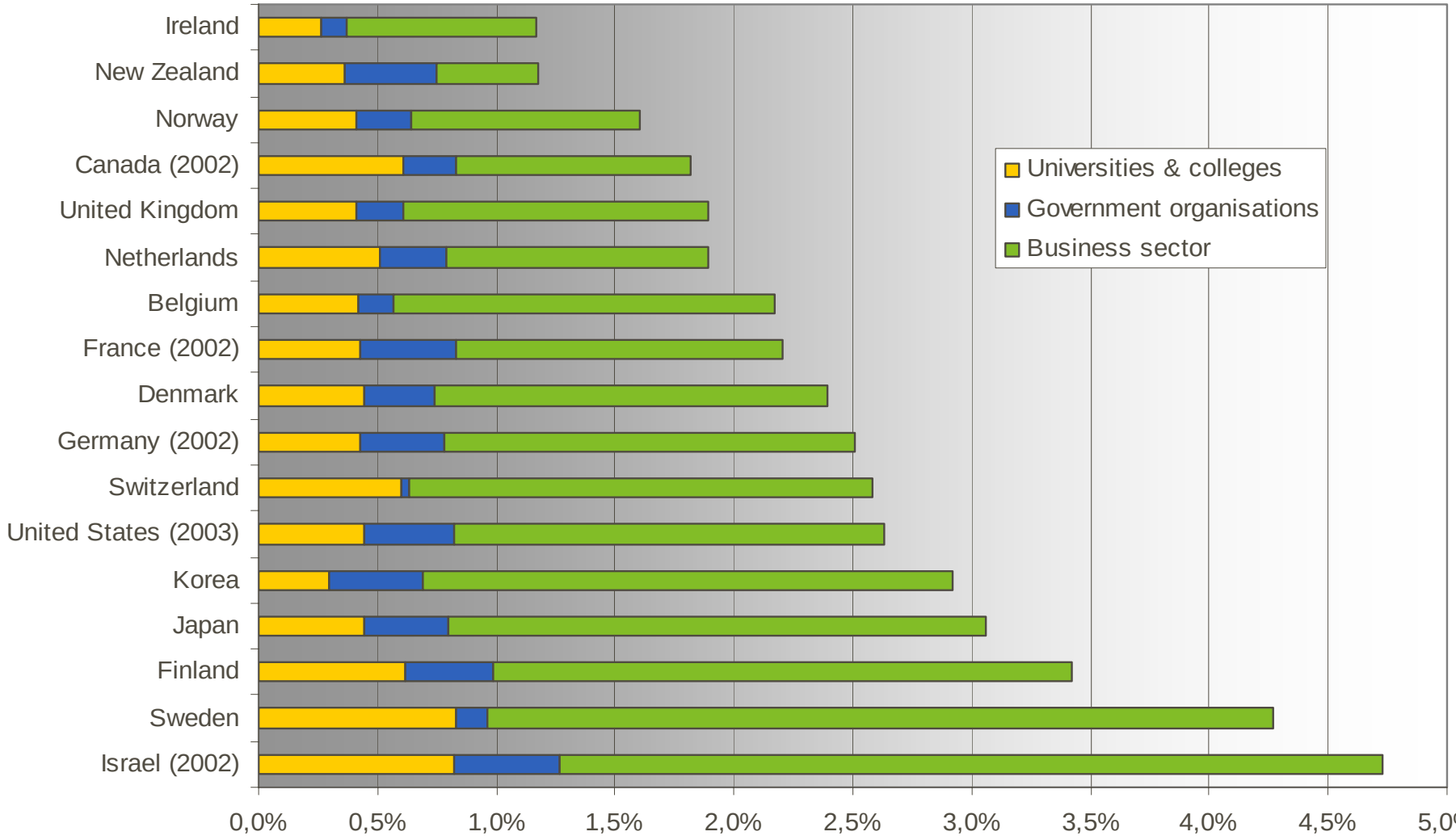
Globalization for the Triple Helix Groups of Actors

- **Business – includes now also SMEs**
- **Academia – a need for strong Research & Innovation Milieus (e.g. Centres of competence)**
- **Politics and policy meet global competitiveness**

Swedish National Innovation System Characteristics:

