# FIFTH INTERNATIONAL WORKSHOP ON BUSINESS DATA COLLECTION METHODOLOGY - LISBON 2018

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## PRINTABLE DOCUMENTS

- BACKGROUND PAPERS

FIFTH INTERNATIONAL WORKSHOP ON
BUSINESS DATA COLLECTION METHODOLOGY
19-21 SEPTEMBER 2018 – STATISTICS PORTUGAL, LISBON

# Background paper to
# THE RESPONSE PROCESS IN LARGE BUSINESSES

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*The work presented in this paper is done by a group of people, including in alphabetic order: Ken Arentsen, Robert Göttgens, Ton Hooijmans, Leanne Houben, Peter Muyrers, Cyrille Pluijmen, and Hen Pustjens. The e-questionnaire was developed by Revolux, a software house that also developed IDEP, International Data Entry Program: the International Trade in Goods Survey e-questionnaire.*

**Organization: Statistics Netherlands**


## 1. Introduction: Redesign of the Quarterly Survey of Finances of Enterprises

In close collaboration with the Dutch Central Bank (DCB), Statistics Netherlands (SN) has redesigned the Quarterly Survey of Finances of Enterprises: SN conducts the Quarterly and Annual Survey of Finances of Enterprises, asking about Balance of Payment and Profit and Loss Account data; DCB conducts a monthly survey asking about details on financial transactions (movements), which are input for the balance of payment. These surveys are used together in the Balance of Payments at the enterprise level and National Accounts. In theory, the SN and DCB surveys should generate approximately the same results at the Balance of Payments level. In practice, however, large differences in results are perceived between these surveys. In order to permanently eliminate the differences, enhance quality and reduce response burden, both institutes concluded that these surveys should be combined into one new quarterly survey, from which the data can be used by both institutes. Instead of post-field editing it was decided to opt for the input harmonisation. The target population consists of the 360 largest non-financial enterprises in the Netherlands.

In 2014, a new set of required data had been developed (the conceptual data model). This data model is very complex and requests for a lot of detailed information. As a consequence, the response process within businesses could be quite complicated and burdensome, even though the goal of this redesign was to reduce response burden. Our expectations are that the data quality will improve, and response burden will decrease after one/two years, as a result of learning to work with the questionnaire and a fully implemented response process. At first however, we expect response burden to increase: businesses need to invest in setting up the internal response process.

As input for the new quarterly questionnaire a feasibility study was conducted, studying the internal response process in these businesses, in order to tailor the questionnaire to the response process. This study resulted in a number of design requirements. This paper discusses the questionnaire design process, including the background of the combined data model, the feasibility study, the business response processes, as well as the resulting questionnaire design. In the presentation, I will discuss the consequences of the response process for pre-testing business survey questionnaires.

## 2. Conceptual data model

As a consequence of this decision, in 2014 the requirements in the Balance of Payments 6 (BMP6) and the System of National Accounts 2008 (SNA 2008) have been translated into a conceptual data model. A project group of financial experts from SN and DCB jointly developed this model.

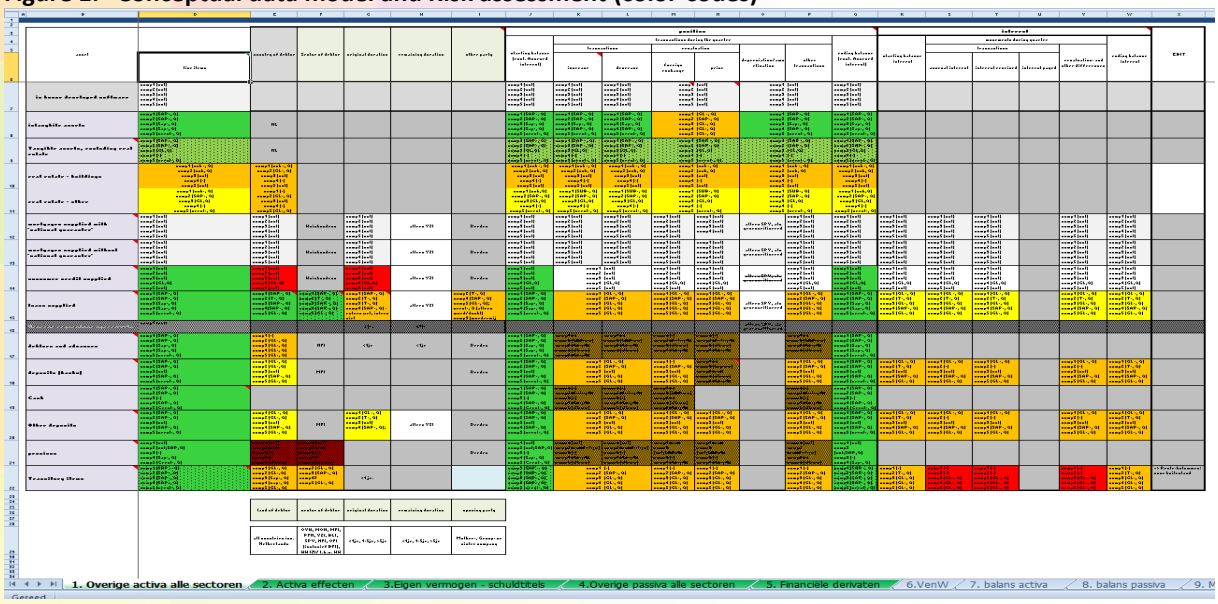
This conceptual data model requests for a lot of detailed information to be provided on a quarterly basis. It is presented as a matrix of line items and columns as is shown in figure 1, defining the information in detail. It was anticipated that this new model would be a risk for the data collection, resulting in item non-response and measurement/unit errors (Haraldsen, 2013; Snijkers 2016). The risks included: are the data available on a quarterly basis, are the data easy to retrieve, and does this reduce response burden? In early 2015 it was decided that a risk assessment was needed: a feasibility study and an independent accounting expert review were carried out. As for the planning, the targeted deadline to field the new survey was set to the first quarter of 2017; it turns out that this will be early 2019.

## 3. Feasibility study: research questions

Instead of moving directly from the conceptual data model to the development of a data collection instrument, the feasibility of the data model was investigated (as described by Willimack, 2013; Snijkers & Willimack, 2011; Snijkers and Arentsen, 2015). This study was aimed at getting more insights in the response process within these large enterprises. The main research questions were: (1) Are the data available? And, (2) how much work is involved in collecting the data? In business surveys, these questions address the following issues:

1. What (data): What data do we get? Are the concepts clear and do they match or differ with accounting definitions?
2. Who (units): What entities in the enterprise are involved in the response process? Do we get the data about the correct units?
3. Where (people and sources): what business staffs is involved in the response process and where can the requested information be retrieved?
4. When (time): When is the requested information available?
5. How (questionnaire): What would be the best way to collect the required information?

**Figure 1. Conceptual data model and Risk assessment (color-codes)**




## 4. Feasibility Study and Accounting Expert Review

As for the feasibility study five large non-financial enterprise groups were visited on site and asked about the information in the data model. A topic list for a 2-hour discussion on the data model was prepared on the basis of the research questions. These businesses have been visited in April/May 2015.

Since the model under investigation is very large, the topic list was carefully time boxed to ensure adequate information was collected to proceed with the development of the data model and the data

collection instrument. More specifically, the line items in the model were tackled one by one, whereas the required details corresponding to these line items were dealt with on a higher level. This approach does allow for some subjectivity when coding the results. It was not possible to do a detailed record check on availability and retrieval; this would take too much time.

