

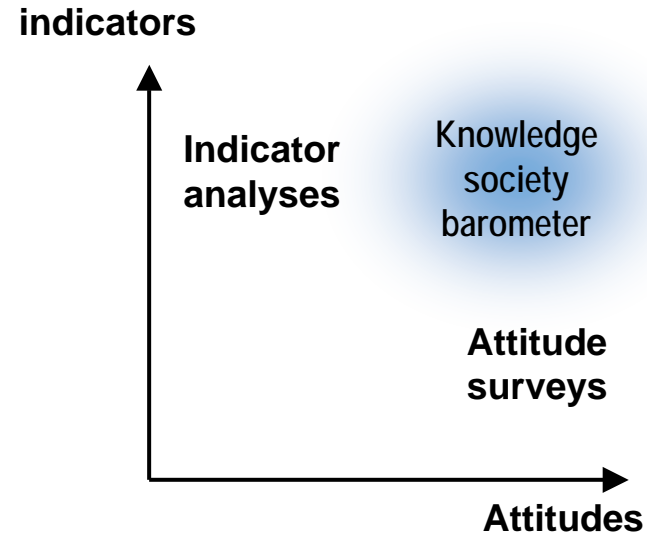


# KNOWLEDGE SOCIETY BAROMETER

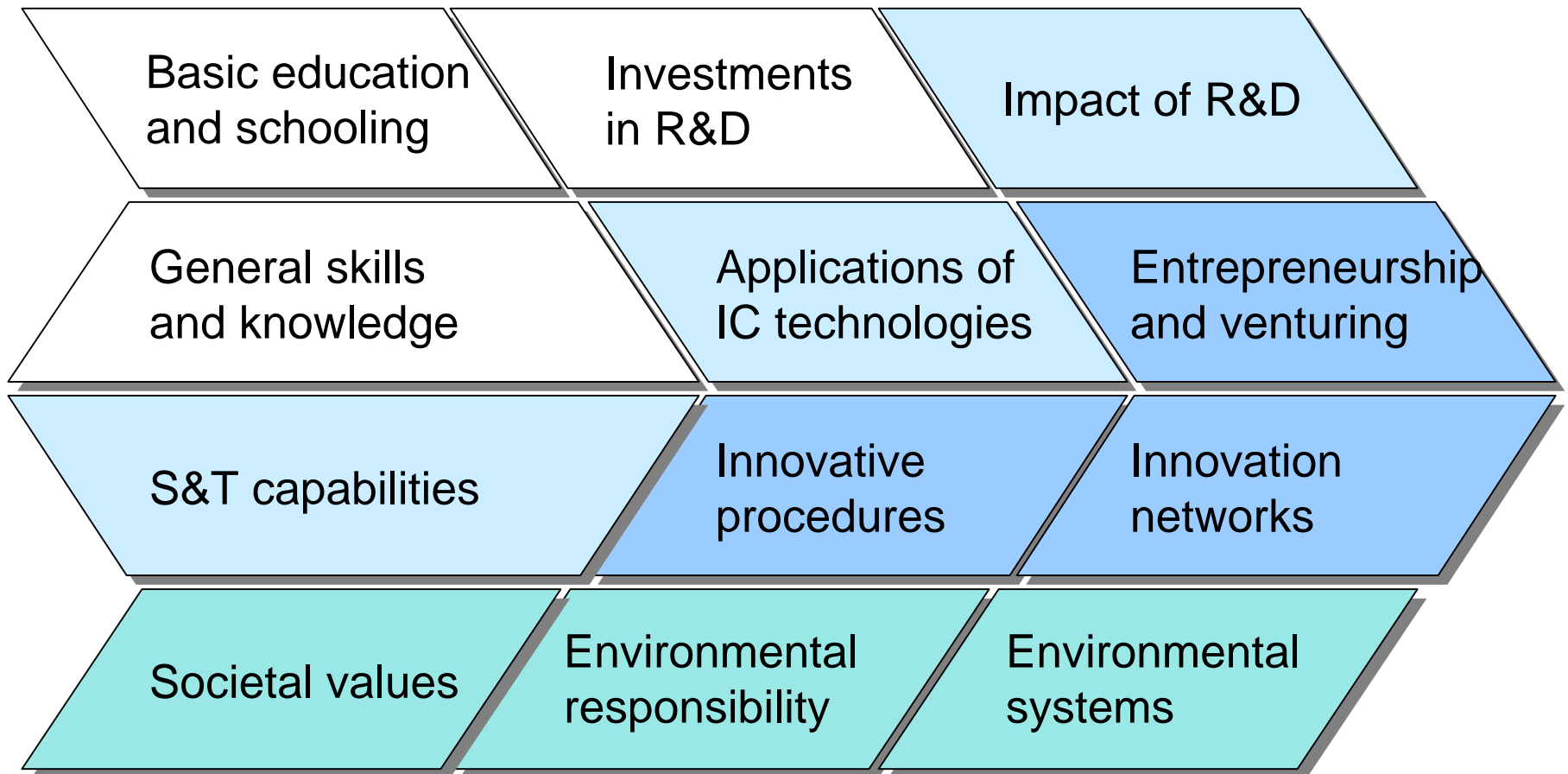
Mika Naumanen  
Technology Studies  
VTT Technical Research Centre of Finland

# Knowledge society barometer

- Economic survey -type of tool to assess a nation's inclination towards innovation and technological development
- Indicator and attitude survey parts
- Measure inclination towards information, knowledge and knowledge-value societies as well as sustainable development
- Attitude surveys focus on youngsters, TEK members and political and business decision makers



## Barometer model



# IMD WORLD COMPETITIVENESS YEARBOOK 2003

The most eagerly awaited rankings on the competitiveness of nations.

Breaking News for 2003!

