Introduction

Over the last five years there has been an ongoing work at Statistics Sweden (SCB) to reengineer and develop the Business Register (BR). At the same time, initiatives have been taken to look at new ways to handle data provision from businesses. Together, the efforts have so far resulted in improvements in the BR production process. This paper describes three achievements which are all based on technological developments.

Basic information on the Swedish BR

- Updated weekly with administrative information on Legal units from tax Authority and Companies Registration Office.
- A single identifier for legal units is used.
- Updates regard among others registration and deregistration of businesses, name, addresses, number of employees and activity codes (Swedish Standard Industrial Classification based on NACE Rev. 2.)
- Based on administrative information new variables are derived, such as status of units and institutional sector.
- Time stamps and other kinds of information of administrative character are also saved to each record that updates the BR.
- The BR comprises the units: Legal Unit, Local Unit, Enterprise unit, Kind of Activity Unit and Local Kind of Activity Unit.
- Upon activation of a registered Legal Unit, all other units are created by default.
- In order to regularly check information on local units, all legal units with more than one establishment are surveyed once a year.
- The BR maintenance team is made up of 14 co-workers, or about ten full-time equivalents. The team does maintenance for legal and local units.

Outline of the paper
The development of the BR, the driving forces, the current situation and the plan ahead are briefly presented.

The tool for checking survey data is described in the following section, as well as a brief overview of the actual BR-survey.

Next section presents the new tool for checking administrative data. This is the latest feature that has been realized from the ongoing reengineering project.

In order to find more effective ways to collect, edit and share data, new web-based approaches are increasingly interesting. How this relates to the BR is overviewed in this section.

Finally, some conclusions will be made on the technical developments. Brief comments of possible events in the coming years and anticipated implications for the BR are also included.

Reengineering project

One issue for SCB for some years has been to move from applications programmed in visual basic 6 (VB6). The driving forces have been declining Microsoft support and incompatibility with Windows 10. For the larger BR-system, which also includes the public BR, the majority of all applications had to be migrated or upgraded. At the time for upgrading Windows in 2016, the main BR application was still in VB6 and therefore needs to be operated on a virtual Windows 7 client. So over the latest years quite a large share of the BR development resources has been focused on handling this technical shift.

Of course, when moving from one programming language to another, the ambition is also to develop functions and contents. Areas for improvement have been identified along the way, but obstacles related to rigidity in the old system to technical changes have put minor upgrades on hold. Consequently, it was difficult to adapt the production to changing user needs and to produce process data. Over time, this resulted in uncertainties regarding the total quality of the BR. To overcome this and to move towards a more user oriented BR-system, the following goals were identified for the project:

Overall goal:

A register that fulfills user demands according to quality, contents and availability

Furthermore, the new BR should be:

- An instrument for coordination of Economic statistics
- Able to live up to quality demands
- Transparent, structured, flexible and expandable
- Comprising working processes that are efficient and quality assured
- Embracing an improved working environment for the maintenance team
- Less dependent on key persons
- Replacing all the VB6 components with modern technology

- Producing process data and thereby traceability of all key areas/variables
- A platform where it is possible to add, remove and change data sources, objects and variables more easily
- A system with a production process that is well known and documented