At the same time, an accounting expert review (Willimack, 2013) was carried out by Pricewaterhouse-Coopers (PWC), with the same focus: to answer the five main questions mentioned above. The PWC study (PWC, 2015) consisted of a desk research, the accounting export review part, as well as on site visits to four enterprises. This study was carried out independently of the SN/DNB feasibility study: during the execution phase, no information was shared between the researchers to avoid bias in outcomes.

Both studies resulted in the same conclusion: combining the SN and DCB surveys into one new survey seems logical for both organizations, but offers no benefits to the enterprises. Consequently they don't perceive the new data requirements as a reduction in response burden. As a result, the goals of improving data quality and reducing response burden may not be achieved.

The findings were presented as a short management summary and a color-coded data model (see figure 1). The coding is based upon the ease of retrieving the required information and the sources that would need to be used. For *each variable* in the data model the color-coded sheet indicates if:

- the information is easily and readily available (at group accounts level): coded green;
- the information is available at a central location, but not in the group accounts (treasury level), which requires more effort: coded yellow;
- the information is available, but decentralized (general ledger level), which requires considerable effort to acquire: coded orange;
- the information is not available: coded red;
- in the meantime, some information was dropped from the data model: this is shown in brown.

The color-coded Excel sheet presents management and researchers with a clear overview of potential risks in the data collection and processing stages: the more steps and the more sources are involved in the response process, and the deeper within the business information has to be retrieved, the higher the risks of survey errors like measurement errors and item non-response.

## 5. Questionnaire design requirements

Following from these studies it was decided to develop an electronic questionnaire. Also a number of questionnaire design requirements were identified: 1. Content issues, 2. User interface & usability issues, and 3. Recommendations regarding the communication strategy:

1. Content issues:
   - A clear definition of the structure of the questionnaire, identifying each and every data entry box.
   - Clear-cut definitions of terminology: there is a difference between statistical and accounting definitions. Also the observational unit should be clear and clearly defined (consolidation cluster).
2. User interface & usability issues:
   - To be accessible and completed from various locations and by various respondents: online application.
   - Both top-down and bottom-up completion should be possible.
   - Data entry not only manually but also by uploading/importing data files; as well as data export options.
   - Indicate where the data come from (to facilitate the internal response process)
   - Provide a clear overview of the questionnaire: use an index to provide overview of the content, for navigation, and progress control.
   - Have a print option of the questionnaire should be available, including an overview of the data asked.
   - Include consistency checks and validation rules
   - The questionnaire should be available in Dutch and in English.
   - Working with matrixes is not a problem.
3. Communication
   - Communicate the new questionnaire in one year in advance so that businesses can prepare the internal process. In follow-up to this result it was decided to include a pilot year (2018).

## 6. Questionnaire design (www.cbs.nl/balanceofpayments)

Early 2016 a project team started with the design of the questionnaire. Again this included two aspects: the operationalization of the content and the user interface. As for the content, the conceptual data model was translated into an overview of the entire questionnaire content using Excel (see figure 2a).This was done in such a way that: 1. each individual data item is represented by a data entry box (meaning that if a box was missing here, the variable would not be in the final data file), and 2. each tab represents a screen (thus serving as input for the user interface). This Excel sheet can be seen as a questionnaire schedule. Developing this schedule was a considerable effort and took quite some time. Specifying the questionnaire content in detail turned out to be a cyclical process: it required going back and forth to the conceptual data model, as the model needed additional specifications.

An initial visualisation of the user interface was designed in Powerpoint, as is shown in figure 2b. In mid-2016, a draft version of this design was presented to a small number of businesses (those who had participated in the feasibility study) as a first check to see if this user interface would work in practice. Especially we were interested in how people would navigate, finding their way, using the index. This seemed to work quite well, which gave confidence to proceed. In 2017 a pre-testing study was done with a more fully developed user interface, mainly focussing at usability issues (Giesen and Vis-Visschers, 2017). Again the results indicated that the user interface worked well.

Even though the data model is quite complex, the structure of the questionnaire is quite simple. The questionnaire is structured around the Balance of payment: assets and liabilities (which was the original SN Survey of Finances of Enterprises). For some items more detailed information is requested: a matrix of financial mutations/movements (reconciliations); these items come from the monthly DCB survey.

As a result, a list of usability issues and functionalities was prepared. Each issue was rated according the MoSCoW principles: Must, Should, Could, Would. This was necessary as it was decided that the questionnaire would be developed by an external software developer. The final design of the questionnaire is presented in two instruction video clips for respondents explaining 1. how the questionnaire works, and 2. how to import data: www.cbs.nl/balanceofpayments.

**Figure 2a. Translation of conceptual data model into an Excel questionnaire schedule**

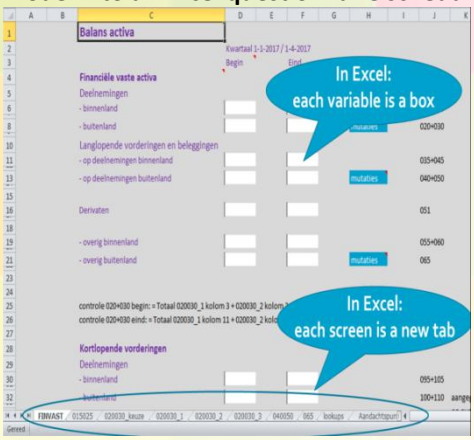
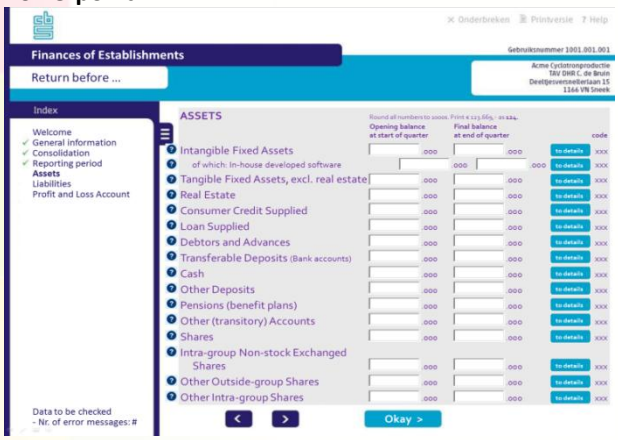



**Figure 2b. Visualisation of the user interface using Powerpoint**




## 7. Business response process

Another important result of the feasibility study, not yet discussed, is that the internal business response process depends on the structure of the business administration. Figure 3 gives an overview of the processes that were identified. For businesses with a centralised accounting this process was straight forward. For complex structures, the retrieval process can be very complex, involving one or more respondents/data providers and data sources at various locations.

In addition to the feasibility study and the 2017 pre-test study, in mid-2018 another small number of businesses was visited for a final check studying if the final questionnaire would work in practice. This time the focus was on how businesses could prepare themselves for working with the questionnaire (there was not time anymore for large changes). The results yet again indicated that accountants could easily work with the questionnaire itself, the problem however was the data retrieval process: the business response process does not only involve the completion of the questionnaire itself, but organisational issues and getting prepared are equally if not more important (Willimack and Nicholls, 2010; Bavdaz, 2006, 2010).

