STATISTICS DENMARK

Documentation of statistics for Innovation in the private sector 2018

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1 Introduction

The purpose of the innovation survey is to examine the scope, the nature and the effect of innovation in the business sector including product and process innovation. Data from 2007 to 2016 is comparable, whereas from 2018 the survey is changed in several ways, and results are therefore only to a certain degree comparable to results from former surveys.

The survey is conducted in accordance with the minimum rules laid down in the EU regulation and thereby comparable to the similar statistics of other EU countries for the types of activities and size classes covered by the statistics.

2 Statistical presentation

Innovation in the enterprise sector is a yearly statistics on resources used for R&D and share of innovative enterprises. The statistics is distributed by sector, size class and region.

2.1 Data description

The aim of the statistics is to analyze the scope, type and effect of business enterprise innovation, including shedding light on the innovation activities.

It contains one part concerning the inputs, e.g. activities and resources used, a second part concerning the process (conditions and knowledge sharing) and a third part concerning the output.

The most important indicators are:

Per cent of innovators by type of innovation: - Product innovators - Process innovators - Innovators total

Innovation expenses, excl. research and development (R&D) - Expenses for wages and social contributions to innovation, excl. R&D - Expenses for other running costs for innovation - Purchase of material , equipment and software - Purchase of external rights - Purchase of other external knowledge - Purchase of consultancy services

Share of enterprises with and without cooperation on innovation activities

2.2 Classification system

Danish Industrial Classification 2007

Size class of enterprise, based on number of full-time equivalents by the following size classes:

- 10-49 full-time employees
- 50-249 full-time employees
- 250(+) full-time employees

Geografically the statistics is distributed by regions.

2.3 Sector coverage

Enterprises in the private business sector.

2.4 Statistical concepts and definitions

Innovative: An innovative enterprise is an enterprise, which have introduced product and/or process innovation

Product innovative: A product innovative enterprise is an enterprise, which have introduced goods or services that are new or significantly changed. The products must be new to the enterprise, but may have been developed or introduced by others earlier.

Process innovative: A process-innovative enterprise is an enterprise, which have introduced new or significantly changed production methods, routines, methods concerning logistics, distribution, accounting and other administrative functions, organization of external relations, responsibilities or human resources, or methods for promotion of products, packaging, pricing, product exposure or customer relations.. The process must be new to the enterprise, but may have been developed or used by others earlier.

PP-innovative: A PP-innovative enterprise is an enterprise, which have introduces new or significantly changed products (product innovative) and/or processes (process innovative). From 2018 this concept is identical with the concept of innovative enterprises.

Organizational innovative: An organizational innovative enterprise is an enterprise, which have introduced new or significantly changed methods for organizing the working place, knowledge management or external relations, including new organizations introduced as a result of a strategic management decision. The concept does not include new organization which are mainly the result of a fusion or taking over of an enterprise. From the 2018 survey this concept is omitted.

2.5 Statistical unit

Enterprises (economic units).

2.6 Statistical population

The frame population is drawn from the Business Register, and consists of a population of 9,291 enterprises in 2018.

2.7 Reference area

Denmark.

2.8 Time coverage

The statistics cover 2007 and onwards. It is comparable from 2007 to 2016, but because of a range of changes to the statistics, 2018 is only to a certain degree comparable to results from former surveys.

2.9 Base period

Not relevant for these statistics.

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2.10 Unit of measure

A range of units of measurement are used: number of enterprises, per cent (e.g. percentage of turnover originating from newly developed products), qualitative measures (e.g. the degree to which clients, customers, suppliers, universities etc.) influence the innovation activities), DKK (in thousands).

2.11 Reference period

01-01-2018 - 31-12-2018 for data related to expenses. 01-01-16 - 31-12-18 for data related to product and process innovations and cooperation

2.12 Frequency of dissemination

Every second year. From 2007-2016 the statistics was collected yearly.

2.13 Legal acts and other agreements

Section 8 of the Act on Statistics Denmark (Consolidated act No 610 of 30 May 2018).

Data are collected in accordance with Decision No 1608/2003/EC of the European Parliament and of the Council of 22 July 2003 concerning the production and development of Community statistics on science and technology, and Commission Regulation (EC) No 995/2012 implementing Decision No 1608/2003/EC of the European Parliament and of the Council as regards statistics on innovation.

2.14 Cost and burden

The estimated response burden for 2018 has been calculated to 4 million DKK.

2.15 Comment

On 1 January 2008 Statistics Denmark took over the responsibility of compiling statistics on research, development and innovation from the Danish Centre for Studies in Research and Research Policy.