Picture 1. Overall description of the new BR
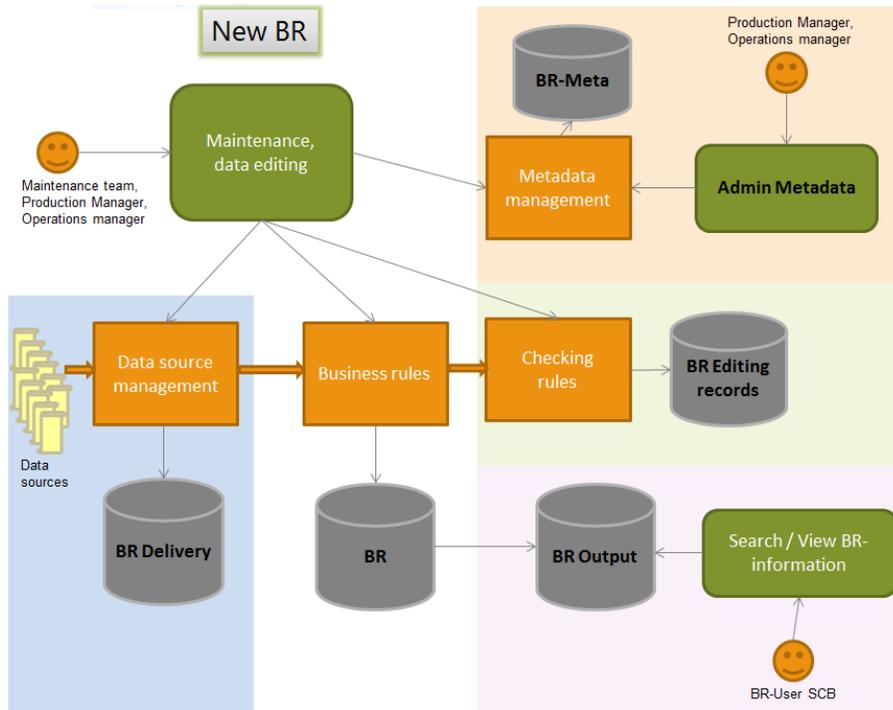
The picture describes very briefly the main features of the new BR. Green boxes symbolize interface functions. Orange boxes resemble business rules and other steering mechanisms for the system. For instance, each of the data deliveries will be specified in a "contract" with the BR. Any "violation" will result in a stop in the process (loading data), which in turn will make the process more transparent and secure. Finally, grey cylinders represent databases.

The project is divided into nine pieces of work packages. The work packages in turn are divided into: different data sources, statistical objects, maintenance application, validity checks, metadata management, migration of information from the old to the new database and final implementation of all new functions. Remaining time for the project is estimated to two years.

Tool for editing survey data

SCB has developed several common tools for the production of statistics over the latest years. Two examples are the web-survey tool and the common editing tool. However, the common tools are designed to fit the purpose of as many surveys as possible. This also means that some surveys cannot use them without further development of the tools or adaption of the surveys, or that the tools are used to a limited degree during an interim period.

All surveys at SCB were subject to start using the web-format. For the BR, the survey directed to all multi located legal units was in question. It was soon evident that the web-format could be used to a large extent. This was however not the case for the common tool for editing. The reason in both cases was the relatively large amount of information (the local units and its variables) for the respondents (legal units) to supply. For the BR therefore, a tool of its own had to be developed that was not part of the common editing tool or any other system at SCB. The BR tool for editing survey data was finalized in 2011 and this year also marked the shift from paper forms to the web-format for the survey.

The BR survey on local units

The survey is used for the BR to update information on local units and is carried out on a yearly basis. The population is made up of all legal units in the BR with more than one local unit. All sectors are represented. In the web-survey tool, it was decided for practical reasons to allow legal units with a maximum of 49 local units to use it. The possibility to overview all information users should provide was decreasing rapidly with an increasing number of workplaces; the largest organization has over 1600. Instead, the largest ones get to use an excel spread sheet form that is saved to the web-survey tool. In this way, even the largest legal units can benefit from the log on function and a secure transmission of data to SCB. In both cases respondents can edit data to some degree by built-in control functions before sending results to SCB.

Facts about the editing tool for survey data

- The purpose is for micro editing and manual follow-ups
- It is designed for editing multi-establishments legal units
- Data is loaded from the web-survey tool to the editing tool
- The maintenance team can load data for editing at any point
- The tool contains 79 controls
- The BR-database is updated from the tool
- Two types of access to the tool: administrator (production managers) and user (maintenance team)
- Production manager can view the results of each person in the maintenance team
- The manager also sets the share of cases to edit for each person, depending on who is on leave and the individual working hours

Picture 2. The editing function displayed with administrator access.

Benefits
- Improved monitoring of the productions process
- No paper forms
- More efficient work process
- Improved work environment for the maintenance team
- The manager can assign cases to individuals in the team, and the users can pick up and edit a case assigned to a colleague

Challenges
- No single located legal units can be edited in the application
- To include the largest organizations in the web-format as well
- Reduce the level of non-response. Now, it is just below eight per cent.
- Connect the tool to the reengineered BR-system

New tool for editing administrative data
The first things that has been developed and implemented from the project are one, first version of the BR data base and the data editing interface. The following will focus on the latter.