Based on these visits, a three-step preparation plan was developed and communicated to the businesses, in order to help them to get ready prior to 2019:

1. Identify the requested information for the consolidation cluster for the previous SN and DCB surveys, and identify everyone who was involved in the reporting processes to SN and DCB.
2. Get together and discuss how the various reporting processes can be integrated into one process, based on the new questionnaire. This should result in new procedures. And identify what should be done to get the new procedures working (changes in the administration and IT system, responsibilities, etc.).
3. Implement the new procedures.

Businesses can get familiar with the new questionnaire since December 2017. They are invited to complete and submit test data for checking by SN by September 2018.

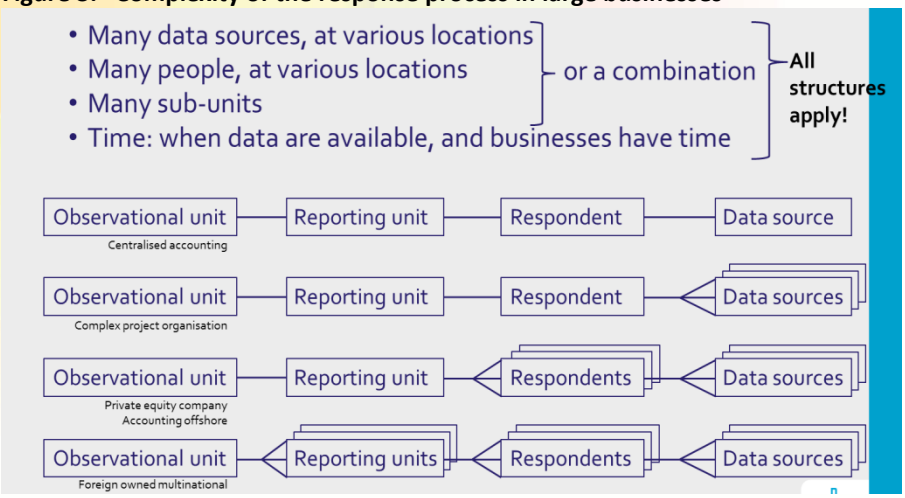
These findings have consequences for a fundamental methodological question: How to pre-test business survey questionnaires? This is discussed in detail by Willimack (2013) and Bavdaz et al (2016a, 2016b). Simple cognitive in-depth interviews may not be sufficient, as this method mainly focusses on step 1 in the Tourangeau survey response model (Tourangeau et al., 2000): comprehension. My hypothesis is that for complex reporting processes getting a good understanding of step 2, the retrieval process, is of more importance. Consequently, starting a pre-test study when a draft of the questionnaire is ready would come too late for tailoring the questionnaire to the response process. In my presentation, I will discuss the complex response process and its consequences for pre-testing in more detail.

**Statement to be discussed:** The common questionnaire development process taken from social surveys:
> **conceptualisation – questionnaire development – pre-testing – adapting the questionnaire,**

should be adapted for business surveys and should start earlier (see also Snijkers and Willimack, 2011):
> **conceptualisation – *study the business context* – questionnaire development – pre-testing – adapting the questionnaire.**

In business surveys it is especially important to take the business context into account, i.e. tailor to the business context (Snijkers et al., 2013), both for the questionnaire and the communication strategy.

**Figure 3. Complexity of the response process in large businesses**



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# AN INTERNATIONAL ESTABLISHMENT SURVEY AND THE COVERAGE OF MICRO ENTERPRISES – DOES ONE-SIZE FIT ALL?

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## Background paper

The European Agency for Safety and Health at Work (EU-OSHA) carried out its second European Survey of Enterprises on New and Emerging Risks (ESENER-2) in 2014, involving almost 50,000 establishments across all business size classes and activity sectors in 36 European countries. Like ESENER-1, its focus was on how European workplaces manage occupational safety and health (OSH) risks in practice.

ESENER-2 built on and extended the approach used in ESENER-1 by including, for the first time, **micro establishments** with 5-9 employees[1]. Micro establishments are a heterogeneous group in many senses, including in relation to their OSH knowledge, awareness and management approaches[2]. In comparison with larger firms, micro enterprises generally continue to struggle to address the proportionally higher risks of their workplaces. Further, they are much more likely to lack the necessary means with which to address these risks, including not only material resources but also those of knowledge, skills, attitudes, education and training. As a result, the decision-makers in these enterprises are often themselves largely unaware of the problem of elevated risks in their workplaces. They are also frequently remote from, and unresponsive to conventional regulatory influences, while at the same time lacking both the motivation and knowledge necessary to initiate reforms. The majority, therefore, are at best *reactive* rather than actively seeking support or guidance to improve their OSH arrangements[3].

Improving such OSH arrangements is not only a challenge for those in charge at the workplace, but also one for regulators and other stakeholders. It is therefore clear that a solid evidence base from which to develop more effective policies and supports is important. However, it is further evident that micro firms are a much harder group to reach and successfully recruit to OSH-related (or indeed other) research. In particular, such research frequently struggles to reach beyond those establishments that the owner-manager, rightly or wrongly, sees as

[1] It also expanded to include establishments in the agriculture, forestry and fishing sector, which are not covered in this paper.
[2] https://osha.europa.eu/en/tools-and-publications/publications/contexts-and-arrangements-occupational-safety-and-health-micro/view
[3] https://osha.europa.eu/en/tools-and-publications/publications/safety-and-health-micro-and-small-enterprises-eu-final-report-3/view

successful in a business and an OSH sense – which the literature suggests is likely to be the tip of the iceberg.

This paper presents some of the main findings of the review undertaken by EU-OSHA to consider the impact of the expansion of the survey universe in ESENER-2. The review was informed by and structured around the Total Survey Error and this paper focuses on its findings on **measurement error** in relation to the inclusion of **micro establishments**.

The review considered whether the survey questions were applicable to micro establishments and the selected survey informants. The work was completed via three main tasks:

(i) a review of the ESENER-1 and -2 questionnaires and relevant background information,
(ii) an initial assessment of capability based on ESENER-2 interview responses, and
(iii) in-depth qualitative interviews with respondents from establishments within the expanded survey universe.

The first two tasks were used primarily as a means to develop the topic guide used for the third task, where in-depth qualitative interviews were carried out with respondents from 28 micro establishments: 14 each in Spain and Romania. Representation was chosen from these groups to focus data collection in areas where OSH implementation levels would be expected to be relatively low[4] and therefore, any potential issues with the content of the survey would be more acute. The participating establishments were operating in the construction, retail, HORECA (hotel, restaurant, catering) and agriculture/forestry sectors – in which micro establishments traditionally predominate.

**Findings**

The review of the ESENER-1 and -2 questionnaires suggested four broad areas of concern, which were the topic of further exploration in the qualitative interviews.

### *1. Participants and participating in OSH surveys*

Recruitment was very challenging in both countries, in particular among the smallest establishments. Overall, the research teams in these two countries *each* needed the contact details of around 800 firms to achieve the 20 interviews[5]. This was primarily due to refusals, most being due to the length (45 minutes) of the telephone interview. However, some also refused after learning that the focus of the study was OSH. Those involved with the recruitment process felt that this may have reflected a perception that the interview would be 'threatening' – perhaps indicating a relative lack of confidence in their OSH arrangements. In general, those who did agree to participate felt both that their establishments had OSH arrangements in place and that these were adequate and effective.

