

A Thirteenth Application of ASPIRE for Statistics Sweden

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October 2, 2025

Contents

1. Executive Summary	3
2. Introduction	5
2.1 The current review round	5
3. General observations and cross cutting recommendations	5
3.1 General Observations.....	5
3.2 Cross Cutting Issues and Recommendations	7
3.2.1 Statistical Leadership and Analysis	7
3.2.2 Quality Monitoring and Analysis	8
3.2.3 Nonresponse	8
4. Product scores and recommendations.....	9
4.1. Interpretation of the scores	9
4.2. Quarterly economic statistics (QES)	10
4.3. Research and development in Sweden (R&D)	14
4.4. Educational attainment of the population and the Education Register	17
4.5 Statistics on Income and Living Conditions (SILC)	20
5. References	23

1. Executive Summary

The ASPIRE team reviewed four products in 2025: the Quarterly Economic Statistics (QES), Research & Development statistics (R&D), Educational attainment of the population and the Education Register, and the EU Survey of Income and Living Conditions (EU-SILC). These products were included in the ASPIRE reviews for the first time with the exception of the EU-SILC which was last reviewed in 2017. They were selected by Statistics Sweden's senior management team, and covered a range of types of outputs, including two mandated by the EU, and economic and social outputs. The selection was not explicitly risk-based which is a departure from the recommendation made in the 2023 ASPIRE review (Linacre et al, 2023). Otherwise, the new approach for ASPIRE, developed in the review of 2023, was followed in this thirteenth application of ASPIRE.

The key findings of the review are set out in two parts. Those findings that are of a cross-cutting nature or might pertain to a number of product areas are covered in Section 3. Those findings that are specific to a particular product, are covered in Section 4.

As in past years, the review team noted the high level of professionalism evident in all product areas, and appreciated the openness and support given to the review team. Interviews were all held face-to-face in Solna and this was appreciated by the review team as it facilitated a co-operative and interactive approach to the meetings.

Statistical leadership has been a theme for ASPIRE over several years, and we are pleased to see the progress feeding down to the topic areas and teams we talked to. The review team felt that there was more to do at a higher level. To be effective as statistical leaders, Statistics Sweden needs to have a place at the table where policy issues, including cross cutting policy issues, and data-based evidence, are discussed and developed. To be at the table, Statistics Sweden needs to be visible and recognised as a valuable partner with its access to, and in-depth knowledge of, a wealth of data assets.

This expertise could additionally be developed and promulgated by using the rich data sources that Statistics Sweden collects to tell the stories of these issues. This arose particularly in one of the reviewed outputs but seems a more general topic in need of greater priority.

The review team felt that the level of quality monitoring and analysis of quality had been heavily limited by resources. This is an important insurance problem against significant errors impacting key users and causing reputational damage and needs to be given a higher priority. All the sources we reviewed had quality investigation plans which were not being realised due to resource limitations.

In common with last year, the review team has been concerned about aspects of nonresponse in business surveys. The overall level of nonresponse appears to be increasing and is now an issue with very large businesses as well as smaller ones. Nonresponse for smaller and medium sized businesses also appears to be growing, and for these businesses, measures that have been introduced in Statistics Sweden to cut costs mean there is no personal contact with the business. There is a risk that nonresponse is already affecting estimates in ways that matter, and that nonresponse behaviour will spread further if there are no consequences.

QES is a relatively recent product, and this is seen in the distinct designs and processing of its three components. These could be harmonised further. All three parts use cut-off designs, and additionally suffer from nonresponse, which seems to be increasing. The quarterly movements are the key statistics of interest, and the review team was concerned that both nonrespondents and the smaller businesses in the cut-off part of the population might have different movements than the observed sample, especially at particular stages of the economic cycle. Research with available data sources (for example tax data) would provide evidence to assess the assumptions.

The R&D statistics are also affected by nonresponse, and the review team again suggests a nonresponse survey to assess whether nonrespondents have different R&D characteristics. The time-use survey of academic researchers has a low response rate, and we suggest that working with universities and research institutions

may be useful to increase it. The recent transition to the new statistical units on the business register has affected R&D as there is now no clear method to produce intensity statistics. The reason for this is that the new units do not line up sufficiently with the observed legal units for the Business enterprise sector in the R&D; further work is needed to redevelop these estimates. This is potentially a wider issue, and the review team is interested in the impact of the change of units in general and would like to follow this up in a future round of ASPIRE.

The education statistics compile variables giving a detailed view of education. The review team noted the risk of measurement errors through not identifying foreign qualifications, or not identifying the qualifications of immigrants. Although these affect a relatively small number of cases, they are potentially in important populations – an example of where statistics could support a number of cross-cutting policy questions. The product team have undertaken investigations of the impact of nonresponse, and the review team welcome these. However, no adjustment for nonresponse has been included in the statistical register, although this could be done, because of the possibility that people could ask for this information. This identifies a general question of whether analytical variables can be included in statistical registers. The review team strongly supports this as an improvement in quality for analytical uses.

EU-SILC is mandated by EU legislation, and compliance results in a lot of quality information being available (more in the EU documentation than in the quality report). The main issue identified by the review team is that Statistics Sweden does not tell the important stories from the EU-SILC data when it is published. There are no cross-cutting views of deprivation, or wellbeing; the longitudinal nature of the data is not exploited and could reveal how people transition between different conditions. Providing this narrative could help establish Statistics Sweden's leadership in this topic area. In common with other products in this round we note that nonresponse is quite high (though currently stable) and would like analysis of noncontact and nonresponse to be given a higher priority.

2. Introduction

In 2011, the Ministry of Finance directed Statistics Sweden to develop a system of quality indicators for several key statistical products. ASPIRE was developed to meet this need. Results were submitted to the Ministry annually between 2011-2022 apart from 2018 when a review was made of ASPIRE. In 2023 another review (Linacre et al, 2023) was carried out by the 2023 ASPIRE team – Stephen Penneck, Susan Linacre and Laurie Reedman – together with the quality group at Statistics Sweden’s Corporate Management Unit. The review was ordered by the Director General of Statistics Sweden to address identified weaknesses in the ASPIRE approach in the context of Statistics Sweden’s present organisation and strategy. The report recommended some changes in the ASPIRE process some of which were implemented during the previous round of ASPIRE in 2024.

