Statistics Norway

Statistisk sentralbyrå

Statistics Norway
IT strategy 2007

Contents

1. IT strategy – background and foundation

IT operations in Statistics Norway shall deliver infrastructure and services that support, improve and make more efficient Statistics Norway's data collection, statistics production and dissemination of statistics products. In addition, IT operations are a part of Statistics Norway's total expertise and shall be utilised to create new and improved business solutions. IT operations have a responsibility for delivering infrastructure and services and at the same time to contribute to improvements within Statistics Norway's primary activity.

It is the responsibility of management to ensure that the development of new solutions is aligned with the IT strategy. This implies that decisions made regarding top level information architecture, choice of technology, IT infrastructure and expertise must be in accordance with the objectives of the IT strategy.
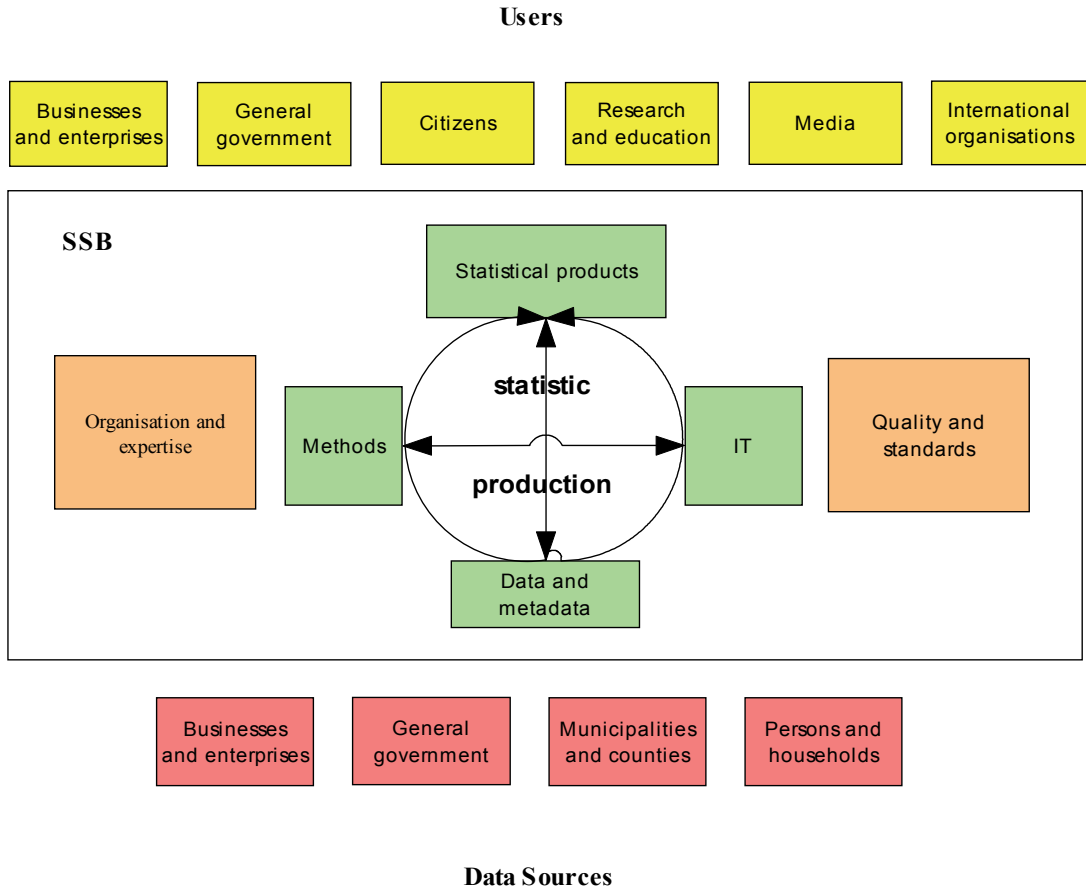
IT in general, has a different and larger influence on business processes today than a while back. This is also the case in Statistics Norway. IT units are for example included at an earlier phase in development projects and contribute in an advisory capacity when work processes are to be changed or expanded. Statistics Norway's management expects IT operations to contribute to the continued development of Statistics Norway as a modern and attractive employer.

It is important that IT is closely linked to the rest of Statistics Norway's operations. This demands even closer cooperation between IT and the rest of Statistics Norway. The more knowledge that we have of each other's business and processes, the greater the benefits. Understanding Statistics Norway's vision and strategy will become even more important in the years to come. It will be increasingly important for the IT units to increase their expertise also in areas that are not purely IT.

Cooperation on solving the challenges that the organisation is facing, must build upon a common use of methods and models that describe, as precisely as possible, the demands and expectations for new solutions. It is therefore important to describe the organisation through enterprise models and, the work flow and data flow through process models. In the same way, it is vital that we steer development work

through well-established best practices, e.g. within project management and system development methodology.

Statistics Norway's enterprise model can be expressed as key business areas and expertise connected to data collection, statistics production and dissemination. The following figure is an example of what an enterprise model for Statistics Norway could look like.