[4] Previous analyses of ESENER-1 (Analysis of the determinants of workplace OSH practice in a selection of EU Member States (2013)) and ESENER-2 (Management of OSH in European workplaces (2018)) identified differences between countries in relation to the various practices and procedures measured by the survey. In summary, the levels of implementation of these measures are generally highest in the United Kingdom and northern European countries. This suggests that establishments in countries where the process-based participative approach to OSH management required by the EU Framework Directive 89/391/EEC (https://osha.europa.eu/en/legislation/directives/the-osh-framework-directive/1) is more embedded in their regulatory systems are more likely to have high levels of implementation of 'good' OSH practices in their workplaces than those where these approaches are relatively newer.

[5] There were 14 micro establishments interviewed in each of the countries but a total of 20 interviews per country, which included establishments in the agriculture, forestry and fishing sector.

Respondents, with only one exception, were all managers or owner-managers, and their businesses were often family owned and run. For most OSH was not their main responsibility but something they dealt with alongside their core duties. In accordance with national norms, virtually all of the surveyed establishments used an external service for support with OSH, so most respondents described their OSH responsibilities as, at least in the first place, primarily revolving around liaising with these organisations. In line with this, some respondents felt that the regulations had been developed to suit the needs and capacities of large companies and had not been adapted to the very different needs and resources of micro and small enterprises, especially those operating in what they saw as low risk sectors (such as retail).

### 2. *Knowledge and understanding of OSH requirements*

The interviews suggested some awareness and understanding of the OSH regulatory requirements among all of the respondents. However, as indicated above, for many the task of ensuring that the relevant arrangements were in place was regarded as the duty of the external service provider. So although the person *'who knew best about health and safety'* within the enterprise was often aware that they should at the very least read through the documentation provided by the external service, even this was sometimes seen as something of a challenge.

This raises the issue of *'paper compliance'* – that is, firms being apparently compliant according to their documentation, but such paperwork having little or no correspondence with workplace practice. This potential mismatch between documentation and practice, and the difficulty of capturing it, is an area of concern for surveys such as ESENER. Furthermore, the priority afforded to OSH increased with the perceived level of risk. This was lowest in the retail sector, where risks were generally regarded as negligible, and highest in the agriculture and construction sectors, with HORECA falling somewhere in between.

These findings suggest that the ways in which survey questions are understood may vary with the circumstances of the participating establishment – in particular its size, sector of operation and the way in which it meets its OSH obligations (in-house or through an external service). This makes the interpretation of responses more complex.

### 3. *Key areas and concepts*

The key areas identified by the review were (a) the presence of a written health and safety policy; (b) risk assessment; (c) worker participation; and (d) the labour inspectorate. They will be dealt with in the presentation at the workshop.

### 4. *Supply chain position of the enterprise and its relationship to survey responses*

All of the participating establishments were part of supply chains, which varied in size and structure, and for the most part they were operating lower down the supply chain. In general, the supply chain relationships they were involved in, particularly in Spain, were described as being long-term and based on loyalty. While in some instances supply chain pressures impacted on the arrangements for the organisation of work and employment made by some

establishments, respondents sometimes saw suppliers as a source of 'expert' information in relation to OSH concerns and queries.

**Conclusions**

Overall, the review suggests that one-size does not fit all, and care must be taken to develop survey methods and content that are appropriate for the smallest as well as larger businesses. To this end, a number of recommendations are made for improving data collection from micro businesses in future waves of ESENER.

- The questionnaire is developed to collect details of the **supply chain position** of all establishments and the influences of their relationships within that chain on their OSH decisions and procedures.
- Consideration is given to respondents' **understanding and interpretation of key concepts and terms**, and its implications for survey development. For instance, some areas of the questionnaire (and/or its prompts to interviewers) could be revised for clarity – for example, the questions on visits by the labour inspectorate, on employee involvement and on risk assessments.
- Consideration is also given to including a **qualitative element** for a proportion of establishments (of all sizes, but with the emphasis on the smallest) that explores the relationships between, for example, reporting that risk assessments are and are not carried out, and the realities of workplace practice. The power of such an element would be substantially increased if it were further extended to include a brief interview with a worker as well as the owner/manager in each case.
- The recruitment process and survey could be developed to ensure collection of sufficient **contextual detail** for meaningful data analysis and interpretation.
- Finally, more intensive efforts could be made to convert micro establishment **refusals** during or after the survey, to provide quantitative evidence on **non-response bias** and improve survey estimates where applicable.

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# EXPLORING RESPONDING BEHAVIOR BEHIND "REMAIN UNCHANGED" ANSWERS

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**Abstract:** This study observes the responding attitude of Business Tendency Survey (BTS) participants. The main issue is about survey participants' behaviors in Business Surveys' questions, in particular to the question of general business conditions in their industry. The data quality and measurement issues on this question is especially important because this is one of the questions used for business confidence index calculation. Confidence indices formed by using business and consumer surveys data plays a critical role since there is not much data out there measuring their current situation and future expectations. Therefore, those short term statistics are very significant for policy makers. Early signals for business cycles are good to consult as long as qualified data is maintained. The general tendency of perception and attitude change due to economic situation is measured by this question by a three-level Likert scale on a monthly basis with a self-administered survey. The three scale points in this question are "more optimistic; remain unchanged; more pessimistic". The high percentages of middle alternative responses over time draw our attention to look into this topic in more details from a cognitive point of view. Therefore, the possible options how this answer choice is interpreted by the respondents of BTS is discussed. At first, by implementing an ad hoc interpolation method, how different the balance would be under certain assumptions is studied. Results show that how firms evaluate middle category response choice does not cause any substantial changes in the direction how we interpret economic tendencies. However, the meaning of answering middle category response is still a puzzle. Secondly, we analyzed the general business conditions data by using decision tree models to observe whether we can classify a certain behavior on developing this response choice. These analyses also proved the uncertain respondents in general. As a further investigation, to validate assumptions, underlying factors that are shaping this behavior are to be researched by in-depth interviews with managers, on a visit to the companies. In this workshop, the intention is to share and discuss the results of this qualitative research. This research aims to help developing better questionnaire design tools in business surveys.

## 1. Introduction

There exists a wide-spread literature about the effects of responding behaviour on population or household surveys, but less is known about the business surveys. There has been a growing concern among countries in the short-term economic indicators to monitor the economic developments and provide the economic analysts with the early signals of the turning points in the economic activity. Such indicators are used to help both the government and the private sector decision makers check their performance and plan their actions. The surveys on expectations are primarily designed to signal changes in economic activity and widely used in macroeconomic assessments and forecasts. The advantage of using survey results is that they are available promptly before the related quantitative measures covering the same types of economic activity and hence, they are considered as complementary to the official statistics. The main aim of business tendency surveys conducted in various ways is to find out the general tendency of cyclical developments and provide economic decision-makers with the necessary information about future expectations. Therefore, the general belief is that respondents in business surveys approach questions within the scope of businesses carried out in their firms and in the sector group in economy they belong to. The motivation in this research is to hypothesize whether this general belief holds or not, particularly for the respondents who answer "remain unchanged" periodically. Is there a direct influence of economic inconsistencies affecting their sectors on shaping their neutral answers? This curiosity stems from the high amount of responses to "unchanged" category in a given month and over the months consequently. The high percentages of "unchanged" category during the periods start to question about the validity and reliability of the survey in the long run.