Other information, e.g. questionnaires, tables etc., can be found on Statistics Denmarks' theme page concerning research and development (R&D) and innovation, see Danmarks Statistik.

3 Statistical processing

Data for this statistics are collected via questionnaires for app. 3,000 respondents among a population of app. 9,300 enterprises. The material is validated already during the response from the enterprise, and afterwards followed by computer-aided validation and manual validation. Imputations and calibrated weighting is also a part of the treatment of data.

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3.1 Source data

The statistics are compiled on the basis of questionnaires collected from app. 4,500 enterprises drawn as a sample from a population of app. 13,800 enterprises. The enterprises are sampled depending on the number of full-time equivalents and type of activity (NACE). All enterprises with 100 or more full-time equivalents are included in the sample, and the likeliness of being chosen for the sample decreases in line with decrease in number of full-time equivalents.The enterprises in the sample are randomly selected. From the reference year 2009 the sample is designed as a 'rolling panel', which reduces the measurement uncertainty of the statistics.

3.2 Frequency of data collection

Every second year.

3.3 Data collection

The statistics are collected via http://www.virk.dk as an electronic questionnaire.

3.4 Data validation

A comprehensive validation of the data is carried out: In the electronic questionnaire validation is performed on a range of the variables, e.g. on totals. If the total entered by the respondent does not match the calculated total, the respondent will be presented to this, and has the opportunity to correct the total or one or more of the components. The same applies if a calculation in the questionnaire has to sum up to 100 per cent, and this is not the case. If the levels of some of the key data typed in by the respondent are much higher or lower than the previous year, the respondent will be notified, and has the opportunity to correct if necessary. This applies e.g. to innovation expenses. After the data collection the data are mechanically validated and to some extent corrected. The ICT-programs that checks the data for errors also forms lists of likely or de facto errors. The types of errors that are identified as those having the greatest influence on the quality of the statistics are listed together with identification numbers of the respondents and checked manually. Finally outlier tests are carried out for key variables/combinations of these. A minor part of the data collected is compared to other sources with the aim of assessing whether the response is likely correct or should be corrected. This applies to e.g. to the innovation expenses, which are compared to the total turnover of the enterprise, which comes from The Central Business Register. Also public accounts from the enterprises are used as a supplying source of information.

3.5 Data compilation

The final, corrected data material is compared to the original sample. Enterprises above a certain size, that have not responded to the questionnaire, will have their response imputed, either by using the data collected from the respondent in the previous year, or via cold-deck. A calibrated weighting is carried out.

3.6 Adjustment

Not relevant for these statistics.

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4 Relevance

The statistics is used by ministries, business organizations, researchers, the media, private enterprises and students. It is used for research, publications from ministries and for international comparison. Indicators based on the statistics is part of the documentation of the knowledge society. Indicators based on the statistics are included in the EU Innovation Union Scoreboard, which is part of the Europe2020 strategy.

4.1 User Needs

- Users: Ministries, business organizations, researchers, the media, private companies, researchers and students
- Fields of application: For research, ministerial publications, international comparisons. The statistics are included in the documentation of the knowledge society. Data are made available for the purpose of research.

4.2 User Satisfaction

No systematic information on user satisfaction is collected for this statistics. Primary users are represented in the Contact Group for statistics on Research, Development and Innovation.

4.3 Data completeness rate

The statistics completely matches the specifications of the EU-regulation and comes up to existing guidelines as the Oslo manual concerning statistics on innovation.

5 Accuracy and reliability

Errors in the data reports and problems for companies with determining exact amounts that are used on innovation, and when it is innovation and innovation activities.

5.1 Overall accuracy

As the survey is based on a sample, uncertainty is attached to all the figures in the form of random variation. This applies, in particular, to the results broken down according to the most detailed industry, region and size figures, where the figures should only be regarded as normative.

As part of the general quality control, a quality handbook has been published for the statistics on R&D and innovation. See Danmarks Statistik

5.2 Sampling error

The calculated coefficients of variation (CV) for key indicators in 2018: - Share of enterprises with innovation: 2,0 - Innovation expenditure, other innovation expenditure: 4,5

5.3 Non-sampling error

Non-response is one of the sources of uncertainty, together with lack of coverage, e.g. when enterprises with high influence on the statistics are not included in the sample, e.g. as a result of changes in the basic registers.

5.4 Quality management

Statistics Denmark follows the recommendations on organisation and management of quality given in the Code of Practice for European Statistics (CoP) and the implementation guidelines given in the Quality Assurance Framework of the European Statistical System (QAF). A Working Group on Quality and a central quality assurance function have been established to continuously carry through control of products and processes.