2.1 The current review round

The external review team for the ASPIRE review 2025 comprised Siobhan Carey, Susan Linacre, Laurie Reedman, and Paul Smith, from the University of Southampton in the UK, who was welcomed as a new member to the expert team. This current round was the last ASPIRE round for Susan Linacre after participating in the programme for eight years.

The current round was carried out with a physical visit to Statistics Sweden only in Solna where representatives of products from Solna and Örebro met the experts. Two meetings were held with relevant directors from top management. Also, a meeting was held with section heads for methodology, another with methodologists regarding frame issues.

The selection process for products to be evaluated differed from the 2024 round such that the risk analysis approach recommended in the ASPIRE review of 2023 (Linacre et al, 2023) and tested in 2024 was not used. Instead, two statistical products were selected by the Director of the Department for Economic Statistics and Analysis – the Quarterly Economic Statistics (QES) which is a relatively new survey of businesses and the Research and Development Statistics (R&D) which is a census survey regulated by the EU. Likewise, two statistical products were selected by the Director of the Department for Social Statistics and Analysis – the Statistics on Income and Living Conditions (EU-SILC) which is a survey of individuals and households largely regulated by the EU and the register-based statistics on Educational attainment of the population and the Education Register.

Each product team did their necessary preparatory work with the checklists, following the format recommended in the 2023 ASPIRE review, and with the quality documentation which was sent to the expert team in advance of the review as usual. Thereafter, the review team had a written exchange with follow-up questions and answers with each of the product teams before the review.

The review team would like to express their gratitude to staff in Statistics Sweden who have participated in ASPIRE round 13. We are also grateful for the quick responses we got to our questions and for the open way that staff responded.

3. General observations and cross cutting recommendations

3.1 General Observations

The process this year went smoothly with invaluable support from the internal Statistics Sweden ASPIRE team who, as always, made the experts feel welcome and were available to facilitate additional requests. They provided support not just to the expert team, but it was clear they also supported the product teams in preparing for the review and in understanding the objectives and format of the review. The quality, completeness and timeliness of the materials provided in advance, as well as their ability to source clarification on points of detail and to arrange additional unplanned meetings throughout the week made the process very efficient.

We were very pleased to have the opportunity to meet the new DG Eva-Lo Ighe and we wish her well as she settles into her new post.

The selection of products for review this year was a good mix of register and survey based. Two products reviewed are conducted under EU Regulations which added an interesting dimension and a layer of complexity. Eurostat requirements add a significant level of scrutiny, oversight and structure above national requirements. Our initial thoughts about the value of including such strictly specified products in ASPIRE were not borne out in practice and we had some very fruitful, insightful and hopefully helpful discussions on these products. The selection of register-based, business and household survey products gave us a good view overall of the range of activities conducted by Statistics Sweden. In future we welcome inclusion of products that cover a range of activities and data sources as well as new products and products that pose a risk.

The documentation we received in advance was comprehensive and supplemented this year by the EU-documentation for the two EU regulated products. While overall the Quality Reports were an easy read, they sometimes lacked detail of interest to an engaged user. Subjective statements summarising evidence available to the team or assumptions made such as “we don’t think it is a problem” need to be backed up with evidence. Links to analysis or investigations need to be provided so that the reader can decide for themselves whether they concur with the assessment. The EU documentation was much more detailed and very extensive and should be better reflected and more easily visible in the national quality documentation. This year the documentation generated fewer questions to the product teams in advance of the review but there is still room for improvement.

Yet again we appreciated the engagement and openness of the teams we met. This year there was a notable absence of comments on IT/technology issues which was refreshing. The teams all seemed content with the technology available as fit for purpose and performing well. No one mentioned IT infrastructure or processing systems as a barrier or drag on their production process.

We did however continue to hear the impact constraints on resources were having and the need to reduce costs or keep costs to a minimum is well embedded in the culture. Alongside budget constraints there is a strong awareness within teams of where their role starts and ends. In some cases, this means there is little opportunity to fully exploit the asset due to cost/resource constraints. Where products are providing data rather than providing insight and knowledge there is a missed opportunity to maximise the value of the investment in collecting the data. There is little point in collecting data if it is left relatively unused.

While it was evident that access to methodological resources has improved, resources more generally, including methodology, were a significant constraint on delivering day to day business requirements and progressing development ideas and further analysis, whether for internal consumption or for external publication. All the teams had ideas for improvement on their horizons, but they often remained as potential future plans due to pressure to simply meet production schedules. Teams have ideas about how they could better understand their data but struggle to carve out the time to take them forward despite best intentions.

We were pleased to see the continuing flow of strategic objectives down to product teams. We noted that areas are starting to experiment with new technologies such as Machine Learning and Artificial Intelligence. They were actively considering how such methods might be applied in their product area either to find efficiencies or improve data quality. Similarly, the micro-editing approach is well adopted.

From our discussion with methodology the approach and organisational structures seem well conceived to deliver the objectives, and we had evidence of methodological expertise being more obviously integrated with subject matter expertise.

The synergy between individual topic areas and cross cutting themes, particularly on the social side, seemed weak. There is a rich bank of data available, and we are aware of the cross-cutting teams that have been created to join up thematically.

The ASPIRE checklists again proved a useful framework for the discussions although some inconsistencies remain between the self-assessments and the other documentation provided. We also noted the assessments provided from the annual Evaluation of the Quality of Official Statistics (Statistics Sweden. 2025:1) –

the so-called SOS-Q assessments – although they weren't a main focus of our discussions. It was not obvious from our discussion with product teams as to how well SOS-Q assessments are used to identify risks and stimulate action.

Overall, we felt we got a good opportunity to see what we needed during the week including adding in extra meetings where we needed further understanding. We are grateful for people making themselves available at short notice. We appreciated very much that the product team meetings were able to be convened in person which we feel contributed to the very open discussions.

3.2 Cross Cutting Issues and Recommendations

3.2.1 Statistical Leadership and Analysis

Statistics Sweden has been successfully developing a culture and capability for statistical leadership for some years now. To be effective as statistical leaders, Statistics Sweden needs to have a place at the table where policy issues, including cross cutting policy issues, and data-based evidence, are discussed and developed. To be at the table, Statistics Sweden needs to be visible and recognised as a valuable partner with its access to, and in-depth knowledge of, a wealth of data assets.

The review team felt there were two areas where Statistics Sweden might take its approach to 'gaining a seat at the table' further. The first relates to the issue of engaging with users on cross cutting topics. The second relates to developing and promoting a strong awareness of Statistics Sweden's capabilities, both in terms of in-depth knowledge of the data sources across the board, and the richness of this data, and in accessing and using this data to paint the pictures and to inform policy making.