Published since 1989

The United States and Finland have the most competitive economies in the world. New split rankings by population size show each one. These (France), Lom (China), and 2 determine the Institutes arour

THE

Group I:

Score 03	Co
100.0	USA
86.5	Aus
84.1	Can
72.9	Mak
69.8	Ger

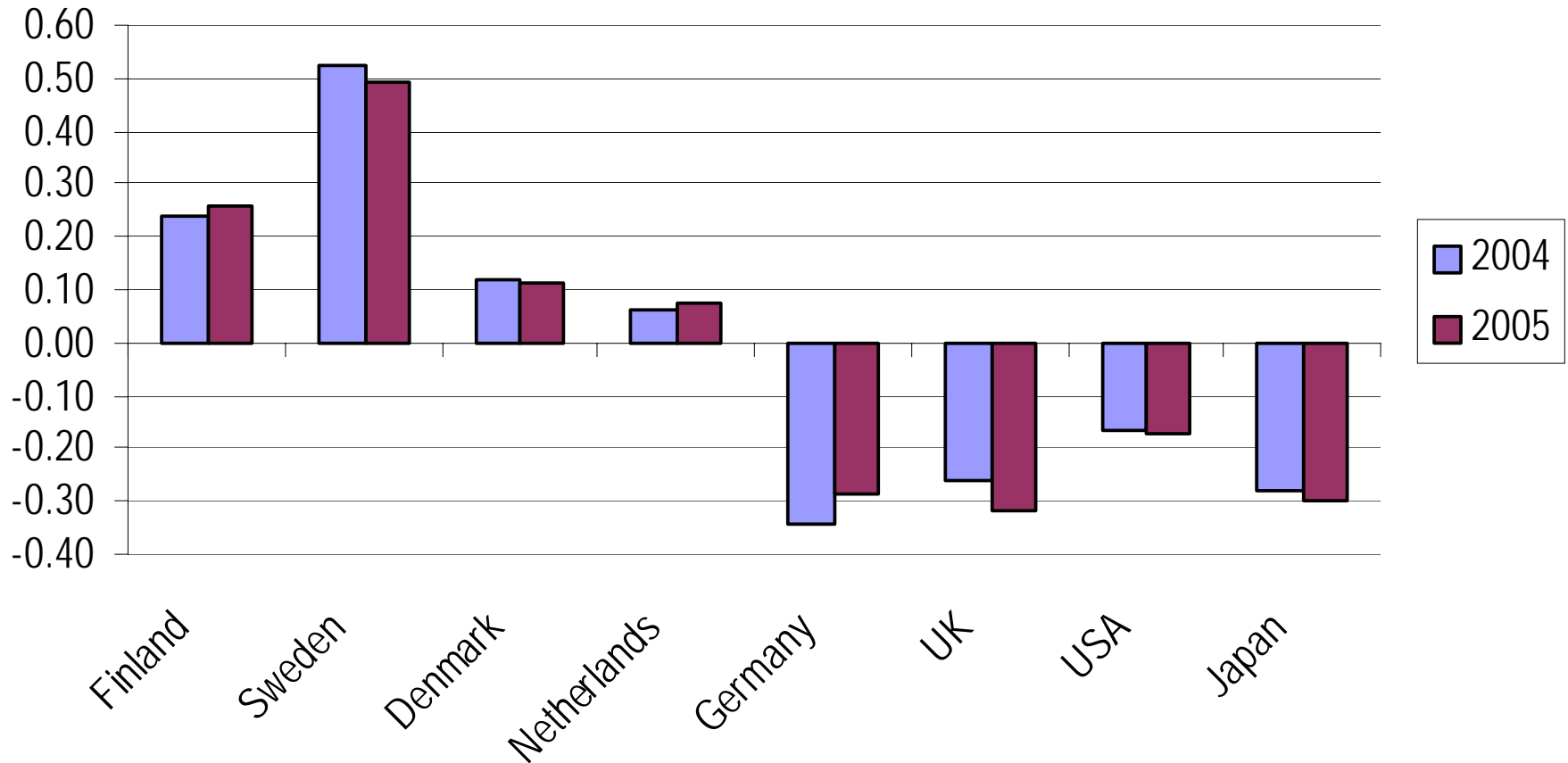
Country	GCI 2004 rank	GCI 2004 score	GCI 2003 rank <sup>a</sup>
Finland	1	5.96	1
United States	2	5.82	2
Sweden	3	5.72	3
Taiwan	4	5.69	5
Denmark	5	5.66	4
Norway	6	5.56	9
Singapore	7	5.56	6
Switzerland	8	5.49	7
Japan	9	5.48	11
Iceland	10	5.44	8
United Kingdom	11	5.30	15
Netherlands	12	5.30	12
Germany	13	5.28	13

GCI 2002 Rank

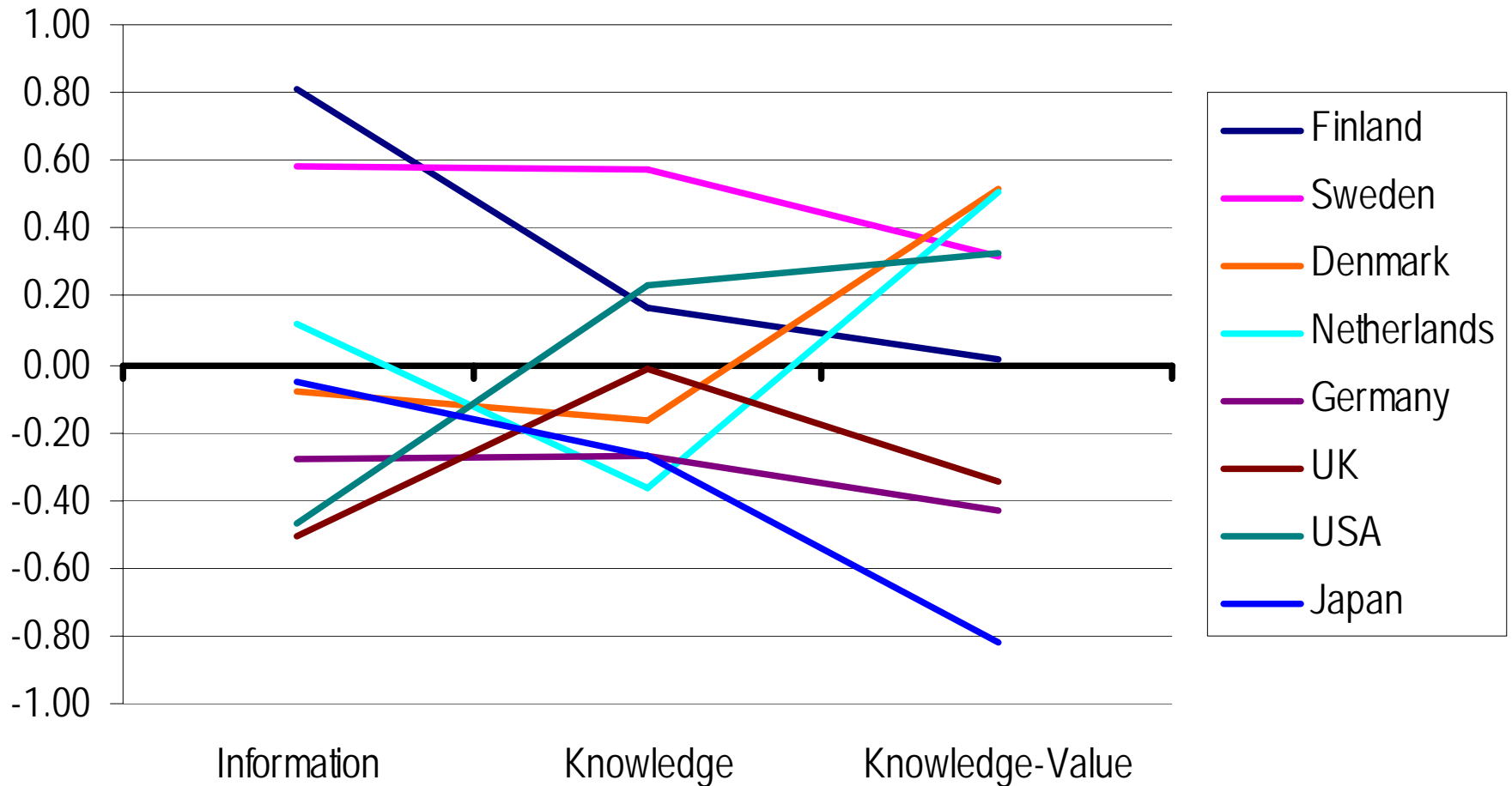
revised\*) (original)