The data in this research comes from a business survey of Turkey which is formed in the structure explained above. Business Tendency Survey (BTS) has been conducted by the Central Bank of Turkey (CBRT) since December 1987 to track the trends in business conditions. Real Sector Confidence Index (RSCI) was constructed in 2005 by using all the series. A comprehensive revision in BTS was made in line with the "Joint Harmonised Business and Consumer Surveys Program" of the EU Commission in 2007. According to statistical criteria and economic theory, the most appropriate index is formed and its performance in tracking the cyclical features of industrial production index is tested (Ece, et al., 2005). The survey has been

the recent past and the future, on production, demand, investment, sales, employment, capacity utilization of their company and their inflation expectations. It is generally difficult to follow all the questions in a survey. Nilssons (2000) stated "The reason why a group of indicators combined into a composite indicator should be more reliable over a period of time than any of its individual components is related to the nature and causes of business cycles". Thus, the responses given to different questions are evaluated collectively by summing them up into a single indicator. The aggregated indicator which is a function of respondents' current and past evaluations, and future expectations is called "confidence indicator". At this point, in relation to the focus of this study, the question is how those responses are formed. Particularly, what is the response behaviour behind so many frequent neutral responses of those business managers?

Response behaviour is the outcome of the evaluations in one's individual brain algorithm. What factors drive this behaviour? How does it form and find shape in understanding? As literature in survey research formulates, the survey response model for individuals consisting of four cognitive steps can be implemented as comprehension, retrieval, judgement, and communication (Tourangeau, 1984). It is assumed that, in formulating an answer for a survey question, the respondent has the knowledge, belief or attitude required to provide a valid response. Comprehension corresponds to understanding the meaning of a question. While responding to questions concerning conditions or behaviours, the respondent attempts to retrieve the required information from memory. Once information has been gathered, the respondent decides how to respond appropriately, taking into account risk, benefit, available answer choices and so on, which is a judgement to make. Finally, in communication phase, the respondent replies to the question by selecting the response category, entering the data into the data collection instrument or communicating to the interviewer.

The focus in this study is to evaluate the responding behaviour at the judgement level using responses to a question regarding general economic situation expectations. The question is "general tendency about current situation in respondent's own sector compared to previous month". This qualitative question's response alternatives are "more optimistic," "unchanged," and "more pessimistic." It is observed that there is a high likelihood of responding "remain

unchanged" throughout the periods. What happens when people are asked their ideas about general economic situation which leads them to respond "remain unchanged?" How do they judge? What factors drive this answer choice? At the end, the answering behaviour influences the survey results and their calculation for a good enough basically representative indicator. That would be the concern of economic policy makers whether those indicators calculated by using those questions are sufficiently reflecting the ideas of businesses in different sectors in population.

The data is collected monthly as a self-administered paper or email survey from approximately 3000 firms which are relatively leading businesses in their sectors. All questions are interpreted on a balance which is called diffusion index (percent of positive answers-present of negative answers). Those balances are used in data analyses for inflation reports, monetary policy reports and any other reports required by the management at the CBRT. There are twenty eight questions and of those, eight are used to calculate a RSCI for Turkey. The average of those eight questions' balances form the RSCI. One of those eight questions is the general economic situation question which is used in this research. As mentioned above, those diffusion indices and RSCI play a crucial role for economic policy makers. Therefore, the meaningful interpretation is especially significant to implement the right policies for the country as a whole.

Accordingly to give some background information, the next section summarizes the related literature. The third section presents the theoretical framework of this study.

## 2. Related Literature

Due to the fact that diffusion indices are the percentage difference of positive and negative thinkers of the questions in the survey, almost half of the responses lost in middle response category cause similar results as in a questionnaire with a high item nonresponse rate. Participating the survey and not responding to certain questions leads one to think first about the questionnaire design. In particular, nonresponses can cause significant biases when nonresponse occurs in relation to the question researched. The missing at random (MAR) hypothesis, which assumes that the average distribution of responding business is representative of non-respondents, is commonly used (Rubin, 1976). From an interpretivist approach, this would be a strong assumption. The individual respondent behaviour is

unpredictable. The way respondents act can be related to their mood, period or anything else which is hard to guess and impossible to categorize. Nevertheless, under a relatively positivist approach, in this study, this methodological idea of MAR is used for middle category choices, to phrase it whether they are neutral at random or not. Virtually in all quantitative macroeconomic

policy discussions, the assumptions are categorizing individuals in definite groups and thus, hypotheses would like to be tested under that frame.

As discussed in the literature, some of those neutral responses can be a hidden don't know. Hidden don't know in this survey represents unclear minds due to the recent economic situation in a given period. Respondents might be unwilling to indicate any idea about economic activity simply because of not being sure about the answer. Those situations exist usually during those times when there is an economic crisis/downturn globally or domestically, sluggish economy, election, political turbulence or critical foreign relations, namely the factors causing instability in the economy. Indecisive or uncertain attitude is the result of one's feeling about the economy during the given period. It is more of a result of a feeling towards the economy after self-interpretations of situation unconsciously. In other words, it is difficult to constantly assess the improving/worsening economic conditions with better/worse over time since the questions are about "developments/changes" (Bovi, 2009). When respondents have limited information to do judgemental operation in evaluating likelihood of uncertain outlook, they may prefer not to evaluate their own economic situation, indicate neutral answer choices representing a hidden don't know. Continuously responding "unchanged" does not show any positive/negative surprise effect between t-1 and t. Updating information frequently for periodic surveys takes more time for respondents because of the difficulty to analyse the developments in large firms. When the question is about the general economic condition, respondents will use their own perception if they are familiar to developments from the daily routine, but if they are not familiar, learning takes time (Kahneman and Tversky, 1974). As the respondents become more comfortable with the survey and want to minimize their burden, they also tend to tick the "unchanged" category (Das et al., 2011), which in other words, a "satisficing" behaviour (Krosnick, 1991).

There has been some split ballot design studies in which respondents are assigned to conditions which offer or omit a middle response category to see the influence of offering this

alternative. For instance, in Sturgis, et al. (2014)'s study, follow up probes are administered to respondents who initially select neutral to determine whether they selected this alternative in order to indicate opinion neutrality or to tell that they do not have an opinion. They find that the attitude of vast majority is to avoid social embarrassment that they should have an opinion on important issues, called faces saving do not know. This can be interpreted more as a cultural

approach. In some cultures "do not know" is an embarrassing answer for any question directed to an individual. Individuals are forced to have an opinion about anything no matter how it is. Interpretation is in the nature of human, any issue can be discussed anyways. On the other hand, they can also evaluate their own economic situation better than general business outlook and the future better than the past, or judge over-pessimistically the past and forecast over-optimistically the future (Kahneman and Tversky, 1974). As experimented, it is difficult to distinguish between respondent behaviours.

As explained before, responding to a question often involves understanding the question, retrieving relevant information from the memory, making some sort of judgement, and then formulating the judgement in a way that is consistent with the question's demands. Respondents are viewed as pragmatists – at times, as opportunists – in their approach to these mental steps (Tourangeau, Rips, et al., 2000).

In the literature, there have been some observed reasons to tick the "unchanged" category frequently. Some uninformed interviewees do not want to answer and provide more neutral answer with the category "unchanged". Respondents may also keep their perception status unchanged in the short run until they get enough information for updating. Highly neutral responses may also point to respondents, who could not process available information (Giovannini and Uysal, 2006). This is a realistic approach. If they accept that they don't know about that, it is no interest to them, simply they might choose to respond middle category.