Users

Data Sources

2. Strategic objectives for IT operations in Statistics Norway

The IT strategy is prepared within the framework of Statistics Norway's overall strategy. The IT strategy builds upon three main objectives that IT operations shall work towards in order to contribute to the strengthening of prioritised business areas in Statistics Norway:

- Simplify, improve and re-use common working processes
- Strengthen information and knowledge management
- Make new roles and statistics products possible for Statistics Norway

The IT strategy highlights actions within the following focus areas in order to reach those strategic main objectives:

- top level information architecture
- choice of technology
- IT infrastructure
- expertise

The next four chapters of the strategy describe changes, challenges and trends within these critical areas in more detail.

We summarise prioritised actions connected to the three strategic main objectives below.

2.1. Contribute to the simplification, improvement and reuse of common work processes

- Development and improvement of the IT solutions shall support Statistics Norway's efforts to reduce the actual and perceived response burden.
- Master systems for metadata must be organised in such a way that they can support and improve cross-cutting processes.
- The use of metadata systems to support electronic exchange between both internal and external systems is a necessary condition for the development of efficient data collection solutions as laid out in Statistics Norway's data collection strategy.
- The best data editing and analysis solutions shall be developed as self-service systems and be used in more areas/statistics.

- The principles of service-oriented architecture should be followed in order to ensure the greatest possible reuse and most effective interaction with other systems, both inside and outside Statistics Norway.

2.2. Contribute to the strengthening of information and knowledge management
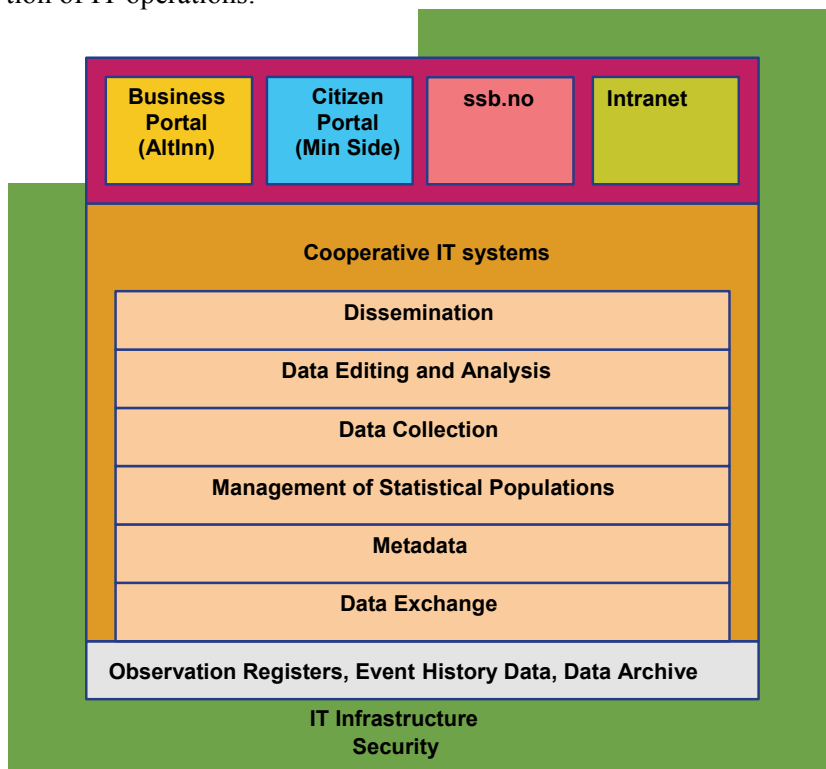
- The intranet shall be developed further to include more shared information and give access to even more standardised routines e.g. data editing and analysis routines.
- Exchange of information and expertise are important elements in the development of robust systems based upon open standards. Exchange of expertise and information across organisational boundaries will be encouraged.
- We shall participate in national forums in order to get feedback and strengthen our contact with partners and users of our systems.
- Our participation in international forums shall contribute to network building and increase the possibilities of finding new areas for collaboration (technical, statistical and methodological).

2.3. Contribute to making new statistics products and new roles possible

- The IT infrastructure in Statistics Norway shall be flexible and able to cope with ever changing conditions and demands.
- The IT solutions shall support increased use of registers, particularly our three base registers, which are the ground property, address and building register (GAB), the business register (BoF) and the population register (BEREG), and improve direct reporting from business and administrative systems within the production of statistics.
- Automatic data collection from the Internet can be an important supplement to data collection from respondents and can give a real reduction in the response burden, as well as providing new or supplementary data for the production of statistics.
- Improved data collection and data editing systems will free up resources within statistics divisions.
- Systems for the management of statistical populations and samples shall be improved so that these systems can be integrated in the remaining data collection and statistics production.

3. Top level information architecture

It is both desirable and necessary that IT operations agree upon a top-level information architecture as a mutual reference ground for discussions about services and technology. In order to support the enterprise model of the first chapter, we have arrived at the following organisation of IT operations:

Business Portal (AltInn)	Citizen Portal (Min Side)	ssb.no	Intranet

Cooperative IT systems

Dissemination
Data Editing and Analysis
Data Collection
Management of Statistical Populations
Metadata
Data Exchange

Observation Registers, Event History Data, Data Archive

IT Infrastructure
Security

The figure describes how Statistics Norway's collaborative IT solutions can also be made available for external users through three well known access points in the public sector's eNorway: The business portal (Altinn), the citizen portal (Min Side) and ssb.no. The intranet should be developed further as a point of access to Statistics Norway's internal services and tools.

