

Instructions for
**Research and
development in the
business enterprise sector
2023**



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 funded and conducted by organisations in Sweden.

Aim of the survey

The survey aims to describe resources allocated to research and development (R&D) in the business enterprise sector in Sweden. The results of the survey are also used to calculate Swedish GDP. The survey is based on the international guidelines set out in the Frascati Manual, produced by the OECD.

Dissemination of results

Results from the survey are published in Statistics Sweden's website:

www.scb.se/uf0301

Example questionnaire

On the respondent's page (<https://www.scb.se/fou-foretag-en>) you can find an example questionnaire including instructions for each question. This document is a complement to the example questionnaire with additional explanations and examples.

Report previous survey

To your help when answering the survey, you have access to a report containing your enterprise's answers from the previous survey. This report is not finished statistics but should be used as help when your enterprise is reporting in this year's survey.

Definitions and explanations

Research and experimental development (R&D)¹

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.

Types of R&D²

The Frascati manual defines 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.

¹ OECD, [Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development](#) (FM15), 2015, p. 44.

² FM15, p. 50.

An enterprise's R&D activities can consist of intramural and/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.

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 five sections (A-E), each with a number of questions. Aspects that are important to consider when responding to the questions in each section are described below.

A. Funding of extramural R&D 2023

In this section report your enterprise's funding of R&D performed by another party (extramural R&D), in Sweden or abroad. Include funding to other R&D performers both where your enterprise reserves the rights to the results and where it does not.

A2. Extramural R&D by recipient

In this question, report your enterprise's total expenditures on extramural R&D allocated by recipient. Extramural R&D is R&D funded by your enterprise but performed by a second party. Include contributions that the enterprise made to R&D at, for example, universities or other institutions of higher education.

Fees for consultants are to be reported as extramural R&D if the consultants work in R&D projects is carried out independently, and outside of your enterprise's own R&D activities. Otherwise, it is considered intramural R&D and should be reported in section B.

Specify amounts in SEK thousands. Data can be estimated.

B. Expenditure on intramural R&D 2023

In this section report the R&D that has been performed in Sweden by your enterprise. In some cases, the enterprise's R&D activities may be concentrated to one department, but there may also be such activities in other parts of the enterprise. Intramural R&D also includes R&D carried out by commission under the management of your personnel.

B2. Intramural R&D by type of cost

In this question, report your enterprise's total expenditure on intramural R&D allocated by type of cost. Report amounts excluding deductible VAT. **Specify amounts in SEK thousands. Data can be estimated.**

Operating expenses

Operating expenses includes employee remuneration, consultant fees and other operating expenses.

Employee remuneration

Refers to employee remuneration for the proportion of working hours dedicated to intramural R&D activities. This includes salaries and wages, other compensation such as travel allowances and benefits in kind, bonuses and stock options. Furthermore, this includes statutory payroll taxes, other collective charges, contributions to pension funds and other social security payments. Remuneration concerning management and R&D administration is also included.

Consultant fees

Consultant fees refers to costs of personnel that are formally employed by another party, e.g. a foreign subsidiary, but who carry out work on your behalf.

Fees for consultants are to be reported here, if:

- The R&D project is led and performed by your enterprise;
- The consultants are fully integrated into your 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 will be reported in Section A.

Other operating expenses⁵

Other operating expenses include costs for materials, equipment and services used in your R&D activities. Examples include costs of heating, power, cleaning services, repair and maintenance of your own premises and cost of leased premises. Other examples include consumables, insurance, telephones, books, and office supplies. Further, this includes costs of small prototypes or models developed by a second party, laboratory supplies, lease of machinery or equipment, as well as royalties and licences for the use of software and other intellectual property rights. Include the R&D proportion of administration costs.

Exclude depreciation costs relating to buildings, machinery/equipment, software, and other assets. The reasons for this as set out in the Frascati Manual (OECD) are as follows:

- Including depreciation and amortisation costs would result in double counting when calculating total R&D expenditure as the sum of operating expenses and investments.
- Tax regulations on depreciation and amortisation costs vary between countries.

Investments⁴

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

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

³ FM15, p. 113.

⁴ FM15, p. 119.

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 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 för 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 licences, and other intangible assets that are used in R&D. Exclude marketing assets and goodwill.

B3. Intramural R&D by source of funds

In this question, report your enterprise's total expenditure on intramural R&D allocated by source of funds. **Specify amounts in SEK thousands.** *Data can be estimated.*

B3.1 Intramural R&D by type of funds

In this question, allocate the external sources of funds used for your enterprise's intramural R&D by exchanges and transfers. **Specify the allocation in percent.** *Data can be estimated.*

Exchanges

Exchange R&D funds are funds received for projects in which the enterprise perform R&D on behalf of another party outside the enterprise (in Sweden or abroad). The paying party generally reserves the rights to the results.

Transfers

Transfer R&D funds are funds received for projects to support the enterprise's intramural R&D from another unit outside the enterprise (in Sweden or abroad). The receiving party, your enterprise, generally reserves the rights to the results.

B4. Intramural R&D by type of R&D

In this question, allocate your enterprise's total expenditure on intramural R&D by type of R&D (basic research, advanced research, experimental development). **Specify the allocation in percent.** *Data can be estimated.*

B5. Intramural R&D by product field

In this question, allocate your enterprises expenditure on intramural R&D by product field. **Specify the allocation in percent.** *Data can be estimated.*

The classification by product group follows the classification Standard för svensk produktindelning efter näringsgren 2015 (SPIN 2015).⁵ A list of the product fields is available under the question in the web questionnaire, here you can find the name and code for each product field.

The proportion of each product field is determined by the end products in your enterprise.

