



# **SCIENCE, TECHNOLOGY AND INNOVATION INDICATORS IN THE OECD: NEXT STEPS**

Fred Gault  
Statistics Canada  
Chairman, OECD Working Party of National Experts on Science  
and Technology Indicators (NESTI)

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# Outline

- Challenges
- OECD Context
- Why Indicators?
- What Indicators?
- Telling the Story
- Implications for the OECD
- New Directions
- New or Improved Indicators
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- More Information

# Challenges

- To provide the Minister of S&T with indicators and policy advice comparable to that received by the Minister of Finance
- To present complex science, technology and innovation (STI) indicators in a way that is accessible to the policy community
- To develop the science of science policy

# OECD Context

- History of conceptual development leading to internationally comparable indicators
- Examples
  - R&D and the Frascati Family of Manuals
  - Innovation and the Oslo Manual
  - Information and Communication Technologies (ICTs) and the Guide to Measuring the Information Society
  - Biotechnology – OECD Biotechnology Statistics - 2006
  - Nanotechnology, ....

# Why Indicators?

- Monitoring
- Benchmarking
- Foresight
- Interest in accountability for spending of public funds leading to:
  - Evaluation of programmes and projects

# What Indicators?

- Activities
  - Knowledge creation (R&D, ...)
  - Invention (IP, spin offs, ...)
  - Innovation (products, processes, markets, practices)
  - Diffusion of knowledge, technology and practices
  - Human Resource development related to activities
- Linkages
  - Contracts, collaboration, co-publishing
  - Commercialization
  - Networks and network capital
  - Sources of knowledge, technologies and practices

# What Indicators?

- Outcomes
    - Market share, skilled employment, profitability, ...
  - Impacts
    - Wireless telephony and computing, with broadband change lives and industries
    - Genomics and proteomics change healthcare delivery
    - Need case studies as well as indicators
- Move emphasis from Activities towards Impacts**
- But, keep activities

# Telling the Story

- Use STI indicators to tell the story to the policy community
- Requires dialogue between indicator producers and the users
- Use STI indicators to communicate the 'big picture' to civil society
- How can this happen?

# Implications for the OECD

- **Co-ordination** of indicator development across directorates
- **Focus** on what is needed to 'tell the story' or 'communicate the big picture'
- **Use of existing work** in OECD and other international organizations
- Not a radical outcome of Blue Sky II but
  - Not easy to accomplish

# New Directions

- New or Improved Indicators
  - Cross-Cutting Indicators
  - Activities
  - Linkages
  - Outcomes
  - Impacts
- Analysis
- Institutions producing statistics
- Framework conditions
- Development and Developing Countries

# New or Improved Indicators

## ■ Cross-Cutting Indicators

- Human Resources

- Institutions

- Education, training and life-long learning
    - Recovery from learning failures
    - Immigration and mobility
    - ...

- People

- Stocks and flows classified by:
      - Industry, occupation, level of education, field of study, ...
    - Build on OECD work: PISA, CDH, Ad Hoc Group on Steering and Funding of Research Institutions, Global Science Forum, ...

# New or Improved Indicators

- Cross-Cutting Indicators
  - Classification and Guidelines
    - ISIC, CPC, MDGs
  - Firm Characteristics
    - Size, location, and country of control
  - Sustainability
    - Is the activity sustainable?
    - What are the indicators?

# New or Improved Indicators

## ■ Activities

- R&D and globalization
- Invention and open innovation – IP implications
- Innovation
  - Combine indicators for comparability
  - Role of design and management practices
- Diffusion
  - ICTs, Bio, Nano, Sustainable Energy, Grid computing, Health technologies, ...

# New or Improved Indicators

- Linkages, Outcomes and Impacts
- Analysis
  - Co-ordinate databases in OECD and other international organizations
  - Work with micro data as well as macro data
  - Micro economic simulation as well as econometric models
    - Engage the policy community in scenario analysis
  - Use many techniques to 'tell the story'

# New or Improved Indicators

- Producers of Statistics
  - Statistical offices, central banks, ministries, research institutes, ...
  - Facilitated access to micro data
  - Linking of data sets of survey or administrative data to support better analysis and to keep reporting burden low
  - Managing the revision of classification systems
  - ...

# New or Improved Indicators

- Framework Conditions
  - Incorporate measures of
    - Regulation, tax burdens/incentives, provision of venture capital, highly skilled people, contract law, consumer protection, IP management, ...
- Development and Developing Countries
  - Share the knowledge of indicator development and use
  - Help build the absorptive capacity so the knowledge can be used.

# Summary

- High-Level
  - Build capacity to 'tell the story'
  - Move from activity towards impact measures
  - Co-ordinate, focus and synthesize
  - Develop the science of science policy
- Cross-Cutting
  - Human resource indicators
  - Classification and Guidelines and Firm Characteristics
  - Sustainability
- Specific Issues
  - See the paper or the Blue Sky Website

# More Information

- Blue Sky II Website

- <http://www.statcan.ca/english/conferences/sciencetech2005/abstracts.htm>
- Programme, Abstracts, and link to the OECD site for papers

- Background paper

- Selected outcomes of the Blue Sky Forum

- Fred.Gault@statcan.ca