Work within the different areas shown in the model should be supported by a framework that to a greater degree enables Statistics Norway employees to be self-sufficient when planning, operating and ad-

justing their work processes. We have focused on internal routines that can be simplified and made electronically available for internal users within the areas of data collection, data editing and analysis (e.g. common calculation modules and catalogue services), management of statistical populations, dissemination and metadata.

Changes, challenges and trends in each of these areas are described in more detail in the rest of this chapter. All of these areas rely upon the data that Statistics Norway manages. In order to make our collaborative systems more effective there must also be simple and secure access to our data storage.

The top-level strategic objectives for the technical data collection solutions shall support Statistics Norway's data collection strategy.

3.1. Electronic data collection

We shall further develop and improve our data collection solutions, which build upon well tried open standards and cooperation with other government institutions and shared public solutions.

IT solutions shall support Statistics Norway's efforts to reduce the actual and perceived response burden. This will be achieved through further development and improvement of our questionnaires, as well as development of IT solutions and processes connected to other data collection solutions (e.g. use of registers and direct reporting from administrative systems).

Questionnaire and interview surveys will continue to be important sources of information. Use of electronic questionnaires on the Internet will increase at the cost of paper questionnaires, with the consequence that Statistics Norway will receive data that are to a greater extent revised when the statistics divisions start their data editing. Use of electronic questionnaires requires skill in questionnaire design and in built-in help and support functions

The use of administrative registers will increase in the production of statistics. We will see solutions that to a greater extent are tailored to different groups of respondents, amongst other things by combining different data collection methods. For example, large organisations will be able to report data for several purposes in the same operation

and with combinations of data collection methods e.g. reporting from administrative systems combined with questionnaires.

Automatic *data collection from the Internet* can be an important supplement to data collection from respondents and can give a real reduction in response burden. This type of automatic solution makes stricter demands on the handling of the sample and non-response. Internet today, with the disadvantages it has regarding semantic content, makes technological solutions vulnerable to changes in content, domain etc. It is important that we follow the technological development in this area, particularly with regard to semantic web and initiatives to increase interoperability between systems. Semantic web is an extension of the current web where information has a better defined content that makes it easier for machines and humans to exchange information.

Reporting from other types of sources will occur e.g. from the area of geographical information systems (GIS), where instead of reporting geographical information in a questionnaire, this can be transferred from the respondents own geographical information systems.

Use of *metadata systems* and *electronic interchange* between internal and external systems will be a necessary condition for the development of efficient data collection solutions as outlined in Statistics Norway's data collection strategy.
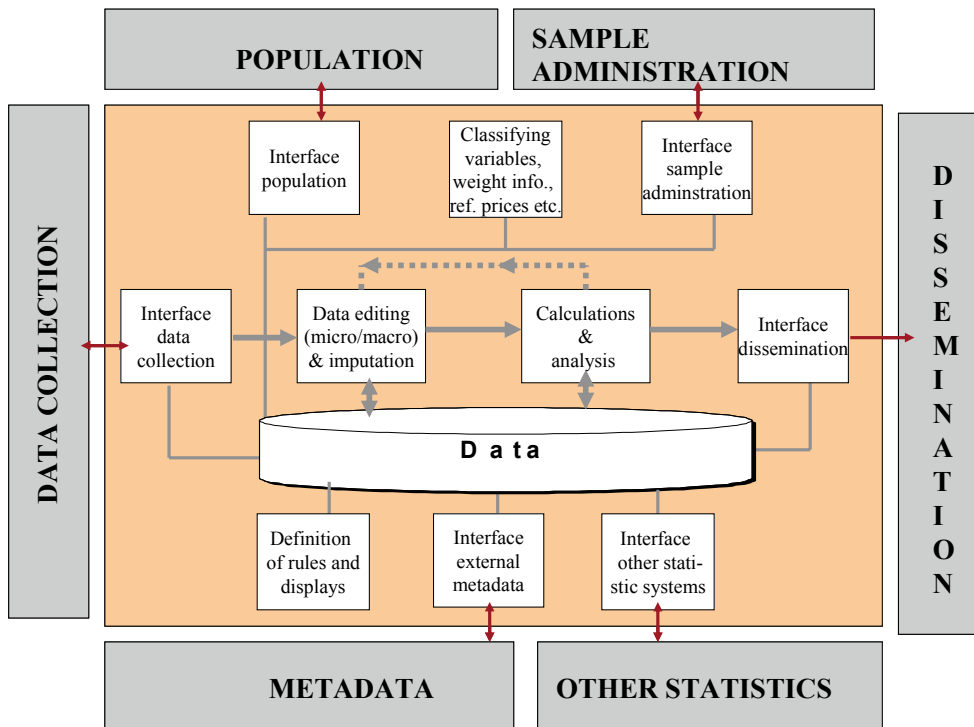
Developing good electronic solutions for data collection also affects systems for *management of statistical populations and samples*. We have good solutions in several statistical areas, but we should explore whether these can also be used in other areas. Systems for management of statistical populations and sample administration shall be improved so that these systems can be integrated in the remaining data collection and statistics production.