- The economy is strongly internationally linked
- The big international companies dominates the R&D-system
- SME invest very little in R&D
- Universities dominates the public R&D-system and they have a third task, to cooperate with companies and society
- Small sector of Research-institutes
- Government invests very little R&D-money in companies outside the military sector

R&D expenditure in relation to GDP



Source: OECD MSTI, 2004

Sweden – national context

- High expenditure on R&D, close to 4 % of GDP
- High level of patenting and publications per capita, but declining
- The Swedish Paradox – High input in R&D but low output

- Highly internationalized business sector: Strong dependency on foreign firms when it comes to R&D, employment, etc.
- ’Few people come to Sweden to work’ (ITPS 2007)

- Macroeconomic stability
- Small domestic market

Governmental Funding Agencies

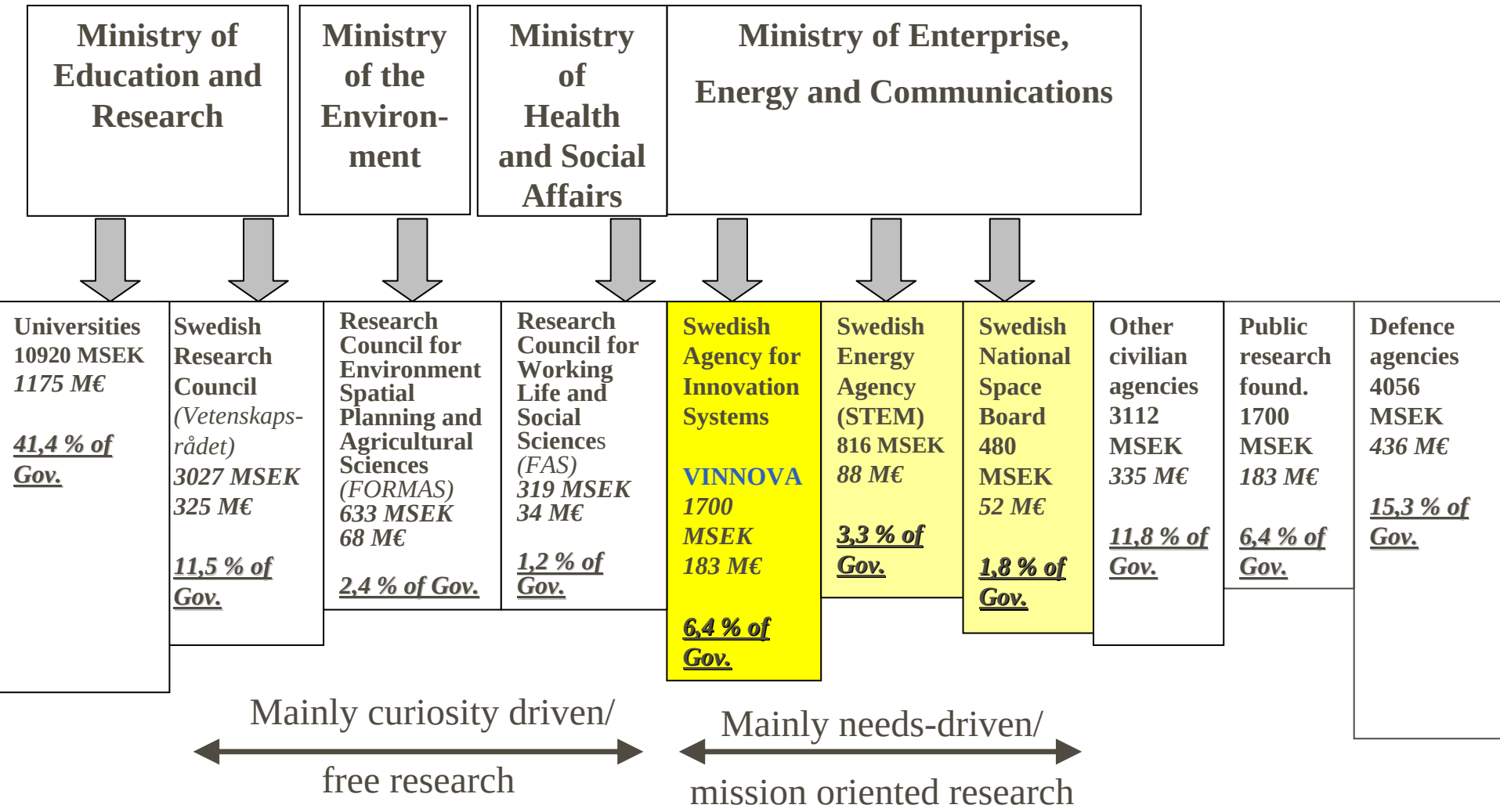
Research Council
Science driven research