Example: An enterprise carries out a R&D project on an electronic control unit for a machine.

- If only the control unit is intended for sale, the R&D project is to be reported under the relevant product field in "26 – Computer, electronic and optical products".
- If the electronically controlled machine as a whole is intended for sale, the R&D project is to be reported under the relevant product field in "28 – Machinery and equipment".
- If both the control unit and the machine as a whole are intended for sale, the R&D project is to be distributed between the two product fields.

B6. Intramural R&D by county

In this question, allocate your enterprise's expenditure on intramural R&D by county. Base your specification on where the employees and consultants who performed the R&D activities mainly carried out their work. **Specify amounts in SEK thousands.** *Data can be estimated.*

⁵ [Standard för svensk produktindelning efter näringsgren \(SPIN\)](#), SCB.

B7. Energy-related intramural R&D by area of technology

In this question, allocate expenditure on energy-related intramural R&D your enterprise has performed by area of technology. **Specify amounts in SEK thousands.**
Data can be estimated.

Energy-related R&D includes basic research, applied research and experimental development related to the production, storage, transportation, distribution, and rational use of all forms of energy.

Energy-related R&D are divided into the following areas:

- Energy efficiency
- Renewable energy resources
- Nuclear fission and fusion
- Hydrogen and fuel cells
- Fossil fuels
- Electric power
- Other energy related technologies

C. R&D personnel 2023

In this section, report on the R&D personnel⁶ in your own R&D project and activities. R&D personnel refers to personnel that are directly involved in R&D activities, regardless of whether they are employed by your enterprise or external personnel (consultants) that is fully integrated in your R&D activities.

C1. Number of employees in R&D

In this question, report the number of employees in your intramural R&D on 31 December by function and sex. Only include employees performing R&D corresponding to at least 10 percent of a full-time. *Data can be estimated.*

Researchers, product developers or equivalent⁷

Refers to professionals engaged in the conception or creation of new knowledge and the application of products, processes, methods and systems. Persons involved in managing R&D projects are also included in this group.

PhD students engaged in R&D activities also belong to this group. Normally, they hold a degree from an institution of higher education and perform research as a part of their doctoral education.

⁶ FM15, p. 151.

⁷ FM15, p. 162.

Examples of titles held by researchers, product developers or equivalent:

- Biologist
- Civil engineer
- Data specialist
- Doctoral student
- Pharmacologist
- Researcher
- PhD student
- R&D manager
- Head of R&D
- Physicist
- Chemist
- Doctor
- System designer or programmer
- Development manager

Supporting staff

Supporting staff consists of both technical staff and other supporting staff.

Technical staff⁸ or equivalent refers to persons whose main tasks require technical knowledge and experience in one or more fields of engineering, the physical and life sciences, or the social sciences, humanities and the arts. They participate in R&D by performing scientific and technical tasks involving the application of concepts and operational methods and the use of research equipment, normally under the supervision of researchers.

Tasks performed by technical staff include:

- Carrying out bibliographical searches and selecting relevant material from archives and libraries
- Preparing computer programs
- Carrying out experiments, tests, and analyses
- Preparing materials and equipment for experiments, tests, and analyses
- Recording measurements, making calculations, and preparing charts and graphs
- Carrying out statistical surveys and interviews

Examples of titles held by technical staff or equivalent:

- Biomedical analyst
- Data operator
- Computer technician
- Laboratory assistant
- Engineer

⁸ FM15, p. 163.

- Research assistant
- Technician

Other supporting staff⁹ refer to administrative, secretarial, and clerical staff participating in R&D projects or directly associated with such projects. Managers and administrators dealing mainly with financial and personnel matters and general administration, insofar as their activities are a direct service to R&D are included in this group.

Examples of titles held by other supporting staff:

- Administrative assistant
- Data logger
- Financial assistant
- Clerk
- Secretary

C1.1 Number of employees in R&D with a PhD or licentiate

In this question, report the number of employees in your enterprise's intramural R&D with a PhD or licentiate on 31 December by sex. Include both PhD's and licentiates obtained in Sweden and abroad. *Data can be estimated.*

C2. Number of external personnel in R&D

In this question, report the number of external personnel in your intramural R&D on 31 December by function and sex. Only include external personnel performing R&D corresponding to at least 10 percent of a full-time. *Data can be estimated.*

External R&D-personnel includes consultants and other hired personnel and refers to such personnel which are either independent, i.e running their own consulting firm or who are dependent, i.e. employees of another enterprise.

This type of personnel must be fully integrated in your R&D activities without formally being employed by your enterprise.

C3. Number of full-time equivalents by employees in R&D

In this question, report the number of full-time equivalents (FTE) performed by employees in your intramural R&D during the reference year, by function and sex. Only include employees performing R&D corresponding to at least 10 percent of a full-time. *Data can be estimated.*

⁹ FM15, p. 164.

One full-time equivalent¹⁰ 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.

C4. Number of full-time equivalents by external personnel in R&D

In this question, report the number of full-time equivalents (FTE) performed by external personnel in your intramural R&D during the reference year, by function and sex. Only include external personnel performing R&D corresponding to at least 10 percent of a full-time. *Data can be estimated.*

D. R&D activities forecast 2024

In this section, report on the intramural R&D that is being or will be conducted during the current calendar year. *Data can be estimated.*

In **question D2**, report a forecast of the enterprise's total intramural R&D expenditure (operating expenses and investments) during the current calendar year.

In **question D3**, report a forecast of total number of full-time equivalents that will be performed by employees during the current calendar year. Report by function.

In **question D4**, report a forecast of total number of full-time equivalents that will be performed by external personnel during the current calendar year. Report by function.

¹⁰ FM15, p. 166.

E. 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!