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An overview to science, technology and innovation
statistics
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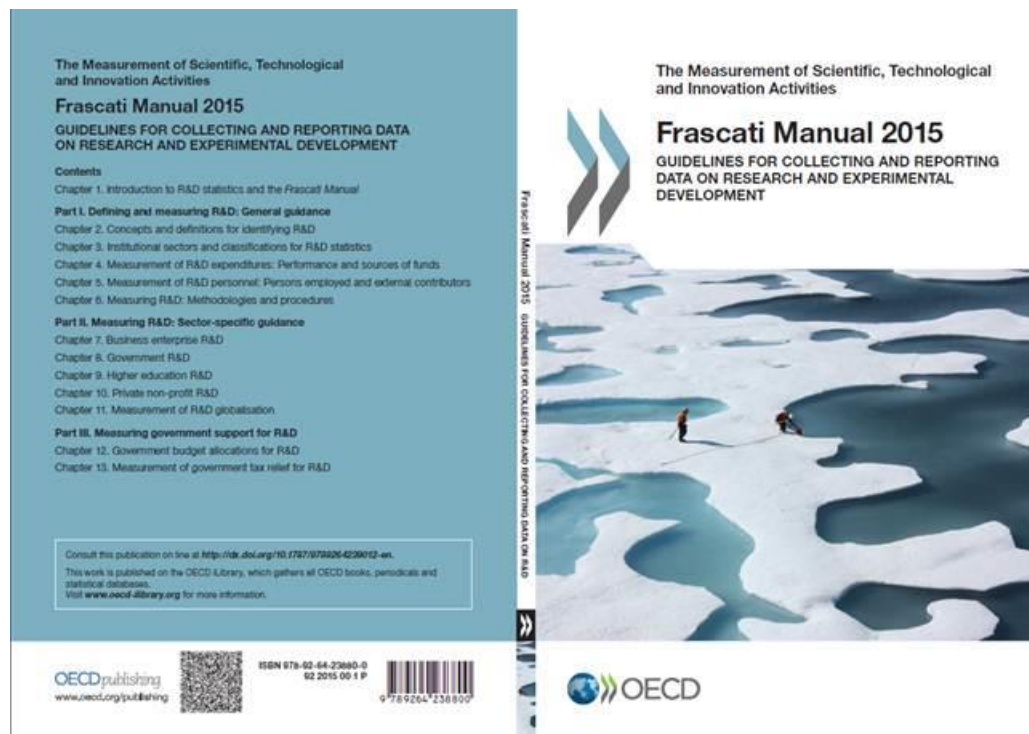
International context

- International origins: Frascati manual by the OECD in 1960's, R&D statistics
- Innovation surveys from early 1990's
- Active international co-operation in harmonisation, Unesco, OECD / NESTI, regional organisations (Eurostat, Nordic countries for Finland)
- Finland and other members of the EU, a common regulatory framework, co-operation in the context of Eurostat
- A lot of national and international policy interest, e. g. EU/Lisbon target 3 % R&D/GDP



Research and development (R&D) statistics

Brand new edition of the R&D manual released now in October



Concept of R&D

Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.

Basic research

Applied research

Experimental
development

Sectors of the R&D statistics

- Business enterprise (BES)
- Public/government sector (GOV)
- Private non-profit (PNP)
- Higher education (HES)
 - universities
 - polytechnics
 - university clinics

Variables and classifications (I)

— R&D personnel:

- Number of personnel (HC) by sex, qualification and occupation
- Full-time equivalent (FTE, time spent on R&D work) by qualification and occupation

Qualification:

ISCED 2011, International Standard Classification of Education (Unesco): level 8: doctorates; 7: master level university degree etc.

Occupation: researchers; (technicians and other equivalent staff; other supporting staff)

Variables and classifications (II)

- Intramural R&D expenditure

by cost category: wages and salaries; acquired services; other current costs; investments

by source of funds: own funds, government/public funds, private sector, abroad

by type of R&D: basic research, applied research, experimental development

- Extramural R&D expenditure

R&D acquired from outside (universities, enterprises, research institutes)

Variables and classifications (III)

- Business enterprise sector by *industry*: NACE rev.2 classification, used in the European Union. Correspondence to ISIC
- *Product field* (based on NACE)
- Public sector and higher education by OECD *field of science* classification
- Regional data on the main variables

R&D funding in the government budget

- GBARD, Government Budget Allocations for R&D
- Survey and analysis of the state budget book
- By *socio-economic objective* (such as agriculture, industry, defense, general advancement of knowledge)
- Institutional/project funding
- International flows of R&D funds
- R&D funding and its realization as R&D expenditure

Innovation surveys



Innovation surveys by EU/Statistics Finland

- Experimental/piloting late 1980's
- Broader view than R&D statistics
- EU: Community Innovation Survey (CIS), Finland has participated since 1996, harmonised production in each EU member state
- U.S, Japan, Australia somewhat in line with CIS, but own emphasizes as well
- Every second year

Types of innovation

- Product (good or service) innovation
- Process innovation
(ongoing or abandoned projects aimed at products or processes)
- Organisational innovation
- Marketing innovation

Concept of innovation

- Joint OECD/Eurostat Oslo Manual
- *An innovation is the introduction of a new or significantly improved product, process, organisational method, or marketing method by your enterprise. The innovation must be new to your enterprise, although it could have been originally developed by other enterprises*
- Three years reference period, e.g. 2010-2012



Other fields of STI statistics

- Human resources in science and technology, HRST, ‘Canberra manual’
 - based on the register data of Statistics Finland
 - register of degrees
 - linked employer – employee data, i.e. Firms and individuals
 - comprehensive registers are not common in EU/world, Labour force surveys used
- Patents, ‘Patent manual’
 - data from National Board of Patents and Registration and Patstat database (EPO, European Patent Office)
 - patent data linked to enterprise level data at StatFin

- Foreign trade in the high-technology products
 - nation's success in the international science and technology-intensive markets
 - export/import balance
- Bibliometrics, quantitative analysis of scientific publishing
 - number of publications and citations, co-authorships by field of science, for example
 - analysis are usually conducted by research institutes or research councils
- Specific technology indicators
 - OECD: guidelines on the biotechnology and nanotechnology indicators

Useful links

- <http://www.uis.unesco.org/ScienceTechnology/Pages/default.aspx>
- <http://www.oecd.org/science/msti.htm>
- http://tilastokeskus.fi/til/ttt_en.html

The background of the slide is a complex, abstract geometric pattern. It features a variety of overlapping shapes, including circles, triangles, and polygons, in different shades of blue (from light sky blue to deep navy) and white. The pattern has a layered, almost crystalline appearance, with some areas appearing more prominent than others due to the overlapping. The overall effect is modern and dynamic.

Thank you for your attention !

Statistics Finland 