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# Quality evaluation of Business register with ASPIRE

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## Introduction

Statistics Sweden has with the help of two international experts, Paul Biemer from the US and Dennis Trewin from Australia developed a system that aims to evaluate quality changes in Statistics Sweden's statistics products. It is called ASPIRE (A System for Product Improvement, Review and Evaluation). The Statistical Business Register (SBR) is assessed now every second year by an external team of international experts.

ASPIRE is one of several elements of Statistics Sweden's quality work. It follows Statistics Sweden's regular cyclical procedure with evaluation of results and feedback to forthcoming production rounds. ASPIRE consists of a quantitative evaluation of the quality component, Accuracy, and its subcomponents. Each of the Accuracy components is evaluated according to six criteria.

This paper will present the most recent quality evaluation of the SBR using the ASPIRE approach, as well as a brief overview of the ASPIRE evaluation system.

# Background

ASPIRE was developed by Statistics Sweden together with Paul Biemer and Dennis Trewin in 2011. The background was that the Swedish government commissioned Statistics Sweden to supplement the ongoing quality initiatives by developing “quality indicators” for its statistics and to annually report the results back to the government. After seven rounds of ASPIRE, Statistics Sweden carried out an evaluation of the approach itself in 2017 which resulted in a number of modifications, among which were a renewal of the expert team and a closer synchronization of ASPIRE to Statistics Sweden quality management system.

The main actors in the evaluation process consist of the external team of international experts and the internal product teams. Starting in 2019, the team consists of the following three international experts: Susan Linacre (Australia), Johanna Laiho Kauranne (Finland) and Stephen Penneck (UK). Dennis Trewin, one of the former ASPIRE experts, acted as support during the 2019 round. Statistics Sweden always assists with administrative support before, during and after the evaluation.

The product teams consist of representatives of the statistical product. SBR was represented by two advisors for the business register, one advisor for large case units, a methodological expert assigned to the SBR and the head of unit responsible for the SBR.

In total five of Statistics Sweden’s most important products were evaluated in 2019. The others were: Labour Force Survey (LFS), Consumer Price Index (CPI), Producer and Import Price Index (PPI), and the GDP component of the quarterly National Accounts, (GDP-Q).

## The process in short

### Input

A few months ahead of the evaluations, the product team takes note of any new information regarding the ASPIRE approach for the current round and prepares the documentation deemed necessary. Input to the rating process is provided via predefined checklists, which constitute a type of self-assessment of the product in comparison with the latest

round. Supporting documentation for the product is also provided to the expert team. A large part of the documentation consists of the standardized documentation templates for describing quality in official statistics in Sweden. Finally, other documents that are relevant to the evaluation are also provided, such as documentation of ongoing development work and quality studies.

## **Interviews**

The experts meet representatives of the product including the head of unit in charge of the product. During this interview, the results of ongoing improvement activities are analyzed and both experts and product teams have the opportunity to ask questions and provide clarifications on the submitted documents. The main users are highlighted in the discussion as well as how results and quality aspects of the statistics are discussed with users. The checklists are reviewed and discussed for each subcomponent of Accuracy, including each applicable source of uncertainty. Finally, the experts make an assessment of the situation for the product by assigning preliminary ratings, as well as hold a discussion of possible priorities for the recommendations for improvements.

Prior to meeting with the product teams, the experts also meet with top management and the department heads concerned to receive a briefing on general developments at Statistics Sweden as well as to learn of any general quality concerns that have arisen since the last ASPIRE round.

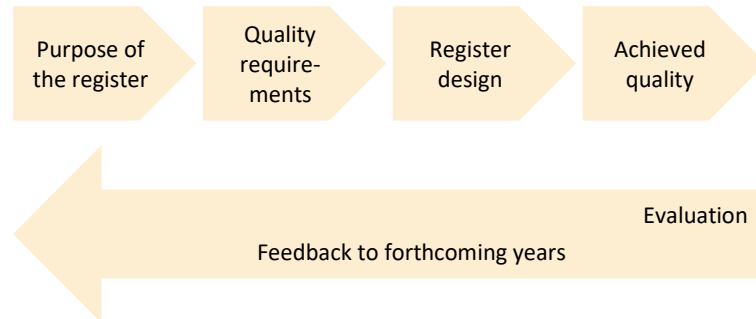
## **Output**

The expert team submits a report presenting the results of the current round, and provides recommendations for each product. Recommendations of a general nature are also provided to Statistic Sweden, for example if structural improvements are considered necessary to improve the statistics. A summary of the results is also reported annually to the Government in Statistics Sweden's annual report.

# **The ASPIRE approach**

The ASPIRE-model is adapted to the overall framework for the evaluation of the quality official statistics at Statistics Sweden. In short this means the ASPIRE process is in line with Statistics Sweden's regular cyclical procedure meaning that quality is always related to the

purpose of the statistics. An analogous cyclical procedure applies to registers.