VINNOVA Governmental Agency for Innovation Systems
Needs-driven research and development

Nutek
Regional development

Major public R&D-funding organizations in Sweden and their budgets 2007

Gross Domestic Product: 3011 GSEK (324 G€) Government R&D-funding: 0.88% of GDP = 26,4 GSEK (2,8 G€)



Curiosity driven and needs-driven research

Other important funding organisations

- **KK-foundation (Knowledge & Competence, Programs for new univ)**
- **Strategic Foundation (Between and overlapping VINNOVA & Research Council)**
- **K A Wallenberg foundation (expensive instruments, close to Research Council)**
- **Innovation Bridge, seven regional offices (Seed financing, Incubators)**
- **Industrial Fund (Government early VC)**

Mission for VINNOVA

Promote sustainable growth

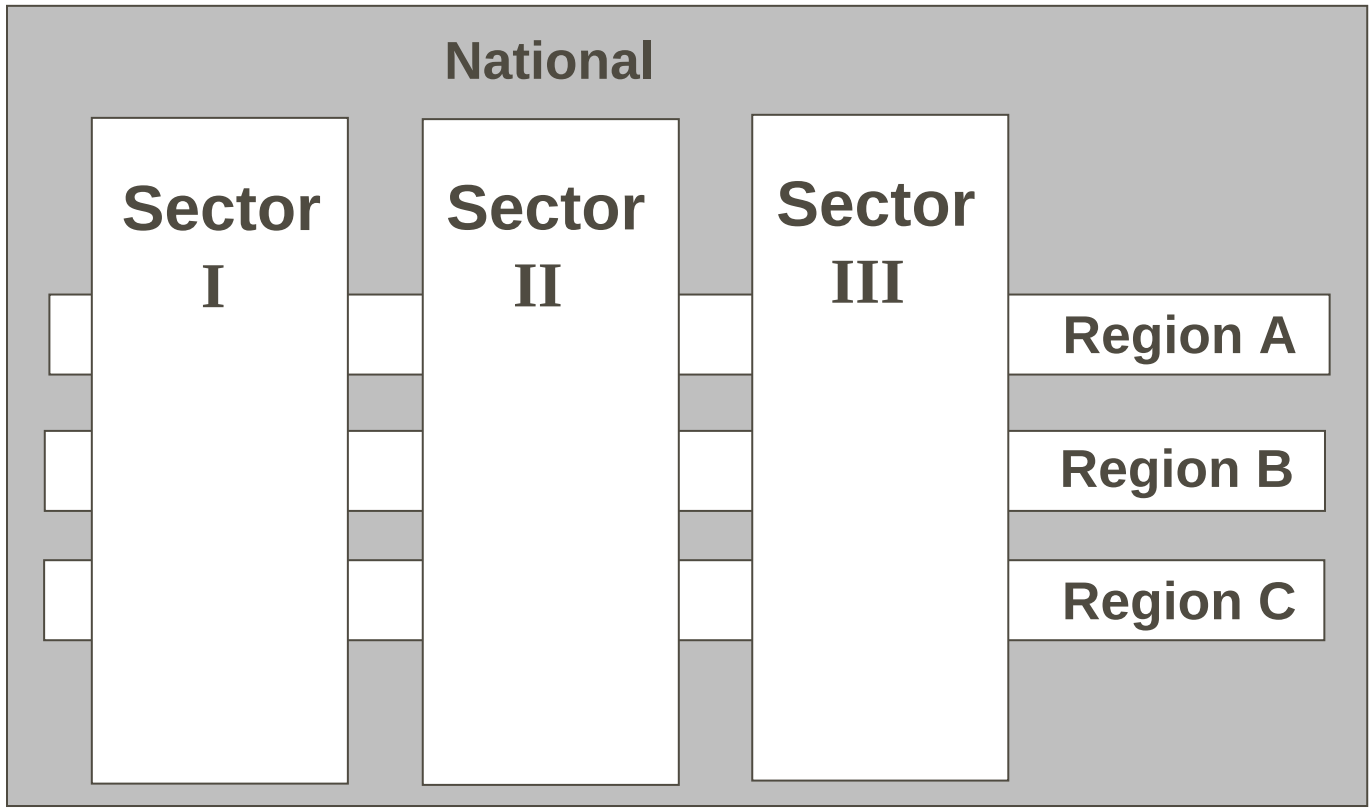
by financing needs-driven R&D and developing innovation systems

