Measuring R&D in Estonia

Aavo Heinlo

Principal Analyst Statistics Estonia





Milestones Methodology Survey Non-profit institutions Enterprises Results



- 1993 Frascati-type survey for non-profit institutions introduced Problems: identification of units, respondents understanding, response rates
- 1996 satisfactory quality reached and from that year data is available in public database
- 1998 survey for enterprise sector introduced (without banks and insurance firms)

Same problems as above, but data published

2003 — financial and insurance activities added, EU level comparability achieved

This addition caused break in series — 8% for GERD and even quarter for BERD. For comparison: in 2010 banks and insurance companies input was only 5% for GERD and 10% for BERD



Proposed Standard Practice for Surveys on Research and Experimental Development (OECD) First edition — 1963 Fifth edition — 1993 Sixth edition — 2002

EU COMMISSION REGULATION (EC) No 753/2004 The concepts and definitions related to the statistics defined in this section are laid down in the Frascati Manual.

OECD R&D statistics jubilee – 50



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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 knowledge **to devise** new applications.

Nobody can take hold of limitless



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ES_____ R&D: Where?

- Scientific institutes
- Higher education institutions (universities + some professional higher education institutions)
- Museums, archives, hospitals (non-routine activities, pre-license clinical trials of drugs), zoo, botanic gardens, national parks
- Private non-profit institutions (professional associations; associations dealing with nature preservation, social research etc.)
- Business enterprises (incl. financial institutions)

ES R&D survey: questionnaire

Two kinds: one for statistical units in non-profit institutional sectors (higher education, government and private non-profit), another for units in business enterprise sector.

Differences:

Data by	Non-profit units	Enterprises
field of science	Yes	No
socio-economic objective	Yes	No
product field	No	Yes

R&D survey: deviations from Frascati

- Frascati recommends that some types of PNP organisations should be excluded from sector if they are mainly serving or financed by government, enterprises or higher education sector. Some countries put all PNP units to other sectors. We do not exclude any.
- Frascati recommends to collect data from universities by smaller statistical units. We do not. There is only 4 "big" multi-science universities. They have R&D offices that do intra-university data collecting. No need for SO to duplicate.

R&D survey: frame for non-profit units

This part of survey is total and the extensive list of potential R&D performers is based on information from:

- earlier surveys,
- the Estonian Science and Education Information Systems,
- administrative sources (grants, foundations, agencies).

To eliminate non-performers for concrete year some checks by phone are done to minimise the workload for respondents and SO.

2011 survey by Sector	Obliged to	Performed	Expenditure
	respond	R&D	share
Higher education	37	24	76%
Government	58	39	22%
Private non-profit (PNP)	82	26	2%

R&D survey: frame for enterprises

There exist analogous list of potential R&D performers that is continuously updated using various sources of information incl. yearly reports, data from foundations, media.

- To this list we add all high-tech and bio-tech firms, knowledge-intensive service firms (incl. R&D, banks).
- In previous years we used to add a random sample of new-born firms, but their contribution even after expansion procedure was about 1%. So, this approach was abolished. Less work for statisticians and less burden for firms.

Expert sample and R&D performers



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US National Science Foundation

"If the primary objective is to make further technical improvements on the product or process, then the work comes within the definition of R&D. If, on the other hand, the product, process or approach is substantially set and the primary objective is to develop markets, to do pre-production planning or to get a production or control system working smoothly, the work is no longer R&D."

COSCI

Once upon a time ...









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R&D survey: contacting respondents

- Right person (not an accountant)
- Preparedness (earlier data, Website information, yearly reports)
- Confident relationship
- Main mean to educate respondents (concepts, estimation procedures)
- Guarantee of quality



Main R&D indicator — the R&D intensity equals GERD/GDP, where GERD is total intramural expenditure on R&D.

Correspondingly BERD is total intramural expenditure on R&D in the business enterprise sector.

Data for 2011:

Country	R&D intensity	BERD/GERD
Finland	3.78%	71%
Estonia	2.41%	63%
Poland	0.77%	30%
EU27	2.03%	62%





R&D intensity (ratio to GDP)



Annual growth rate of GERD, 2000–2009



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Share of high-tech export in Estonian export



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Innovation expenditure to turnover ratio of technologically innovative enterprises



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Experts view and Frascati

The construction and operation of a pilot plant is a part of R&D as long as the principal purposes are to obtain experience and to compile engineering and to be used in designing special equipment and structures required by a new process.

As soon as this experimental phase is over, a pilot plant switches to operating as a normal commercial production unit, the activity can no longer be considered R&D.

It is very important to look closely at the nature of very costly pilot plants. The construction of such plants should not be wholly credited to R&D. Only the additional costs due to the prototype nature of these products should be attributed to R&D.

Consultations with OECD and Eurostat experts confirmed the rightness of our decision to include the expenditure on new oil plants in R&D.

Estonian R&D&I Strategy

"Knowledge-based Estonia" 2002–2006 and 2007–2013 Objectives:

- competitive quality and increased intensity of R&D
- innovative enterprises creating new value in the global economy
- innovation friendly society aimed at long-term development

Measures:

- development of human capital
- organising the public sector R&D&I more efficiently
- policy-making aimed at long-term development of Estonia In practice:
- investments in R&D infrastructure, research centres, technology parks
- support for productivity and high added value export
- support for cooperation



Estonian Statistics — S&T&I http://www.stat.ee/science-technology-innovation

Estonian R&D&I strategy 2007–2013 http://www.hm.ee/index.php?0&popup=download&id=6175

Eurostat S&T&I statistics

http://epp.eurostat.ec.europa.eu/portal/page/portal/science_technology_in novation/introduction

OECD S&T&I statistics http://stats.oecd.org/



Thanks for attention!

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