There appear to be effective mechanisms to build strong user engagement within sectors, such as within the education sector, although it is important to ensure that this consultation includes scope for strategic discussions as well as more technical discussions. However, it is less clear that there are effective mechanisms for supporting policy questions that are cross sectoral on the social side. Statistics Sweden has a very strong capability, in terms of data assets, to support an understanding of cross sectoral issues, but this rich set of assets appears currently underused, and 'under demanded' by users.

Related to this, the review group was concerned that, rather than developing and promoting its rich data and capabilities, areas of Statistics Sweden interpret that the organisational policy is to prioritise putting data into statistical databases for others to access and analyse. The result is that there may be little visible use of the data to tell the key stories in it, and consequently little promotion of Statistics Sweden as having the data and the capability to use it to address key or cross cutting issues. In fact, Statistics Sweden's understanding of its data, and how it can be used with other data to provide information for policy makers, will only grow with the experience of using it itself to tell the stories.

There may be a need to clarify the organisational view of the role that Statistics Sweden should be playing in analysing and presenting the stories in its data and ensure that communications policies are aligned with this role. In particular, when key new datasets become available, the presentation and promotion of these datasets should be clear priorities.

Recommendation 1

Statistics Sweden reviews its user engagement strategy to ensure it has a top-down view of 'burning issue' needs of key users where these issues cross sectoral boundaries. For example, options such as annual 'social statistics data gap workshops', involving senior policy makers across government and research organisations might be considered.

Recommendation 2

Statistics Sweden reviews its policy in terms of the priority given to telling the key stories in all the datasets for which it is responsible. In particular, ensuring that when fresh rich datasets become available (for example the release of SILC results), the opportunity of the release is used to paint the picture of the key stories in the data and promote the data. In addition, it is recommended that consideration be given to other means

of promoting the availability of data and data services including cross cutting analysis of the multiple longitudinal registers and survey datasets.

3.2.2 Quality Monitoring and Analysis

The review team felt that the level of quality monitoring and analysis of quality has been heavily limited by resources and its lower prioritisation relative to production. Quality monitoring and analysis (response rates for example, and the different categories of response) can be considered to be a sort of insurance policy. If things are going well, you don't see any real benefit and your money appears wasted. However, if things become problematic or risk increases, it proves its value as it enables you to both detect the problem, hopefully ahead of reputational damage, and intervene to mitigate against impacts.

Quality analysis, like monitoring, is a key part of understanding the organisation's data, to ensure that the statistical inferences being drawn from it are valid. For example, to monitor the impact of size cutoffs for data collection in sub annual business surveys, it is important to look at the impact on estimates of movement across the business cycle. Do small businesses respond to upturns and downturns in the economy in the same way as large units?

Recommendation 3

Senior management consider the level of quality monitoring and analysis being undertaken and whether there is a need in the organisation to reprioritise this work.

3.2.3 Nonresponse

Some nonresponse is inevitable, and actions are taken to monitor and minimise its extent, and to adjust for any predictable impact on estimates.

However, both last year, and this year, the review team has been concerned about aspects of nonresponse in business surveys. The overall level of nonresponse appears, anecdotally, to be increasing and is now an issue with very large businesses as well as smaller ones. Manual imputation is increasingly required, with implications for quality, including the ability to rapidly pick up movements in the economy. Nonresponse for smaller and medium sized businesses also appears anecdotally to be growing, and for these businesses, measures that have been introduced in Statistics Sweden to cut costs, mean there is no personal contact with the business. One consequence of this is that it is possible that businesses that are no longer operating, are mistaken for live businesses, leading to overestimation of levels and a slowed ability to detect any downturns in business conditions.

Recommendation 4

Statistics Sweden should assess, by size of business, the extent of nonresponse in its business surveys and whether there has been an increase over time. If there is an increase, methods to both reduce the nonresponse, for example through some prosecution action for the biggest units and some personal follow up for the smaller and medium sized businesses, should be considered. If the cost of personal follow-up is prohibitive, this might be instituted on a sub-sample basis to provide information on the nature of nonresponse and a basis for imputation.

4. Product scores and recommendations

4.1. Interpretation of the scores

The scoring system is the same as was used for the first time in 2024, and has the following four compliance levels with respect to the statements provided for each of the six Quality Assurance Factors:

1. Do not agree
2. Agree partially
3. Agree fully
4. Agree fully, and more is done over and above this level

Level 3 in the list above is considered as being “fit for purpose” which is the explicit objective of Statistics Sweden according to the quality concept of Sweden’s official statistics.

Given the change in the ratings system it is not possible to compare the scores in this report with the ratings previously achieved for products also assessed in rounds of ASPIRE prior to 2024.

The ratings assigned to a particular source of uncertainty for a product have however an unknown level of uncertainty themselves due to some element of subjectivity in the assignment of ratings as well as other imperfections in the rating process.

The assessment of low, medium, or high importance to overall accuracy is done within a product, not across products. Thus, it is possible that a highly important source of uncertainty for one product could be of less importance to Statistics Sweden than a medium important source of uncertainty for another product if the latter product carries greater importance and/or risk to Statistics Sweden or for official statistics. The assessment of the importance should reasonably reflect the evidence in the Quality Report, and it may aid the product in prioritising improvement work.

The results of the review are presented below for each product. All of the products that were reviewed face different production conditions and challenges. The sources of uncertainty included in the Accuracy component also vary in importance for each respective product. This means that comparisons between products are not deemed to be meaningful and will not be shown in this report.

Comparisons over time can be made in the future to the extent that the same products are selected more than once over time.

4.2. Quarterly economic statistics (QES)

The QES is a relatively recent product and was therefore selected for ASPIRE to gain a view of its quality. It has brought together existing surveys on inventories and gross fixed capital formation (GFCF) with a new survey on detailed profit and loss accounts, the latter being used to provide quarterly estimates of change in intermediate consumption. The processing path reflects this history – the three samples are designed independently; the relevant sets of questions (for one, two or three parts) are included on a single questionnaire, sent to the selected businesses, so responses reach Statistics Sweden in a single dataset; the data are then split into three parts which are processed independently; and the results are brought back together in a single quarterly publication.