**Figure 1.** A cyclical procedure

The perspective in this procedure is that the achieved quality in the statistics or register should be fit for purpose. The intention is therefore that the quality of the statistics should satisfy the prioritized needs of the main users.

ASPIRE focuses on one of the main components of the quality concept, Accuracy. All three of the subcomponents of Accuracy (according to the Swedish quality concept) are assessed (i.e. Overall accuracy, Sources of uncertainty and Preliminary statistics (register) compared to final statistics (register). Preliminary statistics compared to final statistics is not relevant for the SBR. In the case of statistical registers the Sources of uncertainty comprise:

- Coverage
- Measurement
- Non-response
- Data processing
- Model assumptions

One set of checklists are prepared for each of the subcomponents that the products prepare in advance. Common to all sets of checklists is that they are structured according to six criteria upon which the experts perform an evaluation of the accuracy of a product from the perspective of “fitness for purpose” and key uses of the statistics or register. The evaluation criteria are:

1. Knowledge of potential causes of uncertainty and their impacts
2. Communication with users and data suppliers
3. Available expertise
4. Compliance with standards and best practices
5. Plans for mitigation activities
6. Results of mitigation activities and other evaluation findings

Also common to all sets of checklists is that for each of the criteria there is a list of rating levels. With each successive level, the ambition is raised in comparison with the previous level. The resulting quantitative ratings are also coupled to form five levels of qualitative ratings: “poor” (1, 2), “fair” (3, 4), “good” (5, 6), “very good” (7, 8) and “excellent” (9, 10). Products are to indicate for each criterion the highest level of the product’s compliance and provide comments to justify that level. By doing so, the product signifies that it complies with the lower levels also. Advisably, products can review the assigned ratings from the previous ASPIRE round to find an appropriate starting point on each list. The product should consider if they have improved, deteriorated or remained at the same level as the previous round.

## Results 2019

As previously stated, the experts provide the results of the evaluations in a report where the resulting product ratings and average scores are tabulated. The experts also provide a number of recommendations for the product to consider in making improvements.

	Average Score Current Round	Knowledge of the potential causes of uncertainty and their impacts	Communication with users and data suppliers	Available Expertise	Compliance with standards & best practices	Plans for mitigation activities	Results of mitigation activities and other evaluation findings	Importance to Overall accuracy (single sources of uncertainty)
<b>Sub and sub-components of Accuracy</b>								
Overall Accuracy	55	○	○	○	○	○	○	
Sources of uncertainty:	58							
-Coverage	62	○	○	●	○	●	○	H
-Measurement	58	○	○	●	○	○	●	H
-Non-response	47	○	○	○	○	●	○	L
-Processing	62	●	●	●	○	●	●	H
-Model assumptions	52	○	○	●	○	○	●	M
Preliminary register compared with final register	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Ratings					Importance to Overall accuracy			
●	●	○	●	○	Not applicable (N/A)	Low (L)	Medium (M)	High (H)
Poor	Fair	Good	Very good	Excellent	Weights			
1-2	3-4	5-6	7-8	9-10	0	1	2	3

**Figure 2.** SBR ratings

The ratings for SBR 2019 is shown in figure 2. The average score for overall accuracy (55) is based on the results from the checklists for this subcomponent. The score for sources of uncertainty (58) on the other hand is a weighted average based on the scores for the five sources of uncertainty and the weights associated with the estimated importance of each source to overall accuracy. Efforts related to each one of the five sources of uncertainty resulted in a weighted average which is higher than the average for the subcomponent overall accuracy. The difference

between the two scores can be described as a reflection of the importance of user needs overall for the product. It is the score for the subcomponent overall accuracy that is reported to the government.

Below the numerical matrix is the levels for the qualitative rating, and the weights that are linked to the overall accuracy.

### **Recommendation 1 for the SBR:**

Continue to maintain strong focus on successfully concluding the re-engineering project, and on supporting the profiling of the largest business units. Develop a plan and implementation strategy, including an evaluation strategy, for the automated profiling which covers the next largest units.

### **Comments on the current work with this recommendation**

The re-engineered database will be launched in October this year. This project has been ongoing for almost ten years. The system for handling files from the Tax Office and other data sources has been modernized. The business rules for updating and checking the administrative data have been reviewed and modified, which will free up resources previously tied up by manual updates and make sure Statistics Sweden will have enough staff working with maintaining the profiled enterprises.

While the intensive manual profiling will be done with a focus on annual frames, there needs to be a continuous dialogue between profilers and the BR staff handling administrative changes on the profiled enterprise groups to ensure the quality of the quarterly frames.

The next largest units are currently being profiled using light profiling. Initially the whole enterprise group is assumed to be part of the same enterprise. Using light profiling, the profilers try to identify legal units (or groups of legal units) that are autonomous to a degree that they form a separate enterprise.

Automated profiling of the enterprise groups that are not subject to intensive or light profiling is still being discussed. Which strategy will be used, top-down or bottom-up, is currently under review and a decision will be made shortly.