3.2. Data editing and analysis

Today's IT solutions for data editing and analysis are to a large extent tailored and adjusted to each statistics. As a consequence these are efficient and function well for their users in the statistics departments. The total cost for maintenance of all these solutions is however extremely high, both for the IT department and for statistics producers. A future challenge will be to try to reduce the number of IT solutions. This must be done by creating common solutions that can be used for

several statistics. By using new methods and approaches for data editing it will be possible to improve the data editing process and make this more efficient in the statistics divisions. This must be done in a collaborative effort between IT, statistics producers and methodologists. At the same time it should be a goal to develop solutions that the statistics producers can at least partly maintain by themselves. In this way it will be possible to free-up resources, both within statistics production and within IT, to carry out other tasks. Common solutions must be established without reduction in functionality and efficiency compared to current solutions. High demands must be made for up-time and backup. Work on common solutions has already started and must be given high priority in the time ahead.

The next figure shows a possible design for common data editing and analysis solutions in Statistics Norway.

Data editing   The current data editing solutions must be examined carefully in order to identify common features. Based on this work, the solutions must be harmonised where this is appropriate. Calculation modules for amongst other things age, date, and identification number controls, and logical controls must be standardised and available in one place. This also applies to catalogue services such as postal codes, municipality numbers and other standards and harmonised definitions that are used in statistics production.

Routines and solutions for extreme values, imputation and aggregation must also be examined, common features must be identified and if possible standardised. It is also possible to have more efficient routines for seasonal adjustment, sample supplements and periodisation.

Use of visual tools as an aid in the data editing phase will increase. For example, this can be used to identify extreme values on aggregate levels. In order to further increase the efficiency of the data editing process, our systems must be further developed to also capture information about the effect of the data editing process

Analysis   We shall investigate possibilities for a greater degree of coordination and improvement of the current analysis systems/processes so that producers of statistics can more simply and quickly obtain an overview of the data. This will contribute to the improvement of existing statistics and make new products possible. Increased international co-operation will increase demands on Statistics Norway to produce statistics that are more comparable with statistics from Eurostat and the OECD.

Registers   In accordance with the data collection strategy, we will make more use of data from registers and administrative systems in the data editing and analysis phase. IT solutions must therefore be developed in such a way that use of the solutions is simplified and access for the statistics producers is improved.

Dissemination   Work on simplifying and automating procedures and systems for loading data into StatBank Norway has been proceeding for some time. This work must continue. In addition, solutions should be developed that simplify the process until tables that are ready to publish are available on ssb.no.

Metadata   Use of metadata, as the foundation for all processes, must increase. This can be accomplished by the development of robust and effective communication between metadata systems and statistics systems.

3.3. Management of statistical populations

Statistics Norway has at present three statistical population registers (base registers) for the following units: person and household, business and other legal entity as well as property, address, building and dwelling. Important challenges in this work hereafter are:

- Harmonise development work across the three base registers.
- Aim for a common data model with efficient and secure links between units in the base registers.
- More efficient transaction mechanisms for updating and extraction.
- Establish solutions that give good administration of digital property maps. The move to new cadastre implies a new, comprehensive and central data source in Statistics Norway's statistical population management regime. Since digital property maps will be part of this delivery, there is a need to establish solutions that give a good administration and organisation of digital property maps for common use.
- Focus on the collaboration between statistical population management, metadata, data collection and statistics production systems. The systems must be developed so that traditionally resource intensive activities, such as the transition to a new NACE, can be made quickly and with the least possible use of resources.

3.4. Dissemination

Statistics where people are   From the start of ssb.no in 1995 and up to the present day, we have
and where they need it   concentrated our efforts on the web towards maximum content and best possible structure in order that users can easily find what they need on ssb.no. In the future, the Internet will to a greater extent be a place for collaboration. Information will be available in different contexts as appropriate. Where the information originally was to be found will be less interesting for many of our users. We will have to change our top level perspective from what is has been up until now – attracting people to ssb.no – to the situation that information from ssb.no comes to them. Obviously, this must be combined by continuing to make all official Norwegian statistics easily available on ssb.no. A strong focus on customisation for users and interaction with users will drive the further development of ssb.no

Customisation   We must be able to organise our digital services by starting with the needs of the individual. Because these needs will vary, our dissemination services must be built in such a way that we can adapt dynamically to the increasing variety of communication channels e.g. mobile phones, line capacity and screen sizes. At the same time we must enable users with disabilities to access and use the information we disseminate.

We cannot assume that the way in which we decide to present content is suitable for everyone. We must therefore allow users to select the information they consider relevant and to do so in such a way that they can reuse this for example by establishing self-service systems and personalised services. We will need to make increasing use of syndication technologies like RSS to disseminate our statistics.

