

Modernisation of Statistics Production Process - the Case of Finnish National Accounts

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1. Background

National Statistical Offices today have to keep up with growing user needs, quality concerns, emergence of new technologies and, finally, with decreasing resources. Many offices consider the re-engineering of the statistics production process as a key element in improving their efficiency and rising to the challenge. Standardisation and harmonisation of the statistical processes and tools are essential when moving from product-based statistical processes to a common data warehouse. This is also the case in Finland. Three drivers have been particularly important for improvement efforts during the recent years.

In 2007, Statistics Finland adopted an overall strategy for the development of its activities. One of the main objectives in our strategy is strengthening of the compatibility and coherence of statistical processes. This means, e.g. that the processes are identified and described; they are developed as part of process management. Process thinking is put forward through concrete development projects. In statistics production, it is important to find similar computing and data handling processes, which enable us to operate more uniformly with common tools, methods and processes. Based on Statistics Finland's operating strategy, a specific strategy was drawn up for economic statistics. It includes a series of measures to improve the coherence of the economic statistics. Variations and shortcomings of statistical and information systems often accumulate especially in National Accounts (NA) which are derived from other various statistics.

Another key driver has been the Production Model Project, which was active in 2002-2006, and made a significant contribution to the development and harmonisation of the statistics production process. The aim of the Production Model Project was to standardise the statistics production process, decrease the number of manual working phases, make data management, processing and distribution more effective, and create a uniform framework for the development and maintenance of information systems.

Several new tools were developed within the Production Model Project (such as tools for electronic data collection from enterprises and corporations, and for disseminating statistical data), and recommendations were drawn up for the use of information technology in the production process (such as application architecture and development of software engineering), as well as for the standards to be applied (such as interfaces and data structure). Their implementation has continued since 2006 and various information systems have been modernised. Major results have also been achieved in all statistics in the harmonisation of the publication and dissemination phase of the statistical process.

The third important factor has been the development and implementation of standardised project tools and methods for better management of development and renewal projects. For a few years now, Statistics Finland has had a project office to guide and support the planning and execution of projects. Its task is to

develop common tools and control that they are used.

The production process of NA had been quite fragmented. Certain data were held in information sub-systems, which were quite dependent on individual persons. The information systems were built at various times as separate SAS or Excel spreadsheet applications. The balancing phase of NA was done in an APL application.

The vulnerability and obsolescence of the information systems required fundamental modernisation, which finally meant that almost all parts of the production process had to be renewed and developed.

2. Goals and organisation of the modernisation project

The project started in 2007. Statistics Finland set concrete targets for it: renewal of the production process and construction of a new information system. The sub-targets were better and more automated use of source data, and uniform application and system tools for various parts of NA. One target was harmonisation of the calculation routines. Moreover, it was seen important that the new information system could contribute to the production flow, eliminate dependency on individual solutions and make it easier to learn new things. The final target was achievement of better quality and quality assurance in all phases of the process.

The following task modules were set up:

- Systematic use of the source statistics
- Compilation of Annual National Accounts (at current and fixed prices)
- Compilation of Quarterly National Accounts (inclusive of all sectors of QSA)
- Integration of Supply&Use Tables into “the main” National Accounts
- Rest of the World sector, keeping in mind quarterly and annual compiling
- Application environment backed up by Statistics Finland

A few indicators were defined for follow-up purposes. They concerned:

- Change of compilation and maintenance time (shorten)
- Quality of the process, transparency (improve)
- Effects on the organisation and information service (better management of the system)
- Effects on documentation (improve)

The project was divided into two phases. The first phase was the preparation of the information system, which lasted until the end of 2008. The second phase, the execution, has progressed since then as follows:

- Supply&Use table system implemented in autumn 2009
- Quarterly National Accounts implemented for the first quarter of 2010
- Quarterly Financial Accounts (inclusive of transfer from the Bank of Finland) implemented up to the end of 2010
- Annual National Accounts to be implemented by July 2011
- Quarterly Sector Accounts and Preliminary Annual Sector Accounts to be implemented in March 2012

The resources for the project have been quite modest. Only two full-time employees and several part-time NA and IT experts worked on the project in 2007-2009. In addition, some programming services were procured. Overall, around 20 staff-years by more than 30 persons up to the beginning of 2011.