So far, only the main delivery from the Tax Authority regarding basic information on legal units is implemented. This, on the other hand, is the most important data delivery. On average 20 000 records are loaded each time. These are changes to the information already present in the BR. Once a week data is loaded and the maintenance team can start the editing process. The editing tool is used for those changes that have been flagged for a manual check.

Facts about the editing tool for administrative data

- Designed to edit micro data
- The main idea is to find information that indicates structural changes for the legal unit
- 20 controls or "proposals" for one of the following actions to be taken by the maintenance team: accept, ignore or correct. For controls that can be accepted data is already inserted in the database; ignored means the BR will not be updated with the new piece of information and corrected means that new data will update the BR and that a manual change is required
- The controls are colour based for easy detection
- Cases are grouped together by legal units
- Each case can generate more than one edit
- The cases are ordered by a calculated weight, which is based on number of employees and number of local units. The higher the weight, the higher the priority
- There are three kinds of status for a case: submitted, started or finished
- Each case is tied to an individual member of the maintenance team
- Maintenance team can be grouped into five categories (user groups) depending on the complexity of the legal unit
- There is also a function that allows the maintenance team to display historical records and all collected variables for a legal unit. This is for support during editing

Picture 3. Editing interface start page sorted by all cases. Blue boxes show the statuses submitted, started and finished respectively.
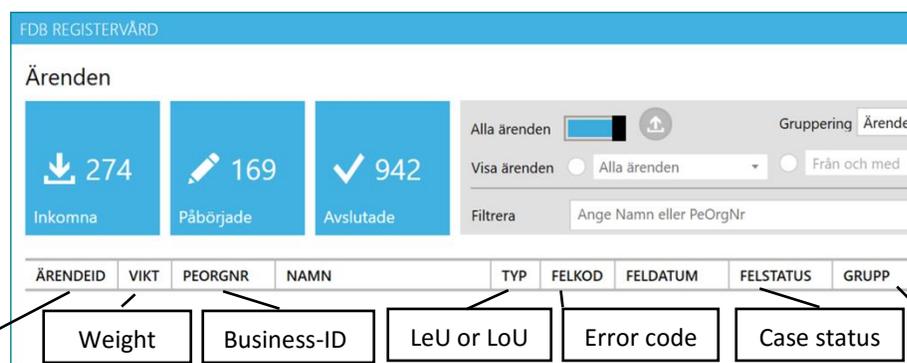
Benefits

- First step towards a fully electronic maintenance tool for the BR
- Better overview of the editing of a legal unit since all controls are now displayed together
- The team can more easily assign cases to themselves and thereby release burden from their colleagues
- The use of weights for each case makes it important for the maintenance team to handle all types of errors. This in turn reduces specialization and dependence on individuals with key competence
- Easier to produce process data for the manager

- Controls can be added or removed more swiftly
- Simplified managerial functions for monitoring the editing process

Challenges
- All technical advantages have not yet been realized. Still, no updates can be made in the tool. Instead, updates must be carried out manually via the old interface
- The assignment of cases may need to be reviewed. It is possible to opt out from an assigned case, and to pick the next one in the succession instead. For efficiency reasons, this option should be limited

Web-portal

The Swedish government has over a number of years called upon the authorities to lessen the response burden on businesses. This has resulted in many proposals of which some have been realized. One important prerequisite is that solutions need to be common for all authorities involved in data collection from businesses and not only Statistics Sweden.

The ultimate goal is also to reach a point where businesses just have to provide "one piece of information once and in one place". What has been implemented is a first version of a basic service within the website "verksamt.se". This is the result of a joint action between the Tax Authority, The Companies Registration Office and SCB. Further, there is also a common solution for e-ID logon and a secure way for authorities to communicate electronically with businesses called "My messages". All governmental authorities in Sweden have to adapt to these initiatives.