Innovation system

An innovation system is the network and interplay of public and private institutions, in which production, distribution and use of new knowledge and technology take place

Most innovations from interplay, up to 9 of 10!

Innovation System perspectives



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Research and Innovation

Research: Money transformation to Knowledge & Competence

Innovation: Knowledge & Competence transformation to Money

Developing innovation system is to make above efficient, i.e. to make investment in R&D profitable. Identify bottlenecks and possibilities.

VINNOVA budget 200 M€ per year

6 % of Gov. R&D investments

Doubled by matching from actors

- **ca 40% to university**
- **ca 20% to research institutes**
- **ca 30% to companies**
- **ca 10% to others**

Triple Helix composed decision-making boards

Transformation from push to more market pull in the research system is now the trend.

The VINNOVA Strategy – a summary

- Promote Market Inspired Research
- Promote projects with an adequate business context
- Promote strong Research and Innovation Environments
- Stimulate the professionalisation of Universities and Research Institutes regarding commercialisation and exploitation of research (”Collaboration for Growth”)
- Stimulate the improvement of innovation capabilities of SMEs
- Bridge the gap between research and the commercial market through pre-seed financing, active project support, selective follow-up financing and syndication/collaborative financing efforts

National Research & Innovation System Programs

- Promote strong research and innovations environments (eg. VINN Excellence Centers – Institute Excellence Centers, VINNVÄXT)
- Programs to strengthen the role of Research Institutes in their innovation systems (Institute Excellence Center, etc,)
- Promote growth in SMEs through research and development (Forska&Väx, etc)
- More effective commercialisation and valorisation of research results (Key Actors Program)
- Verification/Valorisation support

Examples of VINNOVA funding instruments

- Centers of Excellence (VINN Excellence Centers/Industry Excellence centers/etc)
- World Class Clusters (VINNVÄXT)
- Commercialisation and valorisation support

Center of Excellences programmes

- Long term, successful programmes
- Competence Center program (started 1995)
- VINN Excellence Centers (started 2005)
- Berzelii Centers (started 2006)
- Institute Excellence Centers (started 2007)

VINN Excellence Centers

- Provide an arena for research collaboration between universities, industry and public sector
- Research centers must be internationally competitive
- 19 of planned 25 already established
- 10 years
- 2.2 M€ per Center and year
  - 1/3 from VINNOVA
  - 1/3 from industrial and other partners (in kind and cash)
  - 1/3 from host university (commitment of institutional funds)
- 10-15 partners per Center, both large and small innovative firms
- Call for proposals in two steps; first resulting in planning grants
- Highly competitive process
- Review of scientific excellence by international experts