3. Challenges of process development

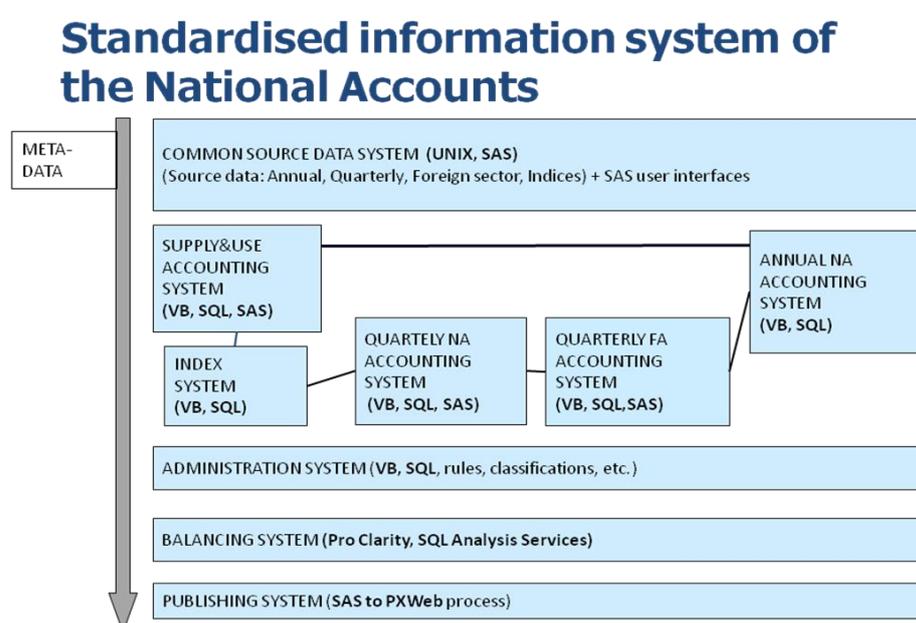
As already said, the work practices in the compilation of NA were rather individualistic. The calculation and the kinds of tools used in it were dependent on the knowledge and skills of an individual person. The documentation of the methods and sources was not systematic. The sub-systems were often Excel-based and prone to errors. Experts were partly doing overlapping work when processing the same source data independently from each other. Naturally, there was co-operation, but often only during the balancing phase. When the planning of the information system started, it was seen quite early on that new

tools and processes would require essential changes to be made to the organisation of work and ways of working in order to achieve the efficiency and quality targets.

A special working group was established aside the project group to settle job-related and organisational issues. The challenges ahead were e.g. system testing, concurrent tasks (statistics production was running during the whole modernisation process), co-ordination, assurance of the technical skills of staff and their commitment to the use of the new tools and ways of working, establishment of the new accounting organisation, systematisation of co-operation and communication between accounting teams, and improvement of management and leadership to serve the new working culture.

4. The renewed production process

The new information system has progressed and currently looks like this:



The new organisation of the production came into force from the beginning of 2011. The aim is to support move from individual working culture towards a more transparent, secure (e.g. creating a substitute system for personnel) and smooth process. It is mainly based on team structure. The tasks of the teams concern both source data processing and accounting routines linked to one or more sub-systems of NA. Some of the team members may also take care of data publishing routines. The teams comprise e.g. enterprise team, economic trend team, sector accounting team and public sector team. The processing of the basic data uses the same IT tools. Modifications and changes in the basic data are documented at a common workspace and can be used by all national accountants. In addition to the new team structure, a special unit for IT and other supporting activities was created.

5. The results and successes of the modernisation project

For the processing of the source data, the project built a production model for the treatment of an individual data item and for its computerised entry into the NA production database. If changes need to be made during the production process to data on some sub-area of NA, they must be documented in a manner that is standardised and visible to all national accountants. The NA database currently covers the most important source data. Moreover, the source data process and the accounting process are now clearly separated in the database. In the previous system, only the final results but no earlier (original, semi-final) stages could be identified.