5.5 Quality assurance

Statistics Denmark follows the principles in the Code of Practice for European Statistics (CoP) and uses the Quality Assurance Framework of the European Statistical System (QAF) for the implementation of the principles. This involves continuous decentralized and central control of products and processes based on documentation following international standards. The central quality assurance function reports to the Working Group on Quality. Reports include suggestions for improvement that are assessed, decided and subsequently implemented.

5.6 Quality assessment

Under preparation.

5.7 Data revision - policy

Statistics Denmark revises published figures in accordance with the Revision Policy for Statistics Denmark. The common procedures and principles of the Revision Policy are for some statistics supplemented by a specific revision practice.

5.8 Data revision practice

The 2018 statistics are published as preliminary data in February 2020.

6 Timeliness and punctuality

From the next survey, (2020) the statistics is expected to be published app. 11 months after the end of the reference period.

6.1 Timeliness and time lag - final results

Preliminary data for 2018 are published 12th February 2020. Final data is expected to be published in November 2020.

6.2 Punctuality

From the next survey, (2020) the statistics is expected to be published app. 11 months after the end of the reference period.

7 Comparability

The statistics for 2018 is only to a certain degree comparable to results from former surveys. The statistics is to a certain degree comparable with the statistics on innovation in the public sector.

7.1 Comparability - geographical

Delivery of data to Eurostat follows the minimum rules laid down in the regulation, which means that the data cover the types of activities and size classes of enterprises, which are defined by the regulation. Thereby the statistics is comparable to the similar statistics of other EU countries for the types of activities and size classes covered by the statistics.

7.2 Comparability over time

The survey for 2018 differs in a range of ways from the former surveys (2007-2016), and results are therefore only to a certain degree comparable to results from former surveys. The changes introduced with the 2018-survey are:

• The coverage of activities and size classes are changed to comply with the minimum rules of the EU regulation • The structure of the questionnaire is changed, new questions are introduced and others have been changed • The definitions of R&D and innovation have been clarified. E.g. marketing and organizational innovations are no longer considered independent types of innovation, but elements of these former types are included in business process innovation

7.3 Coherence - cross domain

There are no other comparable Danish statistics. The results can be compared to those of other EU countries, since there is a harmonized methodological foundation.

7.4 Coherence - internal

The data are to a large extent consistent, partly as a consequence of the electronic questionnaire guiding the respondents, and partly as a reflection of validation and correction.

8 Accessibility and clarity

These statistics are published yearly in a Danish press release and in the StatBank under Innovation. For further information please see the subject page on Innovation.

8.1 Release calendar

The publication date appears in the release calendar. The date is confirmed in the weeks before.

8.2 Release calendar access

The Release Calender can be accessed on our English website: Release Calender.

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8.3 User access

Statistics are always published at 8:00 a.m. at the day announced in the release calendar. No one outside of Statistics Denmark can access the statistics before they are published.

8.4 News release

These statistics are published in a Danish press release.

8.5 Publications

The statistics is included in the publication "Innovation og forskning".

8.6 On-line database

Business enterprise innovation is published in Statbank under Innovation in the following tables:

- INN11: Innovation expenditure by type, type of activity, size class and region
- INN12: Innovative enterprises by type, type of activity, size class and region
- INN13: Product innovative enterprises by type, type of activity, size class and region
- INN14: Process innovative enterprises by type, type of activity, size class and region
- INN15: Enterprises with cooperation by type, type of activity, size class and region

8.7 Micro-data access

Data are stored electronically, and micro-data can be used for research purposes. More detailed tables than those published can be provided.

8.8 Other

Tables are accessible on Eurostat and OECD's homepages and databases, through which international comparisons can be made.

8.9 Confidentiality - policy

Data Confidentiality Policy for Statistics Denmark.

8.10 Confidentiality - data treatment

In general there is no need for discretion on the existing level of dissemination.

8.11 Documentation on methodology

The statistics completely matches the specifications of the EU-regulation and comes up to existing guidelines as the Oslo manual concerning statistics on innovation.

Other documentation on methodology is only available in Danish.

8.12 Quality documentation

Results from the quality evaluation of products and selected processes are available in detail for each statistics and in summary reports for the Working Group on Quality.

9 Contact

The administrative placement of these statistics are in the division of Business Development. The person responsible is Helle Månsson, tel. +45 39 17 31 13, e-mail: hej@dst.dk

9.1 Contact organisation

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