Respondents can be given a reduced response burden by solutions that are adapted as well as possible to their use of technology and information sources.
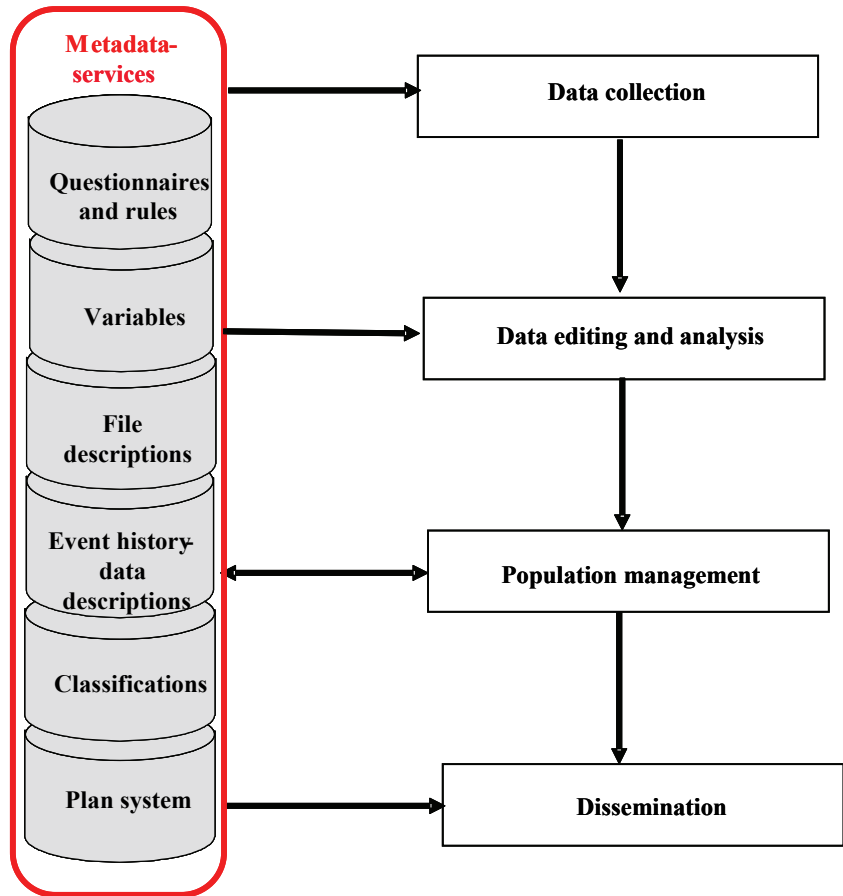
User interaction   Our web has traditionally been a medium with focus on one-way communication i.e. Statistics Norway informs and our users receive. In Statistics Norway's primary strategy it is emphasised that official statistics are seen as a common good. The users must be given the possibility to structure information from Statistics Norway themselves.

Active use of technology can contribute to increased participation by more people and create new opportunities. Establishing communication areas for researchers, statistical advisers and users can be one of several ways to realise this e.g. by creation of digital diaries (blogs).

National and international collaboration   Increased demands for standardisation of interfaces, IT systems and formats for documents increase the possibility to collaborate with others. Data to be communicated and exchanged must, in addition to being in an agreed upon format, have rich enough metadata to give meaning to the data that are exchanged. Through increased collaboration with other players we can improve the quality of the content we produce.

3.5. Metadata

Background   In order to contribute to an efficient statistics production and dissemination, as well as improved quality of the statistics, we need an improved collaboration between systems that document the production processes and the final products. This can be achieved through use of metadata systems that are easily available for all users. Metadata should be created and updated in just one place. Solutions across systems and organisational boundaries require harmonisation and standardisation of definitions and concepts, as well as use of national and international standards.

Structure   In order for machine-machine communication to be possible, metadata must have a structure that is machine readable. Metadata must be defined and stored according to recognised standard models and structures. Work on machine readable structures and exchange standards is important. Search technologies improve the possibilities to find data and metadata as well as indicating which structures are appropriate to achieve this. The intranet will function as a portal for our metadata and as a communication channel for administrative and organisational information.

Responsibility   Clear roles and responsibilities for metadata systems need to be defined and there must be a stepwise development of the content and functionality in master systems for these. The master systems must always hold the 'right answer' for each metadata type. The work on standards must systematically contribute to the establishment of a framework for statistical systems with help from the standardisation of metadata, templates and databases for standards.

Master systems   The following figure shows the systems thar are defined as master systems for different types of metadata in Statistics Norway.

Maintenance　During maintenance of the master systems for metadata attention needs to be paid to the following points:

- Cultivation of the contents to avoid duplication.
- Identification of sources and contact persons.
- Guidelines and routines for the master systems and other systems with which they interact.
- Development of quality indicators for the content and functionality of the master systems that should be a natural part of the development process.
- Regular status reporting and follow-up of indicators (e.g. at the departmental and divisional level) are useful to increase the quantity of information and improve the quality of the metadata systems.

Integration   Development of new metadata systems in line with Statistics Norway's vision will continue, with focus on a closer integration between metadata and statistics systems. A comprehensive metadata system should also include:

- Systems with administrative information (e.g. plan system).
- All data collection systems.
- Metadata for all registers (particularly base registers) and databases.
- Better connections to external systems.

3.6.   Administrative systems

Statistics Norway's IT expertise shall be directed to statistics production. Statistics Norway must however, ensure that we have sufficient expertise as a purchaser and manager of administrative IT solutions, so that we can fill our system ownership role, particularly with regard to the needs for modernisation and further development of the administrative systems.

4.   Choice of technology

The choice of technology must support the strategic objectives of the IT strategy and must be taken into consideration when decisions are made regarding new or further development of applications and infrastructure. In addition, there should be guidelines for choice of technology that hinder the establishment of technological islands that offer short sighted technical solutions that prove inflexible in the long run (costly in the lifecycle of the product). The choices we make in technology must be weighed against these perspectives. New technology can give many benefits but it can also be resource intensive to establish. The benefits of new technology must be weighed up against the establishment costs. The portfolio of tools must be reduced. Below is an evaluation of some important aspects relevant to choice of technology.

4.1.   Service oriented architecture

Statistics Norway's technical solutions shall be built mainly upon the principles of service-oriented architecture. Guidelines on this are presented in *Norway's eGovernment plan*. All solutions for external users and most solutions for internal users shall:

- Have support for *open standards*.
- Be *platform independent*.
- Be *component based*.
- Have support for the packing in of data and functions in the form of *services* (web services).