The product balancing and deflation calculation system was renewed. The same sources and processes

are used in quarterly and annual accounts to calculate volumes. Transaction-specific deflators multiplied by economic activity are entered into the database via the source data process. The weight structure is obtained from final and preliminary Supply&Use tables. The deflators, in turn, are obtained from the common index system, which gains importance in the calculation.

Quite fundamental IT solutions were built into the calculation systems of annual and quarterly accounts. One major example would be a solution for the storing and maintenance of the information managing the calculation system in the production database. This made it possible to build highly flexible calculation system applications for annual and quarterly accounts. All processes (extrapolation, benchmarking, seasonal adjustment etc.) are now in the same application. It became obvious in the project that the flexibility and dynamism of the information system would also be useful in the future.

The competence of the experts increased significantly. The new system requires that every NA expert has to know SAS programming and to have at least basic skills. The biggest lessons for the experts working on the project came from the SQL Server Analysis Service and data cubes. NA were the first statistics to move into the cube world of the SQL Server at Statistics Finland. All corrections made to the calculation templates become instantly observable and analysable on the cube side (cube browser).

Documentation improved fundamentally. Microsoft's new Sandcastle documentation generator was used at Statistics Finland to document Visual Basic applications. With Sandcastle, the technical documentation for the applications can be produced direct from the program code. According to experts, the completed and audited parts of the calculation system have the best technical documentation in the organisation at the moment.

The experiences gained from the new system show that it requires less time for data collecting and allows more time for data analysing. The new system has created improved preconditions for the balancing of NA because the impacts on totals from changes in different data sources can now be seen at an early stage of calculations. Co-operation with the source statistics has also increased essentially and the coherence of the statistics has improved, which influences data quality significantly. NA have started to produce regular feedback reports to the source statistics. The feedback reports contain information about both inconsistencies and errors. During the development phase the existence of the common data warehouse of business statistics would have been of benefit.

6. Lessons learned

The renewal of the production system of NA has been one of the largest undertakings of its kind in recent years. As from every other renewal project, a lot has been learned from it and it has already been possible to exploit the learnings in subsequent projects. One of the most important lessons is that projects should be divided into more clearly demarcated sub-projects of shorter duration than was done in the renewal of the information system of NA.

We have learned that if we are going to alter the data content when we are renewing an information system, then the new data content and the creation of data complying with it should be finalised (at least as far as possible) before we actually start to built the new information system. New needs emerged continuously in the project on the renewal of the NA information system, which took a lot of time to attend to and threw additional challenges to the project. The comprehensive review of business statistics that was launched last year was actually not started until a thorough analysis had been made of users' expectations.

Earlier information system renewals have not resulted in significant savings of resources although more efficient tools than before have been introduced. The main reason for this is that the importance of improving production processes and task divisions had not been adequately taken into consideration from the very beginning. A major lesson learned from the project on the renewal of the NA information system is that concerns relating to the competence of individuals and the division of responsibilities must be borne in mind from the very beginning if the renewal is to make the production process more efficient and achieve productivity gains.

Strengthening and clarification of the role of the steering group of a renewal project is also a lesson that has been better taken into consideration in later projects. The commissioner of a project, and not just the project leader, is responsible for the mediation of co-operation between the project and line work.

So that the solutions in an organisation would be consistent (that, is sufficiently standardised tools are developed which others can also use) projects on information system renewals should preferably engage experienced application planners/developers working as full-time as possible.

In major (information system renewal) projects, the statistics departments should be allowed even more time to think about and decide which line work tasks can be left undone while an information system project is being run and implemented. However, major renewals cannot be achieved with resources totally detached from line work. The NA as such is so complex that the role of the NA experts in the planning phase of information system was crucial because of the special knowledge requirements.

The project on the renewal of the NA information system has essentially improved the internal controllability, transparency and quality of the system. A considerable amount of work still needs to be done on the standardisation of the information systems of the source statistics. In this, too, the essential aspect from the point of data quality will be the coherent warehouse of data on enterprises, which will evolve as a result of the comprehensive review of business statistics.