The introduction of QES facilitated several improvements:

- quarterly estimates of profit and loss and intermediate consumption (an important and previously missing link for the National Accounts)
- better alignment of the data collection with accounting records
- more economical data collection (for Statistics Sweden)
- some response coordination for responding businesses (particularly larger ones included in multiple parts)
- increased resilience of systems

Data collection and nonresponse

There is no coordination between the samples of the three survey components in the QES, but there is positive coordination from year to year in each component, with 80% of units in common. The data collection is integrated into a single questionnaire for each sampled business. The statistical statement says that this is aimed to reduce the response burden, but this is based on an assumption about the way businesses respond rather than a measure of burden.

Resources for collecting data have been reduced, and therefore the response rate has decreased recently. The data collection area handles identified deaths of sample businesses (from email information or undelivered letters), which are therefore treated consistently across the three parts of QES. Where no information is received, however, there is no practical way to distinguish nonrespondents from deaths. The proportion of deaths among nonresponders is assumed to be the same as in responding units (including identified deaths), so to the extent that this assumption is not true (which may vary over the economic cycle) there is a risk of coverage error. Understanding the impact of nonresponse is important. The product team could follow up a subsample of nonrespondents to provide more information on their status and characteristics, and document the outcome.

Following up response from large businesses has been prioritised over micro-editing, which is selective (only edits having significant impacts on the outputs are considered). The selective editing limits have been pushed up. The perception of the product team is that the reduction in micro-editing has not had an impact on quality, as any remaining errors are picked up through macro-editing, and therefore that this is an appropriate efficiency saving. It would be interesting, and useful for users, to assess and document this explicitly.

In the past there was enforcement of the obligation to provide data (pre-COVID), and a letter from Statistics Sweden's DG has been sent to persistent nonresponders to encourage them to participate in surveys. This no longer happens, so some businesses have become persistent nonresponders. Therefore, a reconsideration of some enforcement to support data collection may be needed.

Some businesses selected for the profit and loss account sample contact Statistics Sweden to say that they cannot provide profit and loss information quarterly. There may be a need to work with these businesses. The large cases unit has in recent times been focused on profiling activity, but as this activity is ending, there may be capacity for follow-up of such cases.

Quarterly change

The main focus of QES is on measuring quarterly changes. For inventories, only changes are published, partly because of concerns about the valuation basis of the collected data. Sampling errors, however, are calculated only for the levels of GFCF and inventories (and not for profit and loss which is based on a census). Sampling errors for GFCF are included in the quality report, but those for inventories are not.

All three survey components use cut-off designs (only for some variables in profit and loss, while administrative data completes the population information for other variables), so the smallest businesses are not sampled. Models are used to extend the patterns to smaller (10-19 employment), but not the smallest (0-9), businesses in GFCF and to all businesses for inventories. There is a risk that these modelling assumptions will break down, particularly when there are rapid changes in the economy, for example due to a sudden downturn. An analysis of these patterns would support the model assumptions, so the product team should consider using alternative data sources to analyse these movements over the economic cycle.

Seasonal adjustment has not been applied since QES is relatively new. Clearly for the profit and loss collection the time series is short, and this is acceptable. For GFCF and inventories, there is a longer time series of estimates, although with some differences (and affected by COVID). But the seasonal pattern should have common drivers. We therefore suggest that seasonal adjustment of these series should be provided, with appropriate qualifications about their quality, as they will be more useful to users than the unadjusted series, which is open to misinterpretation.

Estimation

For GFCF, estimation takes place in strata formed by the number of employees. For inventories, strata are formed by inventory values obtained either from the Structural Business Statistics (SBS), from annual corporate income tax returns submitted to the Swedish Tax Agency (Skatteverket), or, for large enterprises in a fully enumerated stratum, the inventory values from the fourth quarter of the preceding year. In some industries specific variables are used (eg property tax value for real estate businesses). This has been based on evaluations which show that there is little difference in predictive power between employment and turnover for GFCF. It would be helpful for users if these studies were documented and linked from the quality report or statistical statement. Nevertheless, the different approaches in the three parts of QES have a cost. Simplifying to one size measure eg turnover might reduce the work needed in creating each annual frame, and also facilitate positive or negative sample coordination for each selection period.

Estimation is based on the Horvitz Thompson estimator. But with good auxiliary information, using a ratio estimator may improve accuracy.

Revisions

Revisions information is given in the quality report, covering one year. It would be helpful to have a longer series of revisions using whatever previous information is available. There is some limited impression from what is provided that revisions may be more in one direction (upward for GFCF, possibly driven by the zero imputations; downward for inventories). The product team could consider an analysis of the consistency of revisions.

Users

The National Accounts are the main users, to derive quarterly estimates of value added, and there is regular communication with them. The quarterly QES publication appears a week before the corresponding GDP estimates and contains more detail. A range of external users is interested in this material, including the National Institute for Economic Research (NIER) and the Riksbank, and the outputs have been used as an input to wage negotiations. A meeting with NIER to discuss QES is planned, and this could become regular. Otherwise, there is no specific user forum for QES, but there is a user council for economic statistics at which user input can be gathered. Much of the communication is push (from Statistics Sweden), but contact information is provided so that specific queries can be passed to the appropriate experts.

The team has provided reports/papers for the Voorburg group and monthly bulletin on the Swedish economy. For the most innovative parts of QES, the product team could consider a paper for *Journal of Official Statistics*.

Recommendations

We recommend that the product area:

1. Consider the benefits and costs of a substantial harmonisation of the parts of QES – in particular
 - a. a common design with the same stratification variables which may make frame creation and sampling more efficient
 - b. positive coordination between the three survey components (which could be through the sample or by using SAMU),
 - c. an evaluation of moving to ratio estimation
2. Take a sample of the non-responding units to the QES and undertake intensive efforts to determine if indeed these units are alive and with relevant activity (this could be supported by the use of legal powers to gain response from persistent nonresponders). If so, see how their characteristics differ (if at all) from responding units in the same stratum. The results would better inform contact and compliance attempts to help improve response rates. It would also inform imputation strategies in the future. If the businesses are no longer alive, investigate whether they are being treated appropriately in estimation as representing other defunct units in the population.
3. Provide documentation of quality investigations supporting the quality descriptions of QES. There are many areas where the team has either (a) assessed quality and provided internal documentation (eg checking on GFCF of new businesses; checking that the cut-off modelling is appropriate; assessing the effectiveness of imputing 0 for GFCF in nonresponding larger businesses) or (b) has an impression of the impact of certain practices on quality, but has not formally assessed them. Clearly, they cannot all be done simultaneously, so there should be a prioritised program to document and/or complete assessments over a reasonable timescale. Documentation should be linked within the quality report.
4. Calculate sampling errors of the changes in GFCF and inventories, as these are the statistics of key interest, and provide them in the quality report.
5. Search out data sources, for example tax data, that allow an analysis over time of whether different sized businesses move in the same way (in aggregate and at industry level), paying particular attention to turning points in the economy.