These are central principals in service-oriented architecture. By applying these principles, applications and services can reuse existing functionality/components completely independent of the system they were developed in. In addition, by use of this technique, we can extend the lifetime of older applications, which have important functionality we wish to expose, just by creating a service layer on top of these. This increases the possibilities for collaboration between old and new applications in a completely new way, which gives benefits in the form of shorter development time, increased reuse and more consistent systems. This also enables us to replace systems behind the scenes, because communication with these is not directly exposed to the users.

By following the principles of service oriented architecture, we will have a good starting point for collaborative systems, inside Statistics Norway but also with other systems, both nationally and internationally.

4.2.   Open source code
Software given out as open source code can be found in almost all categories of software (also hardware) from operating systems, to databases, to development tools. For Statistics Norway this means that we can to a large extent choose software in several categories. In this way we achieve greater flexibility with regard to adjusting our systems to meet our requirements together with the possibility to pay a third party to do so, instead of being dependent upon one software supplier. Use of open source code in Statistics Norway will give us greater flexibility and lower costs, but it also requires more of us in the form of IT leadership and expertise. It is therefore important that we choose products appropriately and that we consider whether these will give us long term benefits both economically and with regard to resources. Costly upgrades by commercial suppliers must be compared with the maintenance costs of having a varied IT portfolio. Open source code must also be evaluated through insight into security and reliability requirements: Easily available code inspection makes open source code more reliable when used in the support of vulnerable and business critical processes.

IT developers are expected to have knowledge of and support from formal methods and be able to plough back best practise from cooperative development work within international and national projects (e.g. the Nordic StatBank cooperation).

Open source code is also mentioned in *Norway's eGovernment plan.*

4.3. Scalability
Statistics Norway's technical solutions (both hardware and software) must be scaleable. This implies that they must function in a production environment and handle the expected volume with an acceptable response time. The volume can be measured in the amount of data, the number of transactions or the number of simultaneous users. It should also be easy to set inmore resources if this should be necessary.

4.4. Tools
Technology choices imply tool choices but there is little point in naming specific tools that will commit IT resources in Statistics Norway for a five-year period. It is our goal to reduce the number of tools in our portfolio to the minimum possible. This goal requires a continuous and qualified evaluation of existing and new tools.

5. IT infrastructure
The IT infrastructure must support Statistics Norway as an organisation. The IT infrastructure must ensure secure access to relevant IT resources and must have sufficient capacity at all times.

The IT infrastructure in Statistics Norway must be flexible and of sufficient quality to meet constantly changing expectations and demands. Such changes also require that IT workers are flexible.

Statistics Norway shall choose software that provides solutions with sufficient functionality at an acceptable cost.

5.1. Security
The infrastructure in Statistics Norway must always maintain security at an acceptable level. Data that require protection must be securely transported to or from Statistics Norway and be stored in a secure manner. Only authorised access should be possible. The solutions offered to internal and external users should be practical.

5.2. Availability, scalability and capacity
The availability of IT services shall be in accordance with agreed requirements. Good follow-up with customers is important in order to

predict needs for increased capacity so that the infrastructure can be quickly scaled to meet the agreed requirements.

5.3.   Simplifying and increasing efficiency

The IT infrastructure shall be simplified and made more efficient through comprehensive and thorough planning. Consolidation will be an important method to achieve a clearly set out and well organised IT infrastructure in which resources are utilised to the maximum. Consolidation of servers via virtualisation can be seen as a first step on the way to consolidation in one data centre in Statistics Norway. This can be achieved on several levels: machines, operating systems, applications, user interfaces, storage and networks. Virtualisation will be one of several important actions that are taken to simplify access to resources and the administration of these.

Higher demands on network connections between Oslo and Kongsvinger will be a natural consequence of gathering resources in one data centre.

5.4.   Mobility/remote working

Statistics Norway has established a solution for remote working via the Internet. We expect to see an increase in the use of this service as a consequence of changes in working patterns and greater demands for flexibility. Synchronisation with mobile phones, handheld devices etc. must be supported in accordance with user needs. However, it is also important that these are properly managed with regard to security requirements.

5.5.   Integrated Internet access on the desktop

Our current access to the Internet via a terminal server is sub-optimal. Integrated access from the desktop will mean increased efficiency and simplification of several working routines in Statistics Norway. The security issues around such a seamless solution must be solved.

6. Expertise

The technological development and diversity place large demands on the expertise of IT workers. We see an increased trend towards specialisation in methods, techniques and tools, and it is therefore important that Statistics Norway has specific objectives for the collective IT expertise.

Statistics Norway's IT expertise must build upon insight and experience in Statistics Norway's key processes: data collection, data editing and analysis, management of statistical populations, metadata management and dissemination and the ability to see this together in order to develop robust IT systems. We shall continue to have close cooperation and contact with other national statistical institutes both with regard to development of common solutions and exchange of expertise.

6.1. Key IT expertise

Requirements   ***Support for electronic collaboration***
The technological development, based on open standards and platform independent systems, opens for new electronic services and forms of cooperation both nationally and internationally. Statistics Norway is in the middle of a methodological and technological increase in expertise in order to make use of this development. Technology and development principals in this connection are described in the chapter on choice of technology and referred to as *service oriented architecture*.