Respondents may be conservative to change their ideas or bored of long periodic surveys. Even though some scholars suggest that middle alternatives offer "easy outs" to respondents who want to avoid taking sides on an issue, it is found that offering a middle alternative reduces the amount of random measurement error in the responses, thus increasing reliability (Muircheartaigh et al., 2000). In a postmodernist thought, respondents

might know and have idea but would prefer to get out of survey as soon as possible, then try to make silly choice by not indicating idea either positive or negative. In their mind, this gives a chance to end the survey soon.

## 3. Theoretical Framework

While there are many theories in cognitive literature, my stand point for this research is supporting more rationalistic theory. The rational expectations theory is an economic idea that the people make choices based on their rational outlook, available information and past experiences. The theory suggests that the current expectations in the economy are equivalent to what people think the future state of the economy will become. Although there is a dilemma with the belief that government policies affect individuals' decisions, pragmatic approach claims that this exists most of the time as explained. Following this theory, rational choice theory has emerged. It assumes that all people try to actively maximize their advantage in any situation and therefore consistently try to minimize their losses. This theory says that people base their decisions on rational evaluations, act with this logic once there is need to choose something, and target to increase either pleasure or profit, that is utility maximization. All the social fact are directed by the human actions. Therefore, to be able to explain any action and change in the economy, rational decisions of the individuals that make up the whole are observed.

At the beginning I wanted to approach this topic in a more interpretivist point of view. Nevertheless, I thought it will be a better and long lasting research if I try to understand and see if my hypothesis of respondents' being influenced by economic instabilities while giving answers is valid or not. Are they rationalists? Are they hidden don't knows while responding middle category? Therefore, this experimental research is followed to analyse my hypothesis which is that individuals are rationally affected from economic uncertainties while forming their ideas on general economic situation. Additionally in the long run, with an interpretivist approach, a research with certain theories as explained in related literature is planned to be studied. Regarding that as one tool I have prepared an in-depth interview and started

meetings with some firms' respondents. So far, using method such as in-depth interview has been a significant contribution to this study.

Although people perceive that there is no change in their situation or in general conditions, the "unchanged" category may represent a few possible interpretations. If the number of respondents in this category systematically remains high and persistent over very long time, such as more than seven months (unchanged state), the validity of responses could be questioned. Although the cyclical pattern of the sentiment indices expressed with Likert scale is a good indicator for the long-term path, the upturn and downturn states of cycle become typically longer when answers accumulate at the "unchanged" category (Bovi, 2009). On the other hand, this responding behaviour might be affected by optimal questionnaire design, follow ups and probing questionnaire. However, in this study, design issues will not be discussed in details.

Overall the respondent behaviour to answer "unchanged" category so many times in a row and high percentage of "unchanged" answer in a given period to a BTS question is investigated. Accumulation of responses dominantly at the "unchanged" category arouses interest to question what if responses of this category are actually a mix of other categories' answers or "do not have an opinion". Responding "unchanged" indicates a neutral state which can actually hide some information. Under the theoretical framework of this study, how the "unchanged" response can be interpreted is summarized as follows. Firstly, it can be evaluated as "same as before", i.e., arithmetically null. Second, this response can mean "same change as before (increase or decrease)", i.e., arithmetically previous month's expectation/answer. The third possibility is "not informative, do not know (DK)", i.e., arithmetically null. Basically by understanding the behavioural reasons behind the "unchanged" response, we question whether a reliable and qualified data is maintained or not. It is found that high percentage of the "unchanged" response does not change the current interpretation of the survey results and its information content.

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# FIFTH INTERNATIONAL WORKSHOP ON BUSINESS DATA COLLECTION METHODOLOGY

19-21 SEPTEMBER 2018 – STATISTICS PORTUGAL, LISBON

INSTITUTO NACIONAL DE ESTATÍSTICA
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FACULTY OF ECONOMICS

United States Census Bureau

**Exploring Web Survey Paradata to Improve Survey Design**

At Statistics Canada, electronic questionnaires (web questionnaires or e-questionnaires -EQ) have long been recognized as very important reporting options for survey collection. Various electronic data reporting tools have been explored over the last 20 years. Statistics Canada (STC) has continued its attempts to develop an effective and efficient e-questionnaire solution that will meet respondent expectations, comply with Statistics Canada requirements for confidentiality, security and data quality standards, and comply with Government of Canada requirements for accessibility and common look and feel.

The key drivers for moving to web-based questionnaires were:

- Requests from respondents to provide an electronic means for reporting their data;
- Provide a secure, convenient and simple means to respond to our surveys;
- Reduce respondent burden and help counteract anticipated declining response rates;
- Reduce costs by reducing mail, data capture and follow-up collection costs.

Establishment surveys began using the first iterations of web questionnaires in March of 2011. The number of business surveys offering web self-response as part of a multi-mode collection strategy has increased considerably since those early days. Today, nearly 75% of ongoing business surveys offer web self-response.

As multi-mode collection including self response became more and more prevalent for establishment surveys at Statistics Canada, significant effort has been put into improving the respondent's experience with the questionnaire. For example, it is a policy at Statistics Canada to conduct qualitative testing on new or revised questionnaires (including web questionnaires) before proceeding to collection. Effort was also made to improve collection strategies aimed at increasing self-response. Examples of strategies included using Secure Access Code letters for recruitment, and promoting the ease of self-response during CATI or NRFU activities.

This presentation will examine paradata generated by Microsoft Internet Information Services (IIS) logs for the electronic questionnaire to mine for lessons that can be learned by survey design teams. These logs record HTTP transactions. For Statistics Canada's web questionnaires, this means that the logs show actions taken in the web questionnaire by both the respondents and the interviewers for a particular survey. The logs do not contain the questionnaire response data, nor do they contain information regarding web pages accessed by the respondent outside of the web questionnaire. The raw logs contain massive amount of information, but Statistics Canada has done considerable work to clean them up and parse out the most important information. They can now be used by survey analysts to understand a range of web paradata about a survey. Among the many types of variables included in the log files, notable information includes:

- Time per page;
- Type of browser and device used;
- Help button usage;
- Questionnaire path taken;
- Language (English or French) used;
- Time and day;

- Edits triggered.

Work on using the logs has evolved over time at Statistics Canada. First use dates to 2015 on business surveys. Logs were then used to examine the results of the 2016 Census. Since 2017, versions of the logs that are more user friendly have been made available. As the use of web questionnaire paradata grows, Statistics Canada can use this information to improve the respondent experience by modifying the design of questionnaires using information learned in the paradata.

This presentation will focus on web paradata from Statistics Canada's "mission-critical" monthly business surveys:

- Monthly Retail Trade Survey (MRTS)
- Monthly Manufacturing Survey (MSM)
- Business Payrolls Survey (BPS)
- Monthly Wholesale Trade Surve (MWTS)

Together, these surveys represent approximately 28,500 sampled units per month, and roughly 60% of those (17,000) self respond via the internet.

The **Monthly Survey of Manufacturing** collects information on sales of manufactured goods, inventories (including raw materials, goods in production and finished products), unfilled orders, and production capacity. This information is used by various stakeholders in the public and private sectors to monitor the economic health of this important segment of the Canadian economy. The objective is to measure month-to-month changes in the main production variables and use this information to show the trends at the industry and provincial level. The monthly sample is approximately 5,500, and the average monthly response rate is approximately 95%. The survey has been offering web self-response since October 2017.