France	14	14	12	12
Norway	9	9	8	9
Australia	10	10	10	7
Japan	11	11	16	13
Netherlands	12	12	13	15
Germany	13	13	14	14
New Zealand	14	14	15	16
United Kingdom	15	15	11	11

## Knowledge society indicators: Aggregate measure



## Nations wrt Information - Knowledge-Value Society Distinction



## From Information to Knowledge-Value Society

Basic education  
and schooling

Investments  
in R&D

General skills  
and knowledge

**Information  
Society**

Information production and capabilities development by investments in human capital and research and development

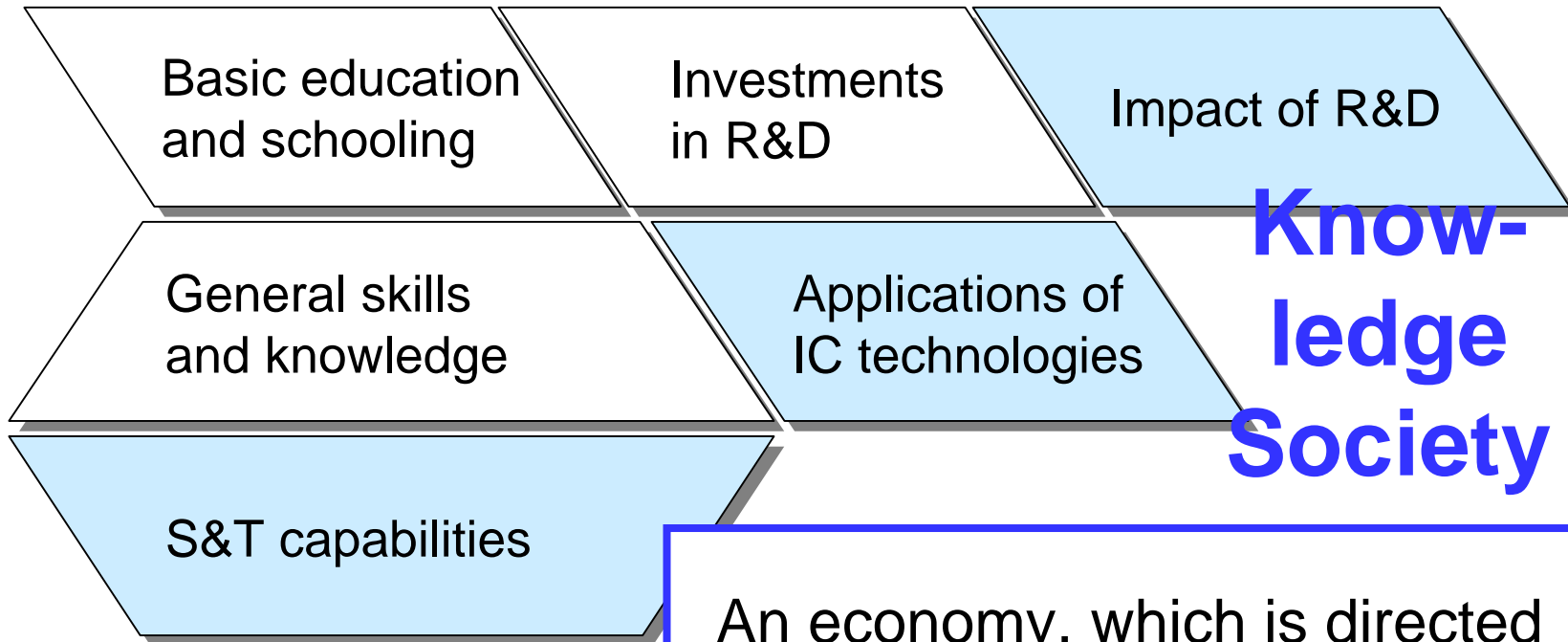


# Information Society

- *Basic education and Schooling*
  - Reading literacy in PISA
  - Mathematical literacy in PISA
  - Scientific literacy in PISA
- *General skills and knowledge*
  - International Adult Literacy Survey
    - Prose, Document, and Quantitative literacy
  - Public expenditure on education
  - Participation in life-long learning
- *Investment in R&D*
  - Public R&D expenditures (% GDP)
  - Business expenditure on R&D (% GDP)
  - Innovation expenditures as a percent of all manufacturing turnover or
  - Percentage of GERD financed by government