The aim of IT operations to contribute to the simplification and improvement of common work processes in Statistics Norway is in agreement with ambitions within electronic collaboration. In order to make these processes available electronically, it will be necessary to increase competency in methods and tools for *enterprise modelling*.

Increased and more efficient data exchange with external actors requires consistent data structures. IT operations need to strengthen their expertise in methods and tools for *information modelling*.

Strengthen cross-cutting project organisation
In order to meet the objectives of this IT strategy, IT development projects must, to a greater degree than before, be organised across organisational boundaries in Statistics Norway. There will be a need for

expertise associated with help and support systems for coordinating and collaborating across these boundaries. The IT strategy sets focus on efficient and robust systems for the management of documents and projects. Office support systems and media tools will be an important supplement.

6.2. Prioritised key expertise in IT operations

Based on the needs expressed above, the IT strategy prioritises (further) development of the following areas of Statistics Norway's key expertise:

- SAS and Oracle, tools experience
- Modelling techniques, including enterprise and information modelling
- Project leadership and management of IT projects
- Service oriented architecture
- Development methods

6.3. Actions for expertise development

Based on this IT strategy, an *expertise plan* must be developed, which describes Statistics Norway's current individual and collective IT expertise. The plan must provide specific actions to develop the expertise that is seen as relevant in order to reach the strategic goals of IT operations. It is a management responsibility to ensure that there are always IT workers with prioritised key expertise in the organisation.

Through cooperation and active participation in *public forums* we wish to contribute in the work of developing robust and efficient electronic public administration solutions, amongst other things by giving input to choice and prioritisation of solutions. The guidelines provided in *Norway's eGoverment plan* are key documents in our work. A central topic will be open standards that are an important factor in developing systems that facilitate electronic collaboration.

To actively participate in *international projects* is important both as an arena for expertise building and development, but also to obtain feedback for further development of internal systems (with regard to technological, statistical and methodological areas). For example, our participation in SOS (Statistics Open Standards), the EU's framework programs and development aid have contributed to the establishment of contacts at the same time as they can reveal or create new areas

with the possibility for international cooperation in technological, statistical and methodological areas.

7. IT governance

The responsibility for coordination and expertise of IT operations is laid down in the mandate for the IT Committee. The committee's activities within the planning and follow-up of IT development projects across organisational borders in order to reach the strategic objectives need however to be strengthened.

System architects will be introduced for each of the areas in the top-level information architecture. The mandate for this role will be made and will support the system architect's responsibility to ensure that IT development projects are in line with the IT strategy.

IT terms

Interoperability
The ability of two or more systems to exchange information and make use of the information that is exchanged. A distinction is made between organisational, semantic and technical interoperability.

- Organisational interoperability is about business objectives and processes where information exchange is desired, but that can have different internal organisational and operational structures.
- Semantic interoperability is about making sure that information exchanged can be understood by applications that were not originally built to handle the information.
- Technical operability is about the technical connection of data systems and applications. This includes aspects such as network, security, open interfaces, data integration, data exchange etc.

Master system
A master system for a type of metadata is the system that contains the standard for this type of metadata (e.g. the database for standard classifications contains those classifications approved for use in Statistics Norway).

Metadata system
A metadata system is a processing system that uses, stores and produces metadata.

Paradata
Paradata are data and information that are collected and that describe the filling-in process. A distinction is often made between client-side and server-side paradata. For the latter, use is often made of web server functionality and logging possibilities. Client-side paradata are collected at the respondent level and provide information on what the filling-in process has been like for each respondent.

Rule engine
Application where rules are separated from the rest of the application code in order to make it easier to change rules and controls and to a greater extent ensure re-use across applications.

Semantic web
The semantic web is an extension of the current web in which information has been given a better defined meaning that makes it easier for machines and humans to exchange information.

Questionnaire engine	Application that controls the process of filling in a questionnaire or survey.

- Presentation of the questionnaire/survey.
- Control the order in which the questionnaire/survey is filled in
- Control support and help services (pre-filling, help/tips/hints)
- Control initial conditions for rules and navigation
- Any relevant administrative services

Statistical metadata   Statistical metadata are structured/systematic information that are used for the production, dissemination, understanding, finding and (re-)use of statistics.

Syndication   Syndication in a web context refers to the automatic dissemination of information from web pages for further use by others in the form of an electronic publication agreement. The most typical syndication technology is so-called RSS feeds that use standardised XML-formats for this dissemination. RSS feeds are currently a de-facto standard, but the WorldWideConsortium (W3C) has made its own standard Atom, which is now becoming widespread. RSS feeds make it possible for users/user applications to keep themselves up to date with updated material. Podcasts are another syndication technology, which use RSS feeds to subscribe to sound/video files.