The **Monthly Retail Trade Survey** collects sales, e-commerce sales, and the number of retail locations by province, territory, and selected Census Metropolitan Areas (CMA) from a sample of retailers. Retail sales estimates are a key monthly indicator of consumer purchasing patterns in Canada. Furthermore, retail sales are an important component of the Gross Domestic Product, which measures Canada's production, and are part of many economic models used by public and private agencies. The Bank of Canada relies partly on monthly retail sales estimates when making decisions that influence interest rates. Businesses use retail sales estimates to track their own performance against industry averages and to prepare investment strategies. The monthly sample is approximately 5,800 and the average monthly response rate is 95%. The survey has been offering web self-response since August, 2016.

The **Business Payrolls Survey** is a key input to the Survey of Employment, Payrolls and Hours (SEPH), which provides a monthly portrait of the amount of earnings, as well as the number of jobs (i.e., occupied positions) and hours worked by detailed industry at the national, provincial and territorial levels. SEPH data provide the principal input to labour income estimates: they also serve as a proxy output measure for about 15% of real gross domestic product and "nominal" gross domestic product. SEPH data are also used by the Canada Revenue Agency (CRA), to revise the maximum pensionable earnings and retirement savings plan contribution limits, and by the private sector, for contract escalations and wage rate determinations. The monthly sample is approximately 15,000, and the

average monthly response rate is 90%. The survey has been offering internet self response since late 2012.

The **Monthly Wholesale Trade Survey** provides information on the performance of the wholesale trade sector and is an important indicator of the health of the Canadian economy. In addition, the business community uses the data to analyse market performance. This survey presents estimates of monthly sales and inventory levels for wholesale merchants in Canada, each province and territory. A variety of organizations, sector associations, and levels of government make use of the information. Governments are able to understand the role of wholesalers in the economy (5-6% of the Gross Domestic Product, depending on the year), which aid in the development of policies and tax incentives. The monthly sample is approximately 3,600 and the average monthly response rate is 95%. The survey has been offering web self response since August of 2016.

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# Subject matter edits in online forms: Problem definition, exploration, development and alternatives

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## Background on ABS online form development and in-form edits

The Australian Bureau of Statistics (ABS) has used online and other electronic forms to collect data for almost twenty years. Our early online forms were limited to a handful of quarterly economic collections with few questions and simple structures. These online forms were static instruments that looked like the equivalent paper form with little additional functionality. In 2012, the ABS adopted a new online form platform, Blaise IS, and over the next three years, rolled out online forms for almost all of our business collections. The large amount of operational, technical and methodological resources required to design, develop and deploy so many online forms within a short time-frame meant that there were few resources available for developing functionality beyond presenting forms in a tabbed format with a navigation bar for moving among tabs, relevant question templates and other necessary basic elements.

This stage of Blaise IS online form development did include the use of one type of in-form edit. All forms included character edit functionality, usually in case respondents entered alpha or special characters into numeric fields. The presentation of these edits was problematic in a number of ways, including that the edits were triggered when respondents entered commas and decimal points within their number answers. Although there was interest in examining form paradata to understand how often these character edits were triggered, there have not been resources to extract and analyse that paradata. The general thinking on this subject is that respondents rarely attempt to put alpha characters in online response boxes and therefore there are no obvious positive or negative benefits to character edits.

A refresh on the layout of the online form template in 2014 allowed us to take more complex business forms online and to improve the presentation of all forms generally. The changes at this stage included a wider question space, a wider and two-level navigation bar, reorganisation and improvement of some of the common instructional elements at the beginning and end of the form, the addition of a page at the start of the form that included a preview (a PDF of the paper form) of all future questions and question level elements including calculation buttons, in-form boxes to allow respondents to explain inconsistent splits and totals. Other functionality was developed as needed for specific collections.

Survey manager stakeholders were keen to use the 2014 refresh to develop in-form edit functionality, specifically, the ability to implement logical edits. The 2014 refresh design work was closely tied to the development of an online form for a collection that we had been unable to take online through the previous form layout. The SMA wanted hard logical edits on responses to questions where respondents (to a paper form) sometimes selected logically inconsistent combinations of response categories. Although small in scope, this development work allowed different forms design, IT and methodology

advisers to work through how to build and present edits. This type of logical edit was developed, tested with business survey respondents, determined to be of low risk and, therefore, implemented. To date, the impact seems to have been low with no negative feedback from respondents or the SMA. Unfortunately, we have not had the resources to obtain and analyse the paradata associated with this form to quantify how often the edits triggered and how respondents changed their answers.

**New in-form edit development and implementation**

Most survey managers are content with basic character and logical edits that are used on their online forms. Some survey managers, particularly high-profile sub-annual collections, are reluctant to use in-form edits that might lead respondents to either not complete their forms or to report inaccurate data with intent to complete their form. Unfortunately, the edit-type that many survey managers would most appreciate – flags on changes in data since the previous cycle – have not been possible due to confidentiality restrictions on returning data to units. These survey managers use alternative methods for improving data quality or accept the data as fit-for-purpose.

However, for some collections, typically annuals and bi-annuals where respondents are less likely to be trained in answering questions, there is interest in using in-form edits where possible. A key motivator here is the need to keep micro-editing costs as low as possible. Survey managers are therefore keen to use all of the available functionality to reduce costs. As with all form design work, Methodology is keen to collaborate with survey managers, the forms design team and technical support areas to ensure that form design delivers survey managers data of the quality that they require. We therefore developed ways of evaluating, developing and implementing in-form edits, or their more effective alternatives.

When survey managers start new cycle conversations with stakeholders in forms development, including Methodology, they outline data quality problems or directly request edits. The first stage of this conversation is oriented at defining the problem and setting the parameters of a simple cost benefit analysis. Subject matter areas will be asked:

- In simple terms, what is the data quality problem?
- How much of a problem was this in previous cycles?
- Was the problem correctable by auto-corrects or simple clerical editing?
- What proportion of businesses had to be called to discuss the problem?
- What proportion of businesses that were called were significant contributors?
- What proportion of phone calls identified answers that were incorrect and lead to changed answers?
- What proportion of phone calls were relevant to and therefore may have been required for macro editing anyway?

These questions are not always easily answerable – especially when management information is insufficient or difficult to assemble and analyse – but survey managers often find this a valuable process because it allows them to quantify and clarify their intent within their own areas. It is common to also discuss whether in-form edits are the best solution for outstanding problems. The conversation here in includes discussion of:

- Can the problematic question/s be improved?
- Is there an obvious fix for the question or is conceptual and cognitive testing required to investigate improvements?

- What would be the timeline for improvements: In the next cycle or another acceptably near cycle?
- If there is a delay on improvement, is it worth testing the efficacy of edits before improvements can be made?

At this stage, survey managers may decide that problems are less important than initially thought or identify alternative strategies and withdraw their edit request.

If the outcome of the SMA's simple cost benefit investigation identifies that in-form edits are still of value to the collection, we move on to designing the edits. The first stage focusses on identifying the conditions for the edit being triggered. Survey managers specify response activity at or among questions and how the online form could flag the need to present the edit. Sometimes it is simple but other times it is more difficult to identify problematic activity live within the form, for example if responses from two questions should be consistent but if, as is almost always the case, respondents can complete the questions in non-consecutive order, the edit will not fire at the related question.