19 VINN Excellence Centers already selected

Broad field	Research focus	University
Biotechnology and Wood Fiber/Paper Technologies	Ubiquitous Intelligence in Paper and Packaging	Royal Institute of Technology
	Biofiber Materials	Royal Institute of Technology
	Supramolecular Biomaterials - structure dynamics and properties	Chalmers University of Technology
	Biomaterials and Cell Therapy	Göteborg University
	Protein Technology	Royal Institute of Technology
	Antidiabetic Foods targeting the Insulin Resistance Syndrome	Lund University
Information and Communication Technologies	Antenna Systems	Chalmers University of Technology
	GigaHertz Microwave Technology	Chalmers University of Technology
	Sustainable Communications (communication that can serve as alternative to physical travel and transportation)	Royal Institute of Technology
	Mobile Services and Ubiquitous Computing	Stockholm University
	Wireless Sensor Networks	Uppsala University
Industrial & Materials Technology	Hierarchic Engineering of Industrial Materials (quantum mechanics in materials engineering)	Royal Institute of Technology
	Functional Nanoscale Materials - High-Impact Surface Engineering Solutions for Industry	Linköping University
	Efficient Product Realization (fast, flexible, and highly customized global product and production development processes)	Chalmers University of Technology
	Functional Product Innovation (incl. facilitating 3R)	Luleå Technical University
Transport	Tools for future vehicle design	Royal Institute of Technology
	Next Generation Innovative Logistics	Lund University
	Sustainable development of passenger transportation services	Karlstad University
Working Life	Managing Mobility for Learning, Health and Innovation	Linköpings universitet

8 Institute Excellence Centres selected

VINNOVA, The Foundation for Strategic Research and the Knowledge Foundation jointly arranged a competition among all Research Institutes for “Institute Excellence Centre” grants. Each grant amounts to 4.3 M€ over six years, with the same amount from industry.

Broad field	Research focus	Institute
Drug Delivery	Controlled Delivery and Release	YKI (Institute for Surface Chemistry)
Wood	Center for Eco-efficient and Durable Wood-based Materials	SP/Trätek (Swedish Institute for Wood Technology)
Information and Communication Technologies	Center for Networked Systems	SICS (Swedish Institute of Computer Science)
	Fiber Optic Center	Acreo (contract research in electronics, optics and communication technology)
	Imaging Integrated Components	
	Center for Advanced Sensors, Multisensors, and Sensor Networks	FOI (Swedish Defence Research Agency)
Metals	Casting Innovation Center	SweCast (Swedish Institute of Casting Technology)
	Center for Process Integration in Steelmaking	MEFOS (Metallurgical Research Institute)

World class cluster programmes for regional development - VINNVÄXT

Characteristics:

- Excellent research
- Long term (10 yrs funding)
- Strong involvements from both High technology SMEs and large companies
- Innovation support organisations
- Geographical focus
- Leadership (based onTriple Helix)
- Development of strong brand
- Attracting capital, people and business

More effective commercialisation and valorisation of research results from the universities

- *an entrepreneurial culture*, *an effective infrastructure* and *a more professional way* to commercialise research results from Universities (=The Key Actors programme)
- Funding projects in the *most early stage* of the commercialisation process (Verification program – cooperation with the Innovation Bridge)
- A national incubator program (run by the Innovation Bridge and funded by VINNOVA)

Key actors program

To enhance the professionalism of Universities regarding:

- cooperation between academic researchers, industry and other actors in the surrounding society
- knowledge exchange, incl. utilisation of knowledge and commercialisation of research results

The programme will strengthen the entrepreneurial culture, infrastructure, competence, processes and methods

Peer review performance assessment at all Universities

7 Universities including Linköping University are funded

Success Through Research

Impact Coatings is an example of a company that has improved their international competitiveness through R&D.

– As we are getting closer to market we realise that there are constantly new questions raising regarding the qualities of the material. Therefore it is essential to be able to work closely with universities and having access to external financing.

The product is thin film of the MAX-material that replaces gold as a contact material in electrical contacts. Cheaper than gold, but with far better characteristics.

Impact Study, Safety in Cars, Whiplash, 1985 - 2003

The R&D Program gave 5,5 Billion SEK in profit for society, investment 200 Million SEK!
Autoliv, world leading company for safety in cars!

Programs for Regional Research & Innovation Systems

VINNVÄXT (WIN Growth) a new program

Competitive Regions (by letting the regions compete)

Cooperative, Triple Helix and regional based, R&D

The VINNVÄXT (WIN-Growth) Program

Cooperative Triple Helix and regional based R&D

- Regional Growth Through Dynamic Innovation Systems in a focus area
- Competition between functional regions to get funding for cooperative R&D
- A focus area with growth potential from every competing region
- A world leading regional innovation system in the focus area is the goal
- Triple Helix leadership
  - University, excellent cooperative research
  - Industry cooperation, support and cluster
  - Regional Goverment & Public sector support