Score matrix, QES 2025

Components of Accuracy	Quality Assurance Factors						Importance to Overall accuracy for single sources of uncertainty (Low, Medium or High - L, M, H)
	F1. Available expertis	F2. Compliance with standards and best praxis	F3. Communication with users and knowledge of quality requirements	F4. Knowledge of achieved accuracy and results of improvement activities	F5. Knowledge of quality improvements and plans for improvement activities	F6. Communication with representatives of data sources	
Overall accuracy	3	3	3	2	3	3	
Sources of uncertainty (average):	2,8	2,8	2,7	2,3	2,5	2,5	
Sources of uncertainty (mode):	3	3	3	2	3	3	
-Sampling	3	2	3	2	3	3	M
-Frame coverage	3	3	2	3	2	3	M
-Measurement	2	3	3	2	3	2	H
-Non-response	3	3	2	3	2	3	H
-Data processing	3	3	3	2	3	2	L
-Model assumptions	3	3	3	2	2	2	H
Preliminary statistics compared with final statistics	3	3	3	3	3	3	

Response options in relation to statements for Quality Assurance factors

- 1 Do not agree
- 2 Agree partially
- 3 Agree fully (considered as fitness for purpose level)
- 4 Agree fully but more is done over and above this level.

4.3. Research and development in Sweden (R&D)

The Research and Development (R&D) statistics illustrate the financial and human investments in research and development in Sweden. The statistics enable comparisons between different performers within the country, within the EU, over time and between EU countries. The core statistics are commissioned by the European Commission. Additional data is collected and statistics of interest to other users are produced.

The statistics cover 4 sectors: Business enterprise sector, Government sector, Higher education sector and Private non-profit sector. More than 70% of R&D carried out in Sweden is in the Business enterprise sector, and 50% of it comes from just 10 enterprises.

In odd numbered years (2021, 2023, etc.) data is gathered from several registers and one or more survey for each of the four sectors, asking about R&D activity. In even numbered years the EU data requirements are less rigorous; therefore, model estimation is used to produce statistics from registers and data from other surveys (not expressly conducted for this purpose but with relevant questions).

Business enterprise sector

The target population for the Business enterprise sector is all private and state-owned financial and non-financial enterprises operating in Sweden that conduct or finance R&D. The frame is constructed from the business register and various surveys and administrative sources that give a signal of R&D activity. All enterprises in SNI 72 (Scientific Research and Development) are included, and all enterprises with 200 or more employees are included. Estimates of R&D activity for all enterprises with 10 or more employees are required by the EU Commission. In reference year 2023 enterprises with 1-9 employees (micro-enterprises) that were likely to conduct R&D activities were also surveyed. The same criteria for delimiting the frame were applied to the micro-enterprise population as to the rest of the population. A census survey is taken of all frame units, including the micro-enterprises.

The observation unit for the R&D statistics is the legal unit. In cases where the enterprise consists of only one legal entity, the statistical unit and the observation unit are the same. For enterprises where no R&D units have been identified from administrative sources and with 200 or more employees, one legal unit (the one whose characteristics are closest to those of the enterprise) is chosen to be the observation unit. The European Commission stipulates that all EU member states use a common definition of an enterprise as defined by the Council Regulation No 1993/696. In other words, starting with the reference year 2023, a new interpretation of the definition of statistical units has been adopted at Statistics Sweden, affecting several unit types, including enterprise units. The implementation of this new interpretation and the ensuing profiling process resulted in the number of complex enterprises on the business register increasing from 30 to over 50,000.

This had a significant effect on the R&D statistics when presented by industry and size class, and by region. The Product Team are delaying the release of 2023 R&D intensity statistics until they can redesign the methodology and determine a way to make sense of the apparent sudden change in the intensity statistics. Moving from a sample survey to a census of enterprise units was to deal with the new interpretation of the enterprise unit. The issues with R&D intensity statistics are caused by profiling and an investigation on how to produce these statistics is ongoing. The Product Team has met with the Annual Frame Team to discuss a way forward.

Unit non-response to the Business enterprise sector survey in reference year 2023 was 14% for the population of businesses with 10 or more employees and 20% for the population of businesses with 1-9 employees. Non-response follow-up consisted of sending notifications to electronic mailboxes with invitations to complete the survey at the link provided. Telephone follow up was done with the small number of enterprises which make up the majority of R&D activity in Sweden. Two methods were used to compensate for unit non-response. For enterprises deemed important for the survey, previous value imputation adjusted for current year prices was used. To compensate for the remaining unit non-response, post-stratification followed by imputation of the stratum mean was used. This method assumes that non-respondents have the

same characteristics as respondents, which may or may not be true. Also, while information is available for some units, it is not always known which non-responding units are actually no longer in operation.

The population of businesses with 1-9 employees was surveyed in reference year 2023 and also in reference year 2013. Analysis revealed that the levels were similar. Further analysis could show the distribution of industries and R&D spending one decade apart. The Team is preparing an article with their findings on this population. While the data is of great interest to researchers, the inclusion of this population creates a burden on both the Production Team and the respondents; hence this is only done on an ad hoc basis.

Higher education sector

The target population for the Higher education sector is private and public universities and colleges performing R&D, as well as research institutes, experimental stations and clinics whose R&D activities are controlled or administered by tertiary education institutions.

The target unit for the Higher education sector is the institutional unit. For economic variables, the observation unit is the institutional unit. For personnel variables, the observation unit is the position at the institutional unit. The frame population for measuring the economic target variables consists of higher education institutions that have reported revenues for research and doctoral education for the reference year to the Swedish Higher Education Authority. There is no over coverage, and likely no under coverage (if there is, it is likely very limited). A census survey is taken of the entire population. The response rate for reference year 2023 was 100%.