If an in-form edit can be specified and will be flagged within the form, the survey managers need to work through how to present the edit to respondents. The visual presentation format (in-line with the problem question or response) is pre-set by form design standards but the survey managers need to provide the first draft of the wording. This requires the survey managers to translate their concerns into words that will be understood by respondents. Survey managers are provided examples of edit messages. Where appropriate, we encourage word-subbing of respondents' answers, and question numbers if a relational edit, into the edit messages.
A typical edit message is one or two sentences that provides:

- A clear diagnosis of the problem that is directly related to the respondents' own response behaviour
- A clear direction on what the respondent should do

We explain that any edit message must be written so that it can be understood AND acted upon by respondents. The highly illustrative anti-example of in-form edit messages is the typical software or systems message wording - User error #123456!!. This writing task is often a challenging because it raises questions about the ability of respondents to understand relationships that we regard as correct or typical, but respondents may not agree with for their business or have thought about. This is particularly troublesome in situations where an answer or combination of answers would be considered to be highly unusual but is still possible. We suggest that pointing out respondents' unusualness within a form is not helpful and may be better discussed by phone.

For obvious reasons, the question of whether an edit should be hard or soft is considered at the same time as the drafting of the edit message. Survey managers are most likely to want hard edits on key questions where they have previously had an unacceptable level of non-response. The greatest challenge to uses of hard edits is that they stop respondents from scanning through a form to assess their task and work out how they should arrange response.

**Testing of in-form edits**

An early lesson from logical edit development was that edits are quite difficult to test in cognitive and usability testing. We took the prototype online form with all of its refreshed layout and new functionality out to businesses and observed them walking through and completing the form as they

would normally. None of the test participants triggered the edits. Our test protocol was that, after reaching the end of the form, participants were asked to return to questions and provide answers that would trigger the edits and then to reflect on what they saw. All of the test participants identified and understood the edit message, but they also said that they thought there was not much point to the messages as they would never make such "silly mistakes" because the questions were "very clear."

In subsequent business and household testing, we had consistent experiences. It is unlikely that edits fire in these tests and the use of hypothetical scenarios is not very effective. We suspect that there is a test effect with cognitive and usability test participants not being representative and being diligent and compliant in testing. Obviously, also, if forms are designed well and for a range of respondent capabilities, edits are also most likely to only be relevant for a small fraction of the sample and useful test participants require careful purposive sampling. We do approach businesses with problematic response for questionnaire redevelopment testing and may do so for upcoming edits development.

**Conclusion and alternatives to in-form edits**

In general, while we support the development of effective in-form edits, we see limited value in the use of in-form edits. The positive, respondent- centred orientation of good old-fashioned question design methods combined with new online user experience design techniques are far more likely to ensure that respondents can respond in ways that we need them to respond. When forms are developed with the needs, resources, motivations of respondents in mind, our statistical needs are met. In-form edits are not a replacement for good question or form design and can use up scarce technical and other resources in implementation. In form edits, require judicious use and careful design so that they assist respondents to complete forms. Most importantly, any in-form edits should only assist those that need assistance and not be an impediment to the majority of respondents with no needs for assistance to complete their form easily.

Our earlier web form development (2012 to 2014) highlighted how the separation of content across tabs and, simply, on screen meant that respondents found it difficult to understand complex questions and the relationship with other questions. Our online form design introduced error that was not present in paper forms. In 2014, we introduced a page at start of all business forms that encouraged respondents to download and use a PDF of the form's questions. This has been very effective for data quality and is much appreciated by respondents, particularly those in large businesses where the responding person has to share questions with colleagues who are sometimes interstate or overseas.

Summary pages presented immediately before submission, in which responses (or lack of response) is arrayed so that respondents can visually assess their response patterns, identify problems and navigate back to complete the form, correctly. Respondents can easily navigate back through a form without a summary page, but we found that the presence of a summary page encourages and facilitates more respondents to check their answers. This functionality has been very helpful for financial forms where items should reconcile as per a balance sheet.

Our current summary pages are static, without either edit message or links back to questions. We would like to explore the development of active summary pages that include edits. We welcome any thoughts and advice from BDCM workshop members on how to develop these or any better alternatives!

Fifth International Workshop on Business Data Collection Methodology

Lisbon, September 2018

Background paper

# Designing an instrument for collecting data from political organisations

Once a year, Statistics Norway (SSB) collects income and expenditure data from all political parties in Norway on behalf of the Ministry of Local Government and Modernisation. The goal is openness about the political parties' funding, to ensure the public's right to access such information and to prevent corruption and undesirable bonds.

Party financing, accounts per political party. Per cent., [1]

| | 2016 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Christian Democratic Party | Liberal Party | Socialist Left Party | Labour Party | Progress Party | Conservative Party | Centre Party | The Red party of Norway | The Pensioners' Party | Democratic Party of Norway |
| **Income, total** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| Government subsidy, total | 74.4 | 73.3 | 75.8 | 75.1 | 73.7 | 84.5 | 71.7 | 72.5 | 61.8 | 83.6 | 51.1 |
| Own business, total | 17.7 | 25.1 | 16.3 | 13.6 | 18.7 | 10.6 | 17.9 | 23.0 | 16.6 | 15.9 | 48.9 |
| Contributions, total | 7.9 | 1.6 | 7.9 | 11.3 | 7.6 | 5.0 | 10.5 | 4.6 | 21.7 | 0.5 | - |
| | | | | | | | | | | | |
| **Total costs** | **86.8** | **99.9** | **86.1** | **88.3** | **90.2** | **65.4** | **86.2** | **97.5** | **95.4** | **74.2** | **104.6** |
| Salary costs | 39.4 | 56.6 | 35.8 | 46.7 | 45.2 | 22.9 | 31.7 | 50.0 | 46.0 | 5.6 | 8.5 |
| Other operating costs | 47.1 | 43.3 | 50.0 | 41.3 | 44.6 | 42.1 | 54.4 | 47.4 | 49.3 | 68.3 | 95.5 |
| Finance costs | 0.3 | 0.1 | 0.3 | 0.3 | 0.5 | 0.4 | 0.1 | 0.1 | 0.1 | 0.2 | 0.6 |
| | | | | | | | | | | | |
| **Result** | **13.2** | **0.1** | **13.9** | **11.7** | **9.8** | **34.6** | **13.8** | **2.5** | **4.6** | **25.8** | **-4.6** |

*Figure 1 Example of a published table, taken from https://www.ssb.no/en/valg/statistikker/partifin*

The data collection includes all organisational levels of the registered political parties in Norway, i.e. central, county and municipal level, as well as the central youth level and the youth organisations at

county level. The party organisations are obliged to report according to Norway's Political Party Act[1] and report income and costs based on their annual accounts.

The information is now collected electronically through Altinn, the Norwegian public reporting portal[2], by the use of a specific questionnaire, "Political parties' financing (RA-0604)".

The questionnaire is prefilled with government subsidy amounts, and in election years (every second year) with election campaign contribution amounts which are collected through another Altinn questionnaire.

The statistics was first published in 2006, for the fiscal year 2005. From 2006 to 2013 the survey was conducted on paper, mainly because the law demands that the economic report is signed by the party's leader and another member of the board. As soon as Altinn could provide functionality for digital signing, we designed and applied an electronic solution.

## The initial design process

Before the survey was conducted for the first time, we set out to talