

Instructions for

# **Research and development in international enterprises**



## **Introduction**

**Your contribution is important.** A high response rate is necessary for the statistics to provide a fair and accurate description of the R&D conducted by Swedish international enterprises.

### **Aim of the survey**

The survey is carried out on behalf of the Swedish Agency for Growth Policy Analysis. The aim is to describe large Swedish international enterprises' investments in intramural research and development in Sweden and abroad.

### **Dissemination of results**

Results from the survey are published on Swedish Agency for Growth Policy Analysis' website:

[R&D in international enterprises - Tillväxtanalys \(tillvaxtanalys.se\)](http://tillvaxtanalys.se)

# Definitions and explanations

## **Research and experimental development (R&D)<sup>1</sup>**

Research and experimental development comprise creative and systematic work undertaken in order to increase the stock of knowledge and to devise new applications of available knowledge in all fields of science.

For an activity to be defined as an R&D activity, it must be:

- **Novel:** R&D activities undertaken in order to generate new knowledge and to devise new applications of available knowledge.
- **Creative:** R&D activities based on original concepts or hypotheses.
- **Uncertain:** The final outcome of R&D activities is generally uncertain. There is also uncertainty related to the cost or time needed to achieve the expected results.
- **Systematic:** R&D activities are performed systematically and are planned and budgeted.
- **Transferable and/or reproducible:** R&D activities should lead to results that could be possibly transferable and/or reproducible.

## **Intramural R&D or extramural R&D**

**Intramural R&D** refers to all activities that satisfy the definition of R&D activities and are performed by the enterprise's employees or by consultants in a R&D project led by your enterprise. R&D performed for another party (contract research) is considered intramural R&D.

**Extramural R&D** refers to all activities that satisfy the definition of R&D activities and is performed by another party in Sweden or abroad, funded by your enterprise. Extramural R&D includes funding to other R&D performers both where you reserve the rights to the results (exchanges) and where you do not (transfers), for example any contributions made to R&D at universities or other institutions of higher education.

**In the survey, only information about the enterprise group's intramural R&D activities are requested.**

## **Subsidiary company**

Subsidiary companies refer to enterprises that are controlled directly or indirectly by the Swedish parent enterprise. Control refers to holdings of at least 50.1 percent of the voting power.

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<sup>1</sup> OECD, *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development* (FM15), 2015, p. 44.

## **Types of R&D**

There are three types of R&D:

**Basic research** is the systematic work to acquire new knowledge or ideas without any particular application or use in view.

**Applied research** is the systematic work to acquire new knowledge or ideas with a particular application or use in view.

**Experimental development** is the systematic experimental work that draws on research results, scientific knowledge or new ideas to produce new materials, goods, services, processes, systems, methods or significant improvements of already existing ones.

R&D can be conducted in any part of an enterprise, and it is independent of the level of education of the personnel involved. The fact that a project is located in an R&D unit or department does not automatically make it an R&D project. R&D can be conducted by personnel without a doctoral degree.

## **Distinguishing between R&D and non-R&D activities**

It can be difficult to distinguish between R&D activities and other activities in an enterprise. Further difficulties exist in clearly distinguishing between R&D and innovation, where R&D is often seen as a component of innovation meanwhile innovation is not necessarily R&D.

The fundamental criterion for distinguishing R&D from related activities is the presence in R&D **of an appreciable element of novelty and the resolution of scientific and/or technological uncertainty**, i.e. when the solution to a problem is not readily apparent to someone familiar with the basic stock of common knowledge and techniques. The uncertainty should also apply to the resources needed.

Normal engineering or examination that follows established procedures are not considered to be R&D, even if conducted by researchers with a doctoral degree. The introduction of new methods, systems or processes previously used in the same manner by other organisations is not R&D, it is however innovation.

In serial production the development and construction of the prototype is R&D work, but the production of the first series is not, even if some adjustment in the production process is needed. Verifying the results of an existing product or process can be R&D if, for example, problems arise which need to be solved by further research.

## **When is product development R&D?**

Product development is the process of turning an idea or a need into a new or improved product (good or service). In order for the product development process to constitute R&D there has to be an appreciable element of novelty, even to someone familiar with the basic stock of common knowledge and techniques for the area concerned. There should also exist an element of uncertainty about the results of the product development, which could be negative. The product development activities should no longer count as R&D when the criteria for R&D (novel, creative, uncertain, systematic, and transferable/reproducible) are no longer met.

## **When is software development R&D?**

For software development project to be classified as R&D, its completion must be dependent on a scientific and/or technological advance, and the aim of the project must be the systematic resolution of a scientific and/or technological uncertainty.

R&D associated with software as an end product or software embedded in an end product could be classified as R&D when the R&D criteria apply. Software development is an integral part of many projects that in themselves have no element of R&D. The software development component of such projects, however, may be classified as R&D if it leads to an advance in the area of computer software. Therefore, an upgrade, addition or change to an existing program or system may be classified as R&D if it embodies scientific and/or technological advances that result in an increase in the stock of knowledge. The use of software for a new application or purpose does not by itself constitute an advance.

Examples of when software development **is** R&D:

- The development of new operating systems or languages.
- The design and implementation of new search engines based on original technologies.
- The effort to resolve conflicts within hardware or software based on the process of re-engineering a system or a network.
- The creation of new or more efficient algorithms based on new techniques.
- The creation of new and original encryption or security techniques.

Examples of when software development **is not** R&D:

- The development of business application software and information systems using known methods and existing software tools.
- Adding user functionality to existing application programs (including basic data entry functionalities).
- The creation of websites or software using existing tools.
- The use of standard methods of encryption, security verification and data integrity testing.

- The customisation of a product for a particular use, unless during this process knowledge is added that significantly improves the base program.
- Routine debugging of existing systems and programs, unless this is done prior to the end of the experimental development process.

#### **Examples of R&D activities:**

- Research conducted jointly with universities or other higher education institutions as well as research contributions to universities.
- Research projects contracted out to universities or other higher education institutions.
- Research projects contracted out to universities or other higher education institutions, highlighting research questions such as innovative enterprises, leadership in business organisations, elderly care, personal and family counselling services or education.
- Evaluation based on scientific methods or using a scientific approach.
- Projects conducted with research grants which were applied for through calls for research grants proposals.
- Participation in research councils with the purpose of evaluating research grant proposals.
- Research intended to increase the understanding of biological structures and functions (basic research).
- Development and construction of prototypes.
- Development of new methods and problems.
- Disease or other health-oriented research which deals with a clinical problem (clinical research).
- Clinical trials, phase I-III.

#### **Examples of non-R&D activities:**

- Education and competency development.
- Healthcare.
- Metal ore and mineral exploration.
- Legal and administrative work related to patent searches and disputes.
- Experimental work carried out with the sole purpose of investigating alternative manufacturing possibilities for patent-pending products.
- Documentation and information services of a general nature.
- Routine quality assessment and testing.
- Routine gathering of data and statistics for general purposes.
- Routine compiling of literature without the aim of generating new knowledge.
- Routine software development. Normally, not all development conducted in the enterprise's IT-department meets the criteria of R&D.
- Demonstration projects based on already existing conventions.
- Making data available.
- Market and customer research.
- Provision of research infrastructure.

- Spreading of information on finalised R&D projects.
- Creating forums and networks for collaboration and knowledge development.
- Participating in research seminars.
- Clinical trials, phase IV.

The questionnaire has three sections, the first two sections are mandatory, and the third section is optional. Aspects that are important to consider when responding to the questions in each section are described below.

## Section 1.

### Intramural R&D performed by the enterprise group in 2023

In this section report the group's intramural R&D expenditure, type of R&D, and number of full-time equivalents (FTE) performed by your employees by country.

#### 1A. Expenditure on intramural R&D performed by your group

This question refers to expenditures that can be attributed to the R&D activities carried out in each country by the group's internal personnel as well as consultants according to the criteria below. Intramural R&D also includes R&D carried out by commission under the management of your personnel. *Data can be estimated.*

**Expenditures on intramural R&D include the following expenses and must be reported in SEK millions.**

#### Employee remuneration

This includes:

- Salaries and wages, other compensation such as travel allowances and benefits in kind, bonuses and stock options.
- Statutory payroll taxes, other collective charges, contributions to pension funds and other social security payments.
- Remuneration concerning management and R&D administration.

#### Consultant fees

Fees for consultants are to be reported here, if:

- The R&D project is led and performed by your group/enterprise;
- The consultants are fully integrated into your group's/enterprise's R&D activities.