The frame population for personnel target variables is delimited from the register Employees in higher education. This is a register of all positions of employment at Swedish higher education institutions in October of the reference year. Under coverage could occur under several scenarios, for example if positions are added after October. A sample is drawn from this frame and a time use survey is used to collect the personnel target characteristics. This survey is voluntary and had a low response rate for reference year 2023 (44%). Item non-response was compensated for using imputation and re-weighting was used to compensate for unit non-response. This assumes that non-respondents are the same in their characteristics as the respondents, which may or may not be true.

One of the personnel variables is the highest level of education of employees doing research. This variable is available on the Register of Educational Attainment of the Population, but it is known to have missing information. Specifically, when someone gets some of their education in Sweden, then goes to another country for education, for example a Master's Degree, then returns to Sweden and finds a job, the Master's Degree is never reflected on the Register. This error has been detected in the Higher education R&D data in that over time the highest level of education among university staff doing R&D activities seems to be going down, which is unlikely to be true.

Preliminary vs final statistics

A statistical database is released annually, with a preliminary version available in June and the final version in October the year after the reference year. Several publications are disseminated after the final data release. The preliminary statistics have one principal user, the Ministry of Education who use these statistics for their upcoming budget bill. Comparisons between preliminary and final statistics have shown that the size and direction of revisions vary from year to year, and in general, total expenditure on intramural R&D tends to be revised upwards by approximately SEK 2 billion. There is definitely scope for more analysis on the difference between preliminary and final statistics to be done, with the aim of being able to adjust the preliminary estimates and reduce the size of revisions. It is possible that more users would be interested in the preliminary statistics if they were more accurate.

Recommendations

We recommend that the product area:

1. Continue to discuss with the Statistical Business Register Team the best way forward to produce R&D intensity statistics while respecting the enterprise unit as defined by the EU requirements. We also recommend a follow up on this issue in the next ASPIRE round.
2. Take a sample of the non-responding units to the Business enterprise census survey and perform intensive efforts to determine if indeed these units are alive and performing or funding R&D activities, and if so, to see how their characteristics differ (if at all) from responding units in the same stratum. The results would better inform contact and compliance attempts and imputation strategies in the future.
3. Attempt to improve response to the Higher education time use survey through engaging University senior management about the need for their research activity to be fully reflected in the estimates, and provide information on the level of research activity at their institution compared to the rest (colourful graphics, in real-time). The time use survey could be simplified by using radio buttons instead of having the respondent type the percentage of time devoted to research alongside similar feedback on level of activity compared to the rest.
4. Undertake a study to try to find evidence of Master's Degrees or PhDs where they seem to be missing for university researchers, even if only for a subsample. This could be done for example through university websites and LinkedIn. Results and findings from this study should be shared with those responsible for the Education Register for the benefit of all users.
5. Do more analysis on the difference between preliminary and final statistics. Specifically, look for patterns through time at different levels of aggregation. The presence and size of tax incentives could also be used in the comparison.

Score matrix, R&D 2025

Components of Accuracy	Quality Assurance Factors						Importance to Overall accuracy for single sources of uncertainty (Low, Medium or High - L, M, H)
	F1. Available expertis	F2. Compliance with standards and best praxis	F3. Communication with users and knowledge of quality requirements	F4. Knowledge of achieved accuracy and results of improvement activities	F5. Knowledge of quality improvements and plans for improvement activities	F6. Communication with representatives of data sources	
Overall accuracy	3	3	3	3	3	3	
Sources of uncertainty (average):	3,0	3,0	3,0	2,8	2,8	2,4	
Sources of uncertainty (mode):	3	3	3	3	3	3	
-Sampling	3	3	3	3	3	3	L
-Frame coverage	3	4	3	3	3	3	L
-Measurement	3	3	3	3	3	3	H
-Non-response	3	2	3	2	2	3	M
-Data processing	3	3	3	3	3	N/A	M
-Model assumptions	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Preliminary statistics compared with final statistics	2	2	2	2	2	2	

Response options in relation to statements for Quality Assurance factors

- 1 Do not agree
- 2 Agree partially
- 3 Agree fully (considered as fitness for purpose level)
- 4 Agree fully but more is done over and above this level.

4.4. Educational attainment of the population and the Education Register

Statistics on the education of the population in Statistics Sweden cover an array of measures based on significant data sources. Education statistics are used by organisations in the Education Sector for educational planning and policy purposes. They also play an important part in understanding patterns in the labour market, and they are very relevant to cross cutting analyses of socio-economic conditions. In addition, highest level of educational qualification is important within Statistics Sweden in survey design and estimation, used in both stratification and calibration in household surveys. Information on highest level of education is a core statistical variable collected to be analysed jointly with other variables in social surveys such as the Survey of Income and Living Conditions.

In its work on education statistics, Statistics Sweden collects and manages a vast array of data at the population level on all courses and subjects studied at Swedish institutions, from school age up. This provides an immensely rich longitudinal capability for statistics and analysis.

A register of each person's highest level of education, UREG is an element of this capability. It includes each person's highest level of education, the field of study, the time of completion, and the source of the information, along with country of birth, age, gender, county of birth, and municipality of population registration. The unit produces a standard set of statistics from this register annually, and in addition analysts make significant use of the microdata to provide an educational dimension to their analyses.

Given the rich potential of the educational data available to Statistics Sweden, the question arises as to whether the outputs that are produced from it are meeting users' needs, and whether there are further important questions of key users that could be addressed with the potential information available. A simple example would be the ability to include multiple levels and/or fields of study to better understand such processes as the movement of trained people out of one career, e.g. nursing, and into another.

The main avenue for user consultation appears to be the User Council which has a main focus on the use of the statistics for the education sector, for example in planning and policy making, rather than including the broader user needs in social analysis. This limited consultation may be restricting the scope for users outside the education sector to discuss the use of the richer dataset that is potentially available, to answer burning issues they might have.

The key data items on UREG are highest level of education and field of qualification. The main quality issues for these variables relate to data that is missing, both for the foreign-born population and for those who leave Sweden to study abroad. While the numbers of people in these groups are small relative to the overall population, they are groups that are of interest to analysts and their characteristics are not necessarily well represented by the rest of the population.

For the population born outside Sweden, a survey is run annually to collect information on highest level of education as a source for the register. However, 9.2 % of foreign-born persons do not have any information on education on the register. Missing data is most prevalent among new immigrants and varies by country of birth. Studies have shown that about two thirds of those with missing data have immigrated for work and studies, and their level of education is generally high.