Picture 4. How authorities and businesses benefit from common information.
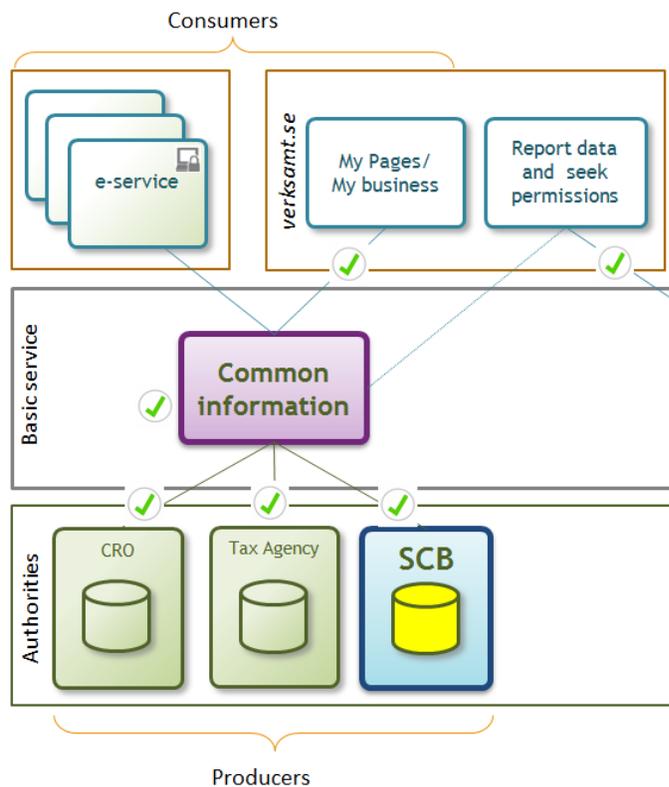
The picture shows a part of an infrastructure where data provisions to authorities are collected. Businesses are represented as consumers. Whenever an e-service is used the business is transferred to the proper authority. At this point basic information for the business such as name, address and business-ID is requested by the service. This is the common information as indicated in the purple box. The idea is that this information should be shared and possible to update in the portal and thereby made available for e-services in the form of prefilled fields. This is however not the case yet.

What is implemented is the possibility for businesses to view and change its basic information. The three authorities (producers in the picture) all deliver pieces of information and the division is decided jointly. SCB provides data from the public BR and in turn gets updates on legal unit variables such as postal address, activities (including activity codes), number of employees, and newly created local units.

There are issues that remain to be solved. One is the use of e-ID. So far, not all legal forms can log in to Verksamt.se and supply data. It is related to the difficulty to identify persons in large businesses who can be registered as a delegate for the business. The public sector has a similar situation.

More information on the ongoing work regarding e-solutions and governmental initiatives in Sweden can be found on scb.se (Erikson & Erikson, 2016).

Concluding remarks

Technical shifts have caused SCB to invest resources in developing new common tools for the production of statistics. This also affects the BR. The reengineering of the BR is one of the prioritized projects and its finalization is set to 2019.

There are as of today two editing applications in use in the BR-system. A relevant question to ask is why there has not been any coordination – why have two separate systems for editing data from administrative sources and the survey? It largely depends on the timing and complexity of the systems. SCB started developing common tools a few years ahead of the start of the re-engineering project. Hence, the transition to the web-format could not be delayed. Further, until then there had been no tool for editing survey data, which made it very awaited and appreciated.

Looking ahead, there are a couple of things that may affect the BR to a large extent if they are realized. The first is a government proposal to have legal units to report their income statements on a monthly basis instead of once a year. As of now, final data has a time lag of t + 9 months. Income statements comprise tax withdrawals for all individuals working for a legal unit. For the BR and the short term production of survey frames, this would very much improve the accuracy and reliability in calculating the number of employees, and would also provide input to calculate the number of employed. Furthermore, information in monthly income statements could serve as input to indicate the number of local units for each employer. As we have seen technical improvement is important, but in the end good data is vital.

The second thing is the cooperation between authorities in terms of data sharing and data provision from legal units. More initiatives of these kinds indicate that use of web based solutions will increase. One example is a service for applying for different kinds of permits which is about to be tested in one Swedish municipality. For the BR, work is in progress to have legal units report all changes regarding their local units on a Statistics Sweden web site. Much work still has to be done, not the least regarding a solution for e-ID. But in the long run this reporting might even replace the yearly BR-survey.

References

Erikson, A-G., Erikson, J. (2016). Cross-governmental initiatives in data collection in Sweden. Conference paper, Nordiskt Statistikermöte, SCB.