During the last year, several surveys have made assessments on the impact of the implementation on profiled enterprises.

### **Recommendation 2 for the SBR:**

Develop a true SBR by liaising closely with surveys on key requirements to ensure the quarterly frames as well as annual frames are usable and used. This would include both implementation of an activity status code, and a centralised approach to frame validation to reconcile differences between quarterly frames. This would improve the ability of

the surveys to support high quality economic indicators, improve coherence between surveys, and improve the cost effectiveness of survey operations by validating quarterly frames once, centrally, for all surveys. The Register Unit should set up some quality monitors of the SBR from those surveys using it, (for example estimated over-coverage by industry on the SBR, estimated NACE miscoding by industry, estimated proportion of total value added that is miscoded on the register).

#### **Comments on the current work with this recommendation**

The quality of the quarterly frames will increase when the Tax Office starts sending monthly income statements later this year.

The re-engineered database will include an activity status code, but the actual implementation of business rules for updating the activity status have not yet been developed. However, the current over-coverage should not be exaggerated. Under the current business rules, only legal units registered for VAT, as an employer or for corporate tax are included in the SBR. Since these units do not have any employees and no turnover, they are in practice never included in any surveys.

There is an ongoing project at Statistics Sweden aimed at coordinating economic statistics. The SBR is a key part, but also coordinating different surveys to reduce response burden and overlapping questions.

#### **Recommendation 3 for the SBR:**

Review the design and size of the Register Unit's business units survey in the light of the potential for automating detection of likely new locations using employee address information. Currently business unit surveys follow up all multi location businesses every year, but other large businesses are only followed up when they are first added to the register. The units survey is currently only 8,000 per year.

Consideration should be given as to whether this is still an appropriate size and whether it is optimally targeted for the key uses of the register, or whether additional sources could indicate larger 'single' location businesses that warrant being surveyed.

#### **Comments on the current work with this recommendation**

All single-location legal units are regularly updated with information from the Tax Office. The number of employees is updated yearly and if large changes occur during the year this is handled. Also, the SBR gets regular feedback from surveys on both multi- and single-location businesses.

In addition to the 8,000 multi-location legal units, an additional 100 single-location legal units suspected of having more than one local unit have been included in the survey the last two years. However, the majority of them have answered that they indeed only have a single

local unit. While this shows that the assumption about the number of local units was wrong, the overall quality has increased since the survey also includes questions about NACE-codes, number of employees etc.

## Discussion

For the product, the approach provides several benefits. First, it is valuable to have an outsider's view of the quality level and planned improvement measures. The comments indicate which measures should be given priority. Secondly, the recommendations are communicated to the top management at Statistics Sweden, which also helps bring up the desired changes on the agenda. Of all the improvement proposals during an ASPIRE round, only a few can be fully realized during a financial year due to limited resources. Thirdly, it provides an opportunity to review improvement proposals in a structured way and reassess them. A recurring review forces the product team to look up and review the entire process chain from data collection to publishing frames to see which proposals are still relevant. The approach also ensures that the product has reliable and up-to-date documentation in place, which in itself benefits users of the product.

The ratings for SBR give significant input to the product team and the users. The scores for each of the five sources of uncertainty provides an opportunity to divide, clarify and communicate development efforts for the quality component accuracy. The scores for a product is not suitable for comparison with other products, partly because they can be very different in their design, but also because the weights associated with the importance to overall accuracy can differ. For the individual product, the rating allows for comparisons between the ASPIRE rounds. Based on a theoretical maximum of 100 for overall accuracy, SBR is in the range 50 - 60. According to the five levels of qualitative ratings, 50 - 60 is "good". Changes in the total score for SBR have been small between rounds. This is largely the result of the long-standing effort to renew the technical platform. The work has locked resources over a long period of time and at the same time limited other, larger development initiatives that could have benefited users.



# Summary and Conclusion

ASPIRE is an evaluation approach that Statistics Sweden uses to quantitatively evaluate the accuracy of a selection of the agency's important statistical products. Statistics Sweden employs a team of external experts to ensure objective assessments. An important starting point of the evaluation is that the quality in the statistics is set in relation to the purpose of the statistics. In addition to the evaluation, external experts provide recommendations which are an important source of inspiration for staff to make improvements – if needed, in relation to a fitness for purpose perspective. The results are reported annually to the Swedish government.

ASPIRE gives valuable input to the continuous improvements of the SBR by highlighting efforts that give value to the users of the register. The recommendations serves as another voice that helps Statistics Sweden prioritize among several areas of improvement. For the SBR, the approach provides detailed recommendations for areas of improvement and how they should be prioritized from the users' perspective. The product team is also forced to evaluate the production chain from an overall perspective with some regularity. All in all, this contributes to Statistics Sweden's cyclical procedure to improve the quality of the statistics in a way that benefits the needs of the users.

# References

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