## From Information to Knowledge-Value Society



**Know-  
ledge  
Society**

An economy, which is directed by knowledge and where the generation and utilization of knowledge is essential for the creation of wealth



# Knowledge Society

- *Science and technology capabilities*
  - Population with a tertiary education
  - New graduates in science and engineering
  - New science and technology PhDs
  - Women in S&T
  - Employment in med-high and high-tech manufacturing
  - Employment in high-tech services
  - Number of researchers in relation to the total workforce
- *Applications of IC technologies*
  - ICT expenditure (% GDP)
  - Use of ICT
  - eCommerce
- *Scientific and Technological Productivity*

# Knowledge Society

## Applications of IC technologies



- *ICT expenditure as a percentage of GDP*
  - IT expenditure
  - Telecommunications expenditure
- *Use of ICT*
  - Level of households' Internet access
  - Share of individuals regularly using the Internet
  - Cellular phone subscribers
  - Percentage of enterprises having a web site
  - Price of telecommunications: local calls and national calls
  - Share of households having a broadband connection
  - Availability of government services online
- *eCommerce*
  - Internet users who have purchased online
  - Percentage of enterprises' total turnover from e-commerce
  - Percentage of enterprises having purchased on-line

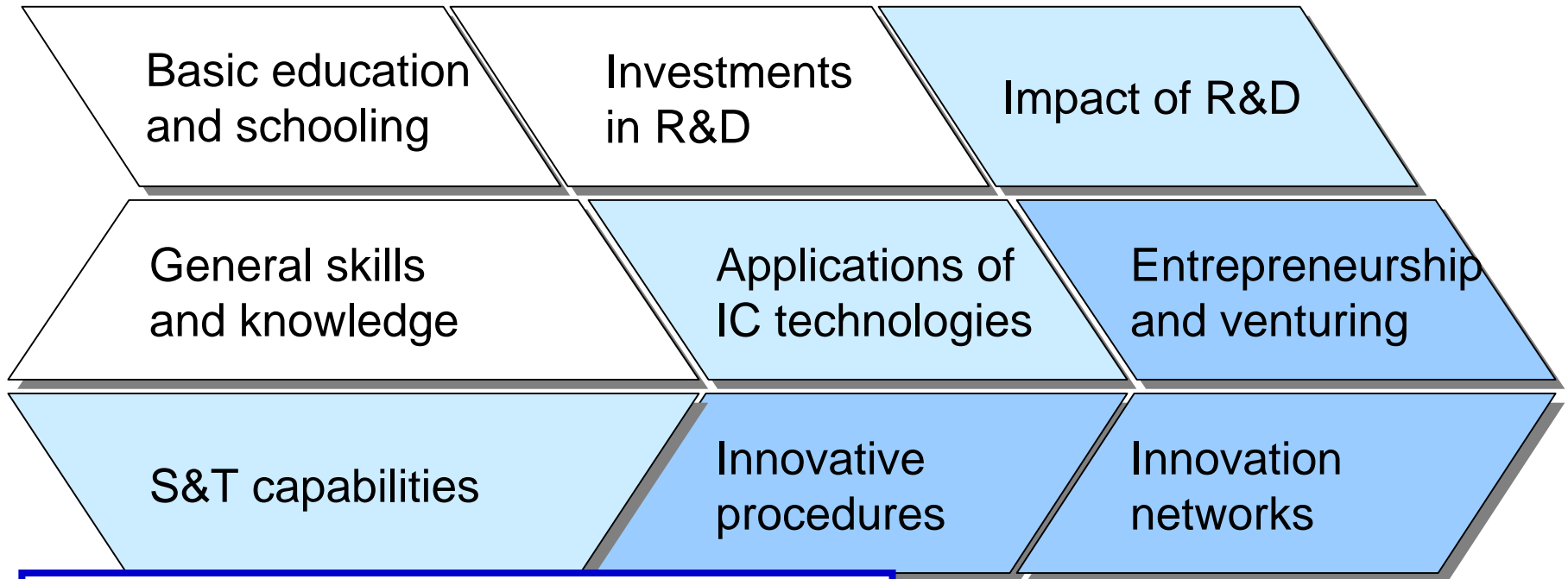


# Knowledge Society

## Scientific and Technological Productivity

- Number of patents at the European and US patent offices per capita
- Number of scientific publications
- Number of highly cited papers per capita
- Labor productivity
- Percent manufacturing value added in high technology industries
- High-tech and medium high-tech industries' share of total output
- Knowledge intensive services' share of total output
- Exports of high technology products as a share of total exports

## From Information to Knowledge-Value Society



Innovation, technological development, openness to new ideas and their proactive exploitation are the driving forces of this networked society