Virtualisation   Virtualisation means to make resources available logically rather than physically. Resources are then not tied to a particular task, geographical location or physical solution.
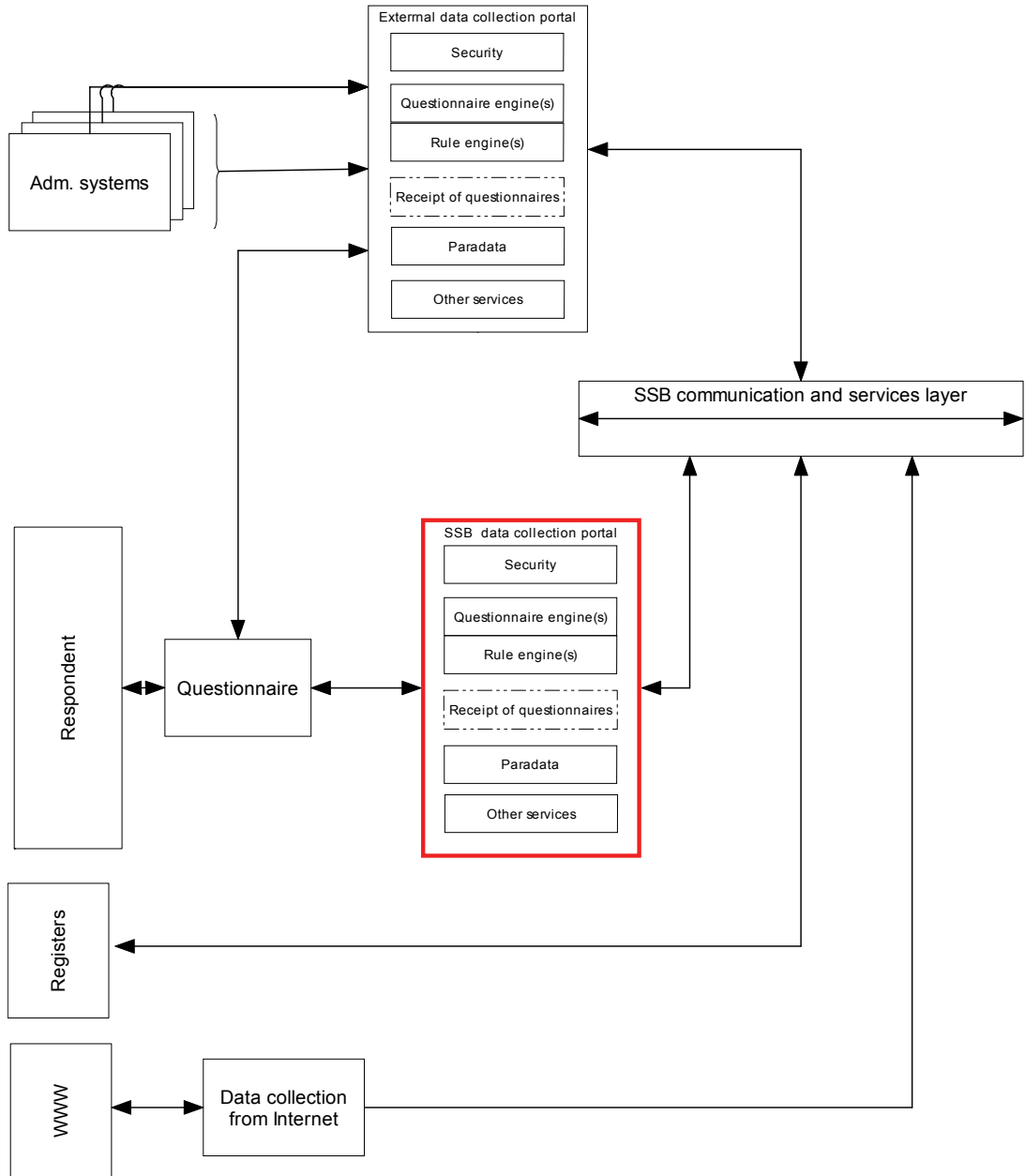
Appendix B

IT abbreviations

GIS	Geographical Information System
HTML	HyperText Markup Language
HTTP	HyperText Transfer Protocol
RSS	Rich Site Summary/Really Simple Syndication
SMTP	Simple Mail Transfer Protocol
SOA	Service Oriented Architecture
SOS	Statistics Open Standards
XML	Extensible Markup Language

IT data collection architecture

External data collection portal

- Security
- Questionnaire engine(s)
- Rule engine(s)
- Receipt of questionnaires
- Paradata
- Other services

Adm. systems

SSB communication and services layer

SSB data collection portal

- Security
- Questionnaire engine(s)
- Rule engine(s)
- Receipt of questionnaires
- Paradata
- Other services

Respondent

Questionnaire

Registers

WWW

Data collection from Internet

In this context, the term questionnaire includes paper, web and interview questionnaires.

Administrative systems are the respondents' own systems, which can also be used to report to public sector. The civil service can specify standards – based on open standards – for exchange of data between the respondents' system and the data collection portal.

Data that are received or collected go either via external data collection portals or via Statistics Norway's data collection portal. Data collection portals will include some central systems for handling of security, questionnaire engines/rule engines as well as solutions for receipt and handling of data. They can also have support and other functionality for collection and handling of paradata, case handling services (online communication between the respondent and case handler), relevant statistics back to the respondent, overview of reporting obligations, cooperation with systems for population and sample administration etc. Receipt of questionnaires has a dotted line around it symbolising that this is a service that can have an existence outside the questionnaire portal and that can have other tasks than just the receipt of questionnaires.

All transferral of data from data collection portals, registers and Internet will go through a communication and services layer in Statistics Norway for distribution to the correct statistics division/area that shall process the data further, produce and disseminate the statistics.

By data collection from the Internet, we mean "engines" or applications that go to random or pre-defined web pages and collect "structured data". An example could be to go to a booking page for aeroplane travel and simulate the ordering of a given flight where the targeted information is the price of the specified flight.