Work has been done to develop an imputation method for missing data which uses known information to select 'donors' to impute values for missing data. The values could, in theory, be added to UREG, but because UREG is seen as a register rather than a statistical database, there are seen to be problems in adding imputed values to the records, even if flagged as 'analytic values'. However not using some form of mitigation for the missing data would mean allowing distorted views of the foreign-born population group to be derived, whether in statistical aggregates or analyses. The current thinking is to use the imputation in deriving statistics, but not to use it to impute individual records. This would mean that external microdata analysts would not have access to the work done by Statistics Sweden, and statistics produced by them would not be consistent with statistics for this group produced by Statistics Sweden. The review team believes that Statistics Sweden needs to consider how to include analytic variables for statistical purposes on its databases used for statistical purposes and for dissemination to analysts.

Another quality concern relates to those born in Sweden who have spent a period of time outside the country, and potentially acquired qualifications in another country, where those qualifications do not require certification to work in Sweden. For these people there will be a value for higher education on the register, but it may not be the correct 'highest level of education'. No studies have been done on this, but the number of people involved is not expected to be large. However, it is also likely to affect some population groups, and some fields of study or levels of study, more than others. A suggestion was that maybe a group of people whose occupation seemed out of line with their level of qualification might be followed up on a sample basis to determine the likely level and nature of any downward bias in 'highest level of education' arising from this source.

A third area of potential quality concern for UREG relates to people who are still on the population register, but who have left the country. Again, if these people tend to have different educational qualification characteristics, it might distort analysis of the distribution of educational qualifications, for example within certain age groups. While this is not believed to be a large source of error on the register, it would be good if some source that indicated people still on the population register, but seen as likely to no longer be in Sweden could be identified (for example through their absence of expected activity on relevant registers). Their characteristics in terms of educational attainment could then be analysed. Sources such as LinkedIn might provide further insights for a sample of these people in terms of current location.

New Developments

While the area has a very full program of work maintaining ongoing outputs including the register and a core set of educational statistics, there is work done more generally in education statistics that is undertaken in response to new needs and new opportunities arising outside the area of educational attainment.

There is work being undertaken relating to data collection from schools via machine-to-machine collection, however this is made difficult by the variety of systems in use by schools.

A new development that is taking place that would be facilitated by such machine-to-machine collection, is the use of Statistics Sweden capabilities to process absence data from schools, illuminating what is happening in an area of significant social concern. This development is seen by the ASPIRE team as an excellent example of statistical leadership.

Work is also being done looking at the feasibility of producing statistics on reading ability for newly arrived immigrants, both adults and children, as well as possibly their ability to speak and understand the language.

There is a proposal from Statistics Sweden to government for a change in policy to enable data from special schools for pupils with learning disabilities to be used and retained for a longer period for statistical purposes.

There is known user interest in some new areas of statistics in the field. This includes coverage of the pre-school educational environment as well as interest in the register including the latest educational qualification gained as well as the highest level of education.

Apart from looking to improve their front-end interfaces with the school systems, the unit is comfortable with their current IT systems and the level of expertise they have with them. However, it is important to ensure their capability is not person dependent. The unit is currently progressing their efficiency with the recent introduction of Machine Learning as a tool for automated coding. The introduction of this tool is progressing, as the area is learning to make effective use of it.

Recommendations

We recommend that the product area:

1. Find a means to get closer to key users outside the education sector, to ensure the rich value of the available or potential datasets and skills can be applied to understanding burning cross cutting issues. (For example, a high-level Social Analysis User group).
2. Consider developing a category of data on the register that is there for analytic purposes. This would consist of additional information flagged on the record as analytic data. It may not be used in official statistics, nor backcast for time series in official statistics, but would be available for analysts to use to get a better picture of the population for relevant analyses. The first set of additional information that is recommended is an imputed level of highest education for foreign born people with missing data. The imputation approach would be of the sort already studied by the area. Users would be informed of the methodology used and would have the choice to work with the actual responses only or to use the imputations provided. The second set of additional information that is recommended for consideration, is an overcoverage flag. This might take the form of a probability measure indicating the likelihood the person is still in the country. Analysts would then have the choice to use the information or not as it would be flagged and explained. It is recognised that adding analytic variables to a register might be problematic, and in that case, it is recommended that consideration be given to how a statistical view of a register might be created that could include analytic values.
3. Consider potential studies of people who have left Sweden for a period around student age say 18 to 25 and returned to relatively well-paid jobs in Sweden. Or people whose occupation and income are unusual for the highest level of qualification stated. Follow up of a sample of such a group might indicate whether there is potentially a large underestimation of highest level of education for this group.
4. Seek out opportunities to measure the overall quality of the highest level of educational qualification as recorded on the register through confrontation of values from different data sources, including any directly collected data.

Score matrix, Educational attainment of the population and the Education Register 2025

Components of Accuracy	Quality Assurance Factors						Importance to Overall accuracy for single sources of uncertainty (Low, Medium or High - L, M, H)
	F1. Available expertis	F2. Compliance with standards and best praxis	F3. Communication with users and knowledge of quality requirements	F4. Knowledge of achieved accuracy and results of improvement activities	F5. Knowledge of quality improvements and plans for improvement activities	F6. Communication with representatives of data sources	
Overall accuracy	3	3	2	2	2	3	
Sources of uncertainty (average):	3,0	2,5	2,8	2,5	2,8	2,8	
Sources of uncertainty (mode):	3	3	3	2	3	3	
-Sampling	N/A	N/A	N/A	N/A	N/A	N/A	N/A
-Frame coverage	3	3	2	2	3	3	L
-Measurement	3	2	3	2	2	2	L
-Non-response	3	2	3	3	3	3	H
-Data processing	3	3	3	3	3	3	L
-Model assumptions	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Preliminary statistics compared with final statistics	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Response options in relation to statements for Quality Assurance factors

- 1 Do not agree
- 2 Agree partially
- 3 Agree fully (considered as fitness for purpose level)
- 4 Agree fully but more is done over and above this level.

4.5 Statistics on Income and Living Conditions (EU-SILC)

Under EU Regulation (2019/1700) countries are required to submit to Eurostat a detailed microdata set of variables at both household and individual level, to a set specification and timeframe. These requirements are met through the Swedish Survey of Income and Living Conditions which was created by a merger of two surveys, (the Swedish Living Conditions Survey and the EU SILC). In 2021 the survey was redesigned to use the resources more efficiently and to meet the requirements of EU regulations. A further redesign took place in 2022 to introduce mixed mode in data collection.