# Knowledge-Value Society



# Knowledge-Value Society

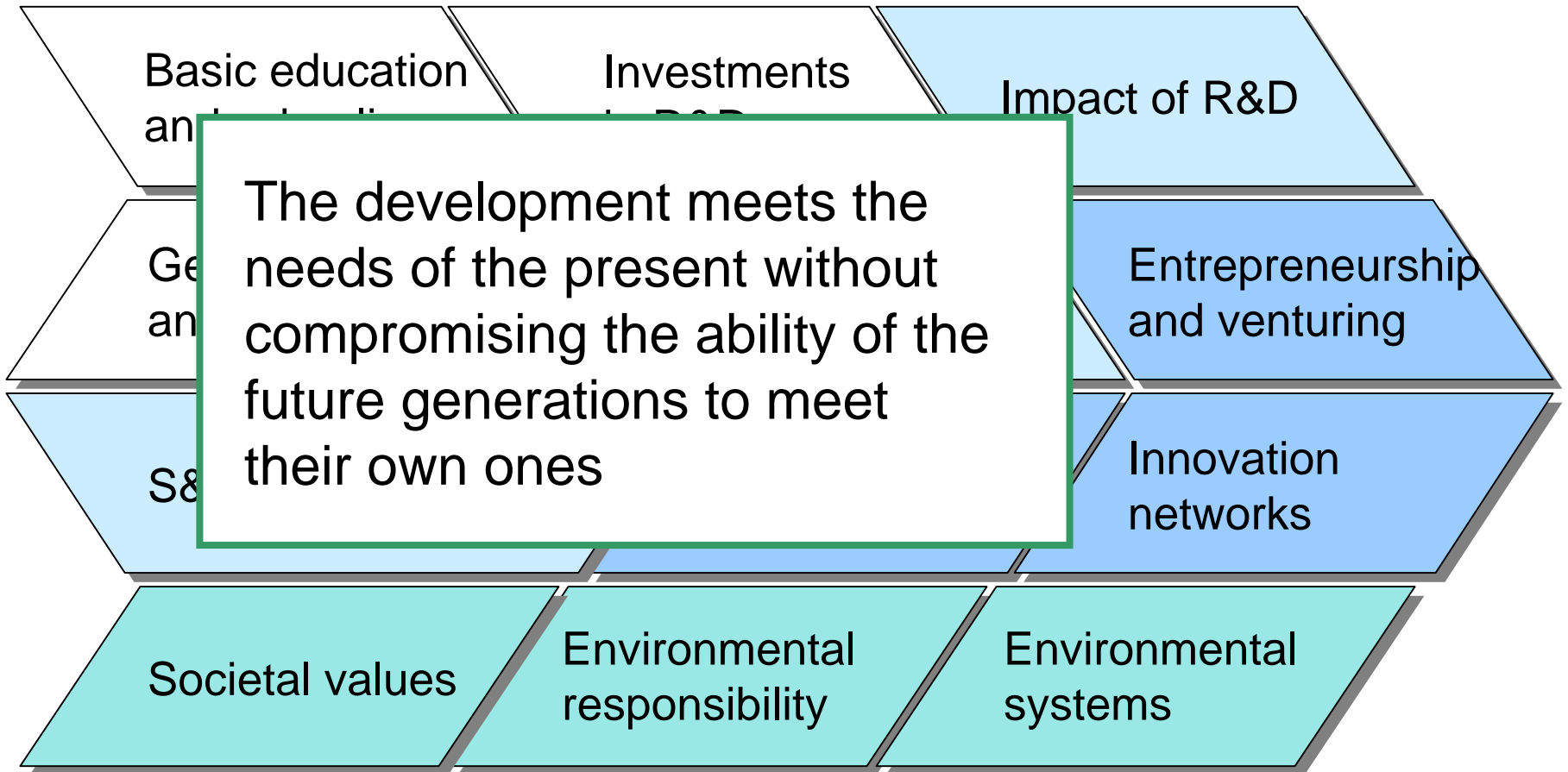
- *Adaptation of innovative procedures*
  - First round
    - Share of SMEs in publicly funded R&D executed by the business sector
    - SMEs innovating in-house (% of manufacturing SMEs)
    - Manufacturing SMEs involved in innovation cooperation
  - Now
    - Persons using the Internet in SMEs
    - Percentage of enterprises having website (SMEs)
    - Percentage of enterprises with broadband access (SMEs)
- *Entrepreneurship and venturing*
  - Entrepreneurial activity
  - Volume of venture capital investment in early stages
  - Business angels' activity
  - Birth rate of enterprises
  - Business investment



# Knowledge-Value Society

- *Innovation networks*
  - Foreign Direct Investment intensity
  - Direct investment stocks as % of GDP - Abroad and Inbound
  - Business Enterprise Expenditure on R&D (BERD) financed by abroad as % of GDP
  - Trade integration of goods
  - Trade integration of services
- was
- Percentage of innovative firms co-operating with other

## From Information to Knowledge-Value Society



# Sustainable Development





# Sustainable development

- *Societal values*
  - Life and health expectancies
  - Social protection expenditure
  - Employment
  - Equality between sexes
- *Environmental responsibility*
  - Private Sector Responsiveness: Investments on Environmental protection
  - Climate Change: Emission of Greenhouse gases
  - Eco-Efficiency: Energy intensity of the economy, Renewable energy sources
- *Environmental Systems*
  - Air Quality
  - Water Quality
  - Biodiversity