If the conditions above regarding consultant fees are not met, the project will be defined as extramural R&D and the costs should be excluded from the reporting.

#### Other operating expenses

This includes:

- Costs of heating, power, cleaning services, repair and maintenance of your own premises and cost of leased premises.
- Consumables, insurance, telephones, books, and office supplies.
- Costs of small prototypes or models developed by a second party, laboratory supplies, lease of machinery or equipment, as well as royalties and licenses for the use of software and other intellectual property rights.
- The R&D proportion of administration costs.

**Exclude:** depreciation and amortisation costs.



### **Investments**

Investments refers to the annual gross amount paid for the acquisition of fixed assets. Include investments in assets both used exclusively for R&D and a share of general assets acquired. An estimation of the R&D share of a general asset can, for example, be based on R&D personnel using the assets as a share of total personnel.

If government or EU grants have been provided to cover part of or all investments for an asset, report the gross amount paid, do not deduct the amount of the grant.

Investments includes investments in buildings, land and real estate, machinery and inventory, software, and other intangible fixed assets.

### **Investments in lands and buildings**

Include costs regarding land acquired for R&D use, construction of buildings and major improvements, modifications, and repairs. Ongoing construction should be included.

### **Investments for machinery and equipment**

Include purchases of or costs incurred for plants, major machinery, other fixtures and fittings, tools, and equipment acquired for use in your R&D.

### **Investments for software**

include purchase of or costs incurred for software that is used in your R&D.

### **Other intangible fixed assets**

Refer to investments in purchases of patents, long-term licenses, and other intangible assets that are used in R&D. Exclude marketing assets and goodwill.

## **1B. Intramural R&D by type of R&D**

In this question, allocate the expenditure for intramural R&D reported in question 1A by type of R&D.

**Specify the allocation in percent by the following types of R&D. Data can be estimated.**

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**Experimental development** is the systematic experimental work that draws on research results, scientific knowledge or new ideas to produce new materials, goods, services, processes, systems, methods or significant improvements of already existing ones.

## **1C. Number of full-time equivalents by internal personnel in R&D**

In this question, report the number of full-time equivalents (FTE) performed by internal personnel in the group's intramural R&D during the reference year, by country. **Exclude** consultants.

One full-time equivalent is defined as the number of hours conventionally worked by a full-time employee over one year. Thus, a full-time spending 50% of their working hours on R&D spends 0.5 FTEs on R&D. One person can never perform more than one FTE, even if the person works overtime.

Examples of R&D FTE calculations:

- A full-time employee spending 30% of their time on R&D over one year:  $(1 \times 1 \times 0.3) = 0.3$  FTE.
- A full-time employee spending 100% of their time on R&D over half of the year (the person is only active for 6 months per year):  $(1 \times 0.5 \times 1) = 0.5$  FTE.
- A full-time employee spending 40% of their time on R&D over half of the year (the person is only active for 6 months per year):  $(1 \times 0.4 \times 0.5) = 0.2$  FTE.
- A part-time employee working 40% of a full-time year spending 60% of their time on R&D over half of the year (the person is only active for 6 months per year):  $(0.4 \times 0.5 \times 0.6) = 0.12$  FTE.

## **Section 2. Factors that determine the localisation of intramural R&D by the group in 2023**

In this section you are asked to grade how well five factors applies to the reason why the group carries out intramural R&D in the countries. Factors are to be graded for each country the group has R&D activities in during the reference year. It is possible to add any missing factors that you believe is important for the decision to locate the R&D in a country.

The following five statements are to be graded in the questionnaire:

The group chose to perform intramural R&D in the country...

**... to adapt a product or a process towards specific customer-/market needs.**

**...because of the existence of important centres of knowledge, i.e. universities or company clusters etc.**

**...because the pre-existing production unit/s in the country required it.**

**...because of the availability of qualified R&D personnel.**

**...because it was expected to generate cost savings.**

## **Section 3. Other information**

In this section you can leave information regarding the time it has taken to submit the information requested in the questionnaire. Include the time it took to compile any documents or information necessary to be able to answer the questionnaire. It is also possible to leave a comment on the survey. *It is voluntary to report on this section.*

**Thank you for your participation!**