The survey is a rotating panel survey of individuals who remain in the survey for six years. Individuals are sampled from the population register and answer questions on their own behalf, by proxy for others in the household, and about the household itself. Each panel of ~ 3000 respondents is intended to be representative of the national population and is replenished each year for new people who join the register. No replenishment is made for panel attrition.

The survey covers a very broad range of topics, most of which are set by the EU and others which are to meet national interests. The potential to include questions on topics of national interest has decreased since the merger of the two surveys but is now accepted by users. One of the positive outcomes of the redesign and merger is that the survey does have a larger sample than previously, so is able to support publication annually rather than having to pool two years of data.

Each interview consists of core questions collected every year (income, deprivation, economic activity, demography, education, childcare, housing costs, health and quality of life) followed by rotating trailers either for the EU or to meet national user needs. EU modules include:

- Labour market, health and children every 3 years,
- Intergenerational transmission of advantages and disadvantages and housing difficulties; Over-indebtedness, consumption, and wealth; Access to services and 'Quality of life' every 6 years
- Ad hoc modules to meet urgent policy needs.

This broad coverage of topics on the same survey sample which has both cross sectional and longitudinal attributes is a hugely valuable asset with the potential to tell the story of life in Sweden and individual and household trajectories. Many of the topics have particular relevance in the context of global and national cost of living crises. The statistics will be of interest beyond the usual audience for statistics as they have a strong human-interest element in relation to poverty, inequality, material deprivation and housing conditions such as overcrowding, not just at a point in time but longitudinally given that respondents remain in the sample for 6 years.

Data collection

The data is collected by web and telephone interview and is concentrated over a six-month period rather than throughout the year. This is to meet the EU data delivery requirements for the reference period. Multi-mode data collection was introduced in 2022 and just over a quarter of interviews are conducted by CATI.

Nonresponse has been identified as an issue that impacts on quality. Response has decreased over the past number of years but has now settled at around the 50% mark. Declining response rates are observed in many countries, so this is not unique to Statistics Sweden, indeed the decline in response rates has been greater in many other countries. The nonresponse is roughly equally split between refusals and non-contacts. Various checks are done at macro level with other sources such as registers to ensure coherence and nonresponse adjustments are made for the responding sample. Adjustment for nonresponse is handled through weighting. The structure of the data is checked through the collection routines and through the very thorough data checks done by Eurostat.

There is ongoing monitoring of response and consideration of what steps can be taken to reverse the trend or at least mitigate against further decline with a particular focus on the new sample/first contacts. The contact strategy is a mix of digital and telephone with many attempts made to contact people. The analysis

that is done to support decision making on contact strategies is relatively high level and resources have not been available to develop this further. The team is aware of the EU funded work on nonresponse on the LFS and are awaiting the recommendations from that work. In the meantime, they are considering other actions such as incentives, but this is a work in progress given constrained resources.

The team does look at various indicators during fieldwork but generally does not make a distinction between refusals and noncontacts. Understanding more about the characteristics of noncontacts versus refusals could provide insight that would inform the data collection process. A planned report on nonresponse has not been taken forward due to lack of resources and would require further methodological input.

Longitudinal series exploitation

The design of the survey is to allow for longitudinal analysis, however the main focus in publication is on the cross-sectional data. The potential for longitudinal analysis has not been realised which is a loss to the value of the dataset. The team are investigating methods for supporting longitudinal analysis including looking at how Machine Learning might contribute to computation of longitudinal weights.

Documentation

The documentation that is required by the EU is comprehensive and the main priority of the team is to meet the EU requirements. There is more detail available on the website and in the EU metadata than is available in the national Quality Report or Statistical Statement. It would be helpful to engaged users to ensure that all relevant information is presented in the national Quality Report, at a minimum including the response rates, and providing links to specific studies that support statements on confidence in the data.

Dissemination

The most recent statistics based on data collected in January to June 2024 were published in February 2025. The main dissemination channel is to deposit the data in the statistical database. No single report is published that draws together the main findings from the survey when the data is released. This is a missed opportunity to ensure wide reporting of the findings and to promote Statistics Sweden as the go to place for statistics and analysis on understanding society. Reports on national topics are published on a thematic basis. Given the sunk costs of conducting the survey, it seems that the full value of the investment is not being realised.

While the main dissemination route is via the statistical database, the review team found it difficult to navigate the many tables that are published and were unable to find signposting to future publications plans. Given this is an annual survey, any casual user, unable to find out when the next release will be available, might conclude that the survey is not continuing.

Recommendations

We recommend that the product area:

1. Consider the priority given to the report on nonresponse with a particular focus on the distinction between refusals and noncontacts. This analysis could provide insightful evidence available to support further efforts to increase response.
2. Review how the detailed analysis available in spreadsheets on the website, for example on the number and characteristics of respondents, could be more visible in the national Quality Report.
3. Ensure future publication dates or database updates, even if only tentative, are always displayed on the home page of the database.
4. Consider providing analysis and commentary at the time of publication so as to fully extract value from the survey and to promote the availability of this rich dataset.

5. Consider how the current analyses, which are cross-sectional or single theme in nature, can be augmented with cross-cutting and longitudinal analyses so as to exploit more fully the potential of the data to show, for example, trajectories into and out of poverty.

Score matrix, EU-SILC 2025

Components of Accuracy	Quality Assurance Factors						Importance to Overall accuracy for single sources of uncertainty (Low, Medium or High - L, M, H)
	F1. Available expertis	F2. Compliance with standards and best praxis	F3. Communication with users and knowledge of quality requirements	F4. Knowledge of achieved accuracy and results of improvement activities	F5. Knowledge of quality improvements and plans for improvement activities	F6. Communication with representatives of data sources	
Overall accuracy	2	2	2	3	3	3	
Sources of uncertainty (average):	2,8	2,8	2,8	2,8	2,8	2,8	
Sources of uncertainty (mode):	3	3	3	3	3	3	
-Sampling	3	3	3	3	3	3	M
-Frame coverage	3	3	3	3	3	3	L
-Measurement	3	3	3	3	3	3	M
-Non-response	2	2	2	2	2	2	H
-Data processing	3	3	3	3	3	3	M
-Model assumptions	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Preliminary statistics compared with final statistics	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Response options in relation to statements for Quality Assurance factors

- 1 Do not agree
- 2 Agree partially
- 3 Agree fully (considered as fitness for purpose level)
- 4 Agree fully but more is done over and above this level

5. References

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