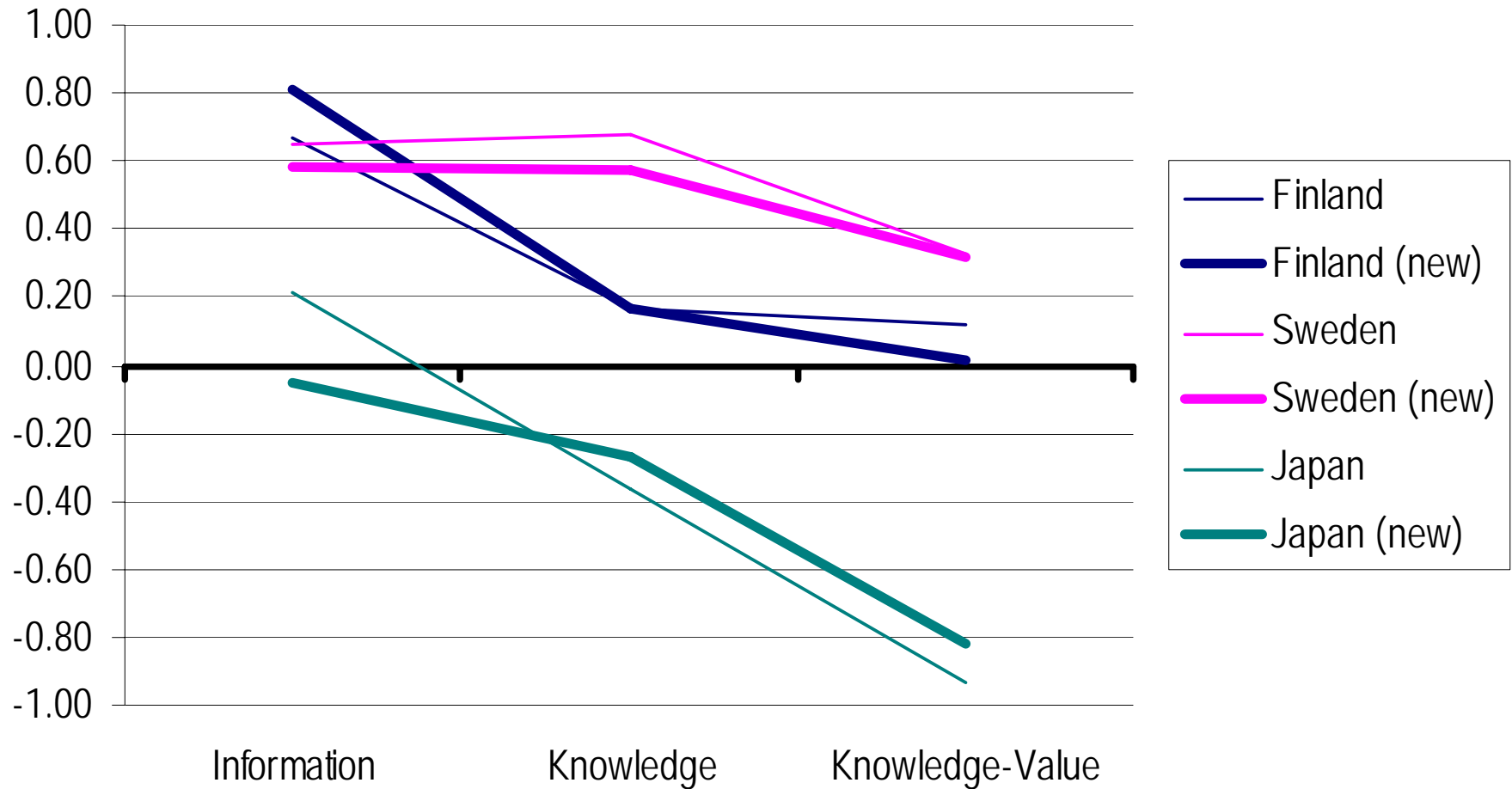
# Sustainable development

## Societal values



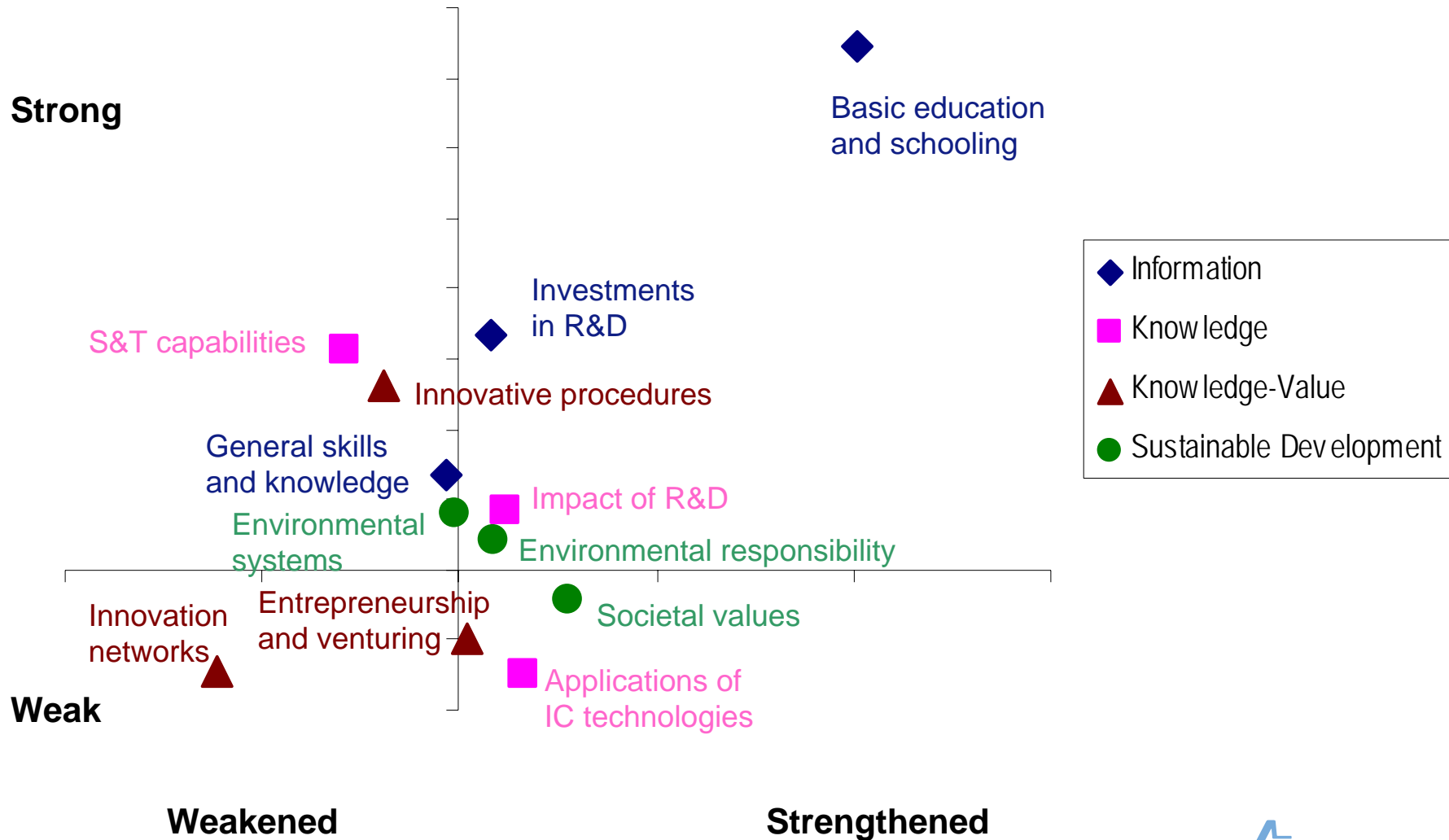
- *Life and health expectancies*
  - Life expectancy at birth, Men and Women
  - Disability-free life expectancy (at birth), Men and Women
- *Social protection expenditure*
  - Distribution of income
  - Risk of poverty rate before social transfers
  - Risk of poverty rate after social transfers
  - Regional cohesion
- *Employment*
  - Employment rate
  - Employment rate of older workers
  - Unemployment rate
  - Youth unemployment (15-24 years)
  - Long-term unemployment
  - Taxation of labor income
- *Equality between sexes*
  - Female share in national Parliaments
  - Female share in national Governments
  - Female employment rate
  - Gender pay gap