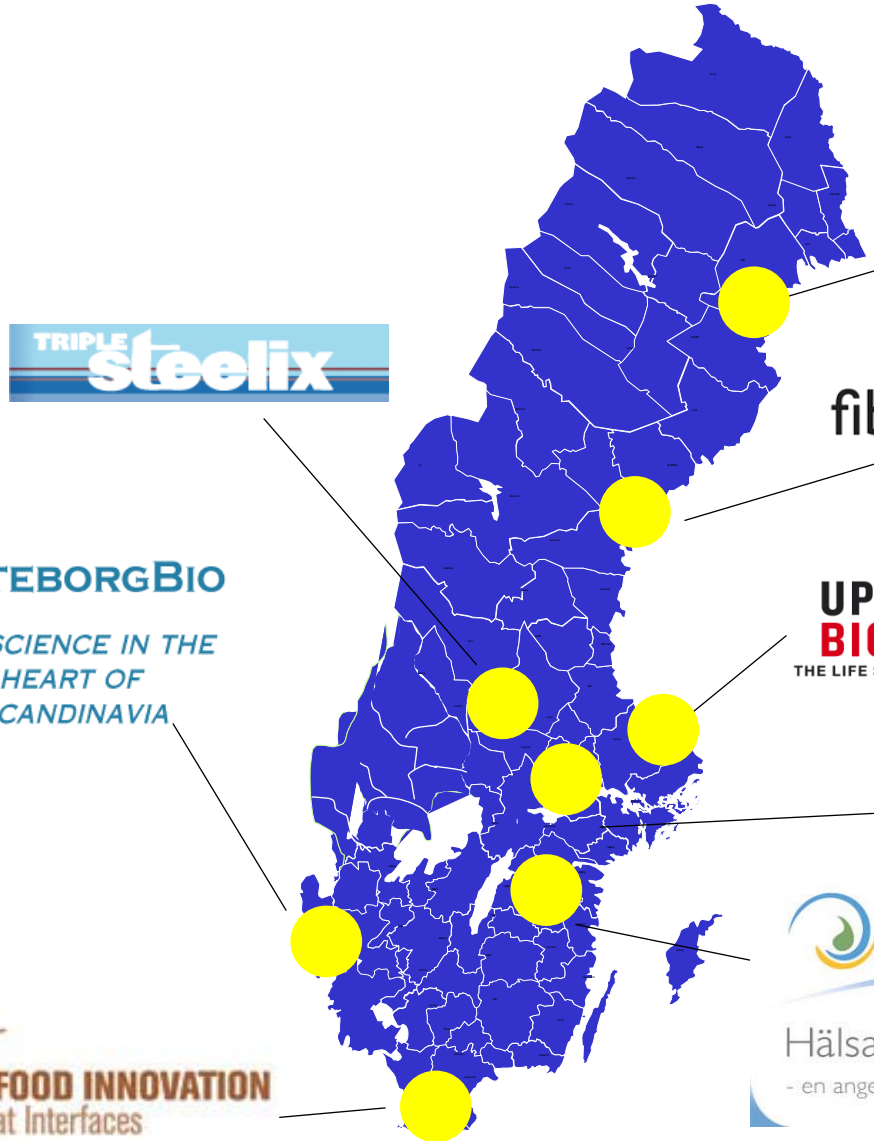
VINNVÄXT – Implementing "Triple Helix" on the regional level

- Triple Helix: Bringing together Business, Academia and the Public sector/Political world
- Own experience from the successful revitalization of the city of Karlskrona through the development of "Telecom City" in the 1990s

- 8 winners so far in two competitions
- 14-22 M€ over 10 years for each winner. Half from VINNOVA and half from companies and regional governments.

VINNOVA

8 winners, so far...



ProcessIT Innovations

TRIPLE Steelix

fiber optic valley

GÖTEBORGBIO
BIOSCIENCE IN THE HEART OF SCANDINAVIA

UPPSALA BIO
THE LIFE SCIENCE INITIATIVE

robot dalen
ROBOTICS VALLEY

Hälsans nya verktyg
- en angelägen östgötsk tillväxtsatsning

FOOD INNOVATION at Interfaces

Fundament of Growth