## Finland, Sweden and Japan have a negative trend

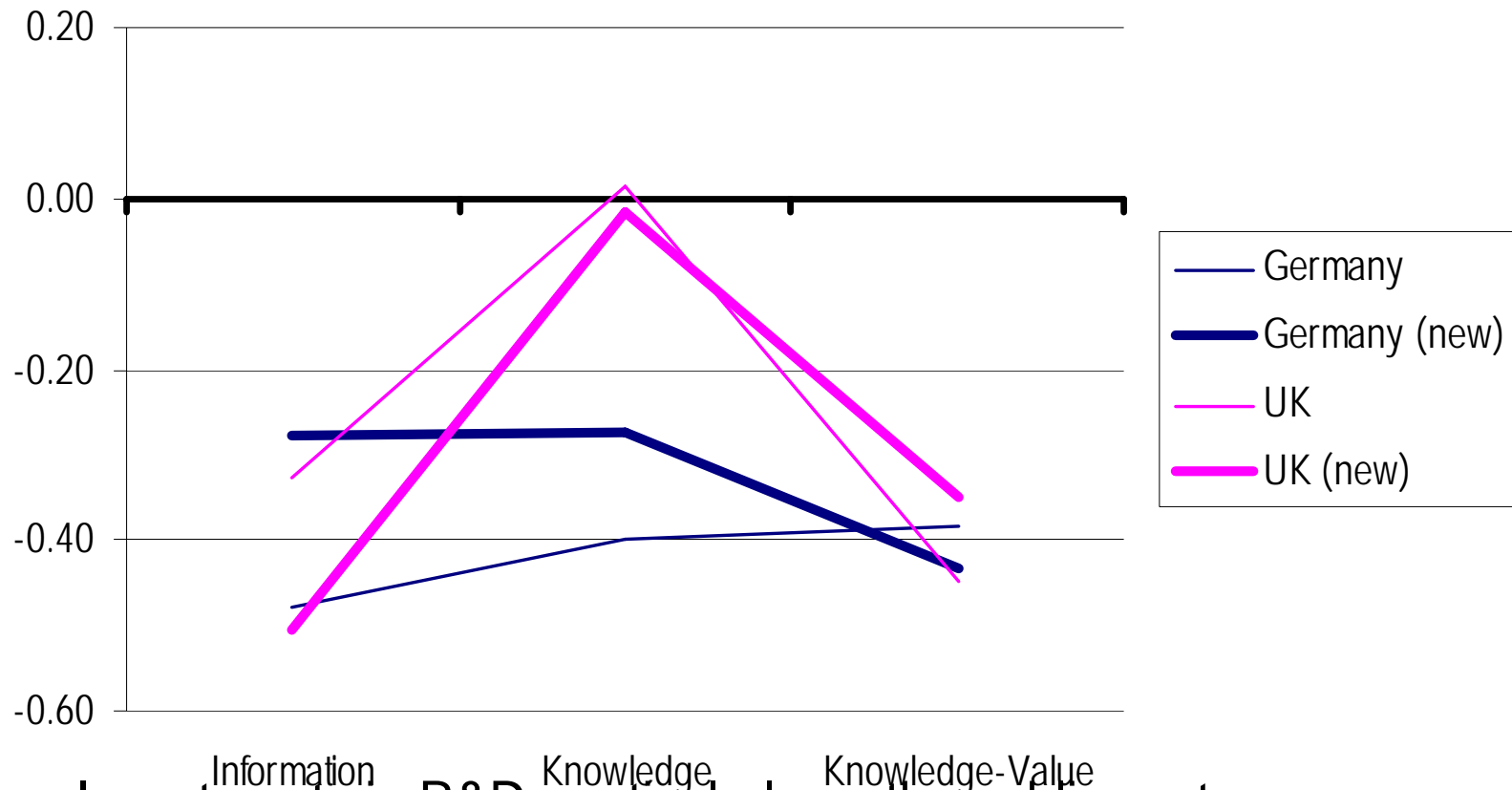


- Japan has declined in PISA measures

## Development of Finland's measures

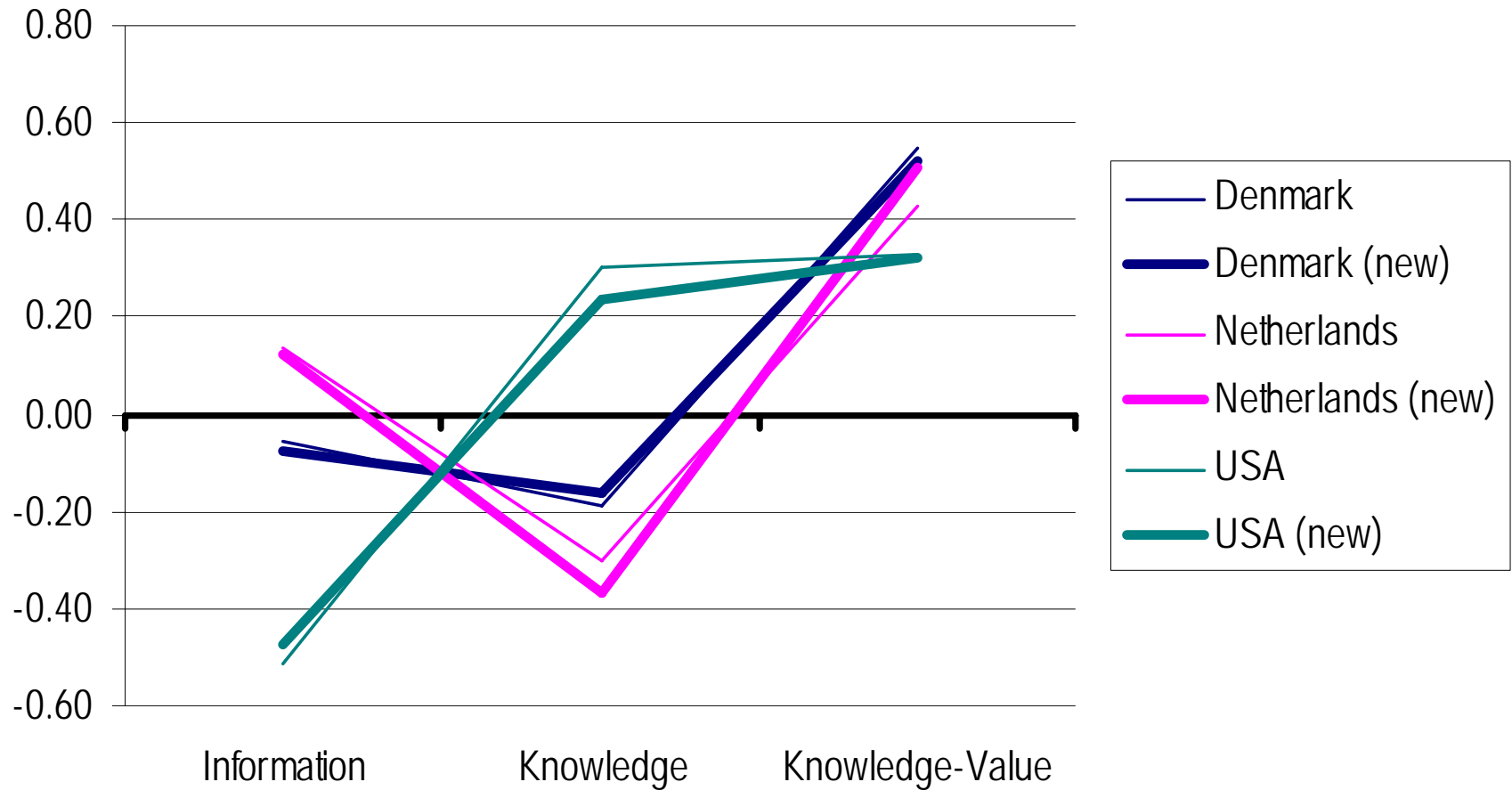


## Germany and UK perform badly

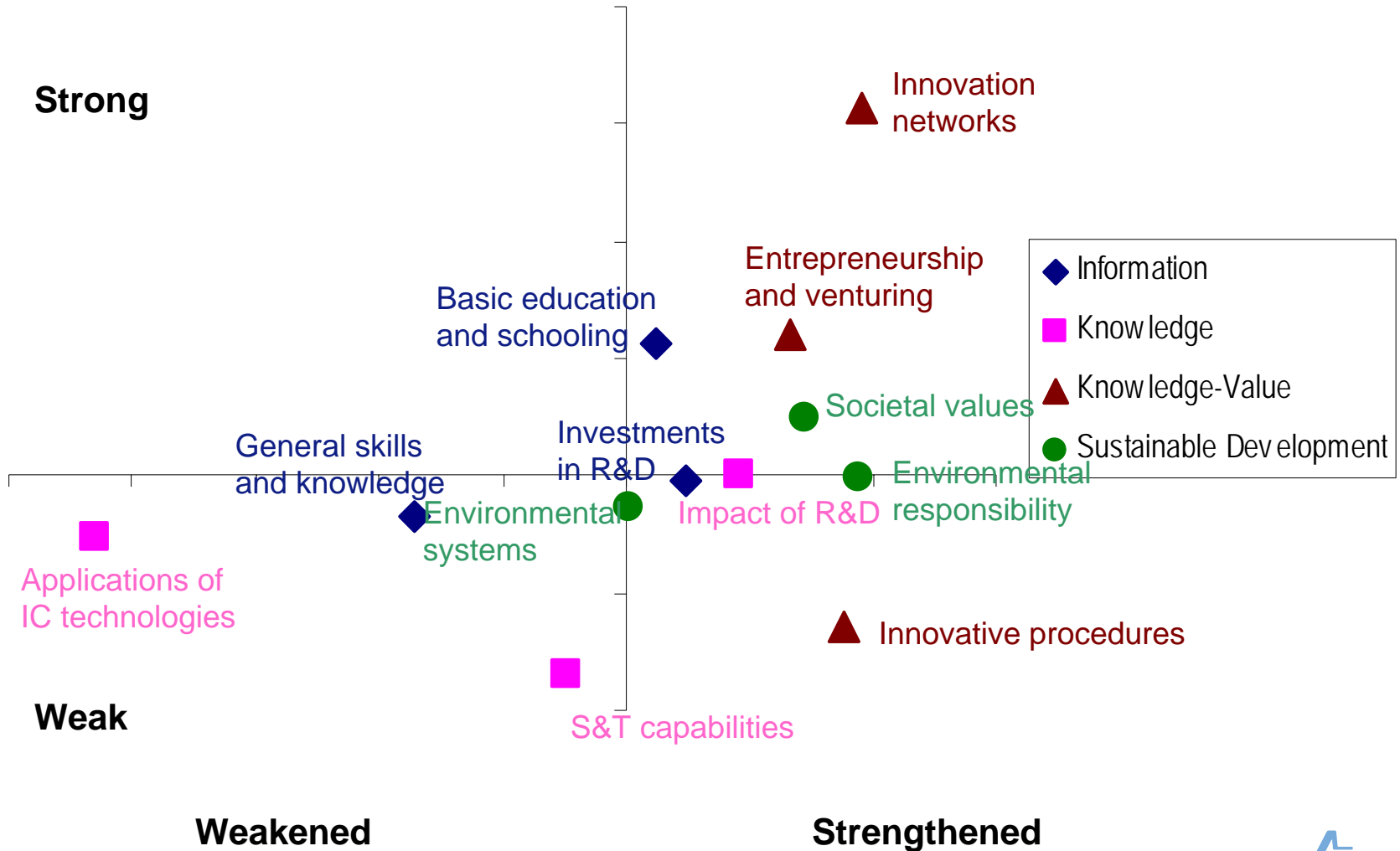


- Investments in R&D, particularly on the public sector, have been decreasing in the UK, Germany has improved in basic education and eCommerce

## Denmark, Netherlands and USA improve



## Development of Netherlands' measures



## EU level knowledge society barometer?

- Does the correlation between knowledge - knowledge-value society measures and GDP and unemployment occur just by accident, or is there something in it?
- Why does not Sweden outperform others in GDP and unemployment?
- How have the national differences in the barometer measures developed over time? Would the time series strengthen or weaken the discovered correlation?
- When comparing nations to each other, do the results in indicators part correlate with the results of the attitude surveys?
- Would the developments in the decision-maker attitudes shed light on the origins of national technology and innovation policies?



# Nations wrt Information - Knowledge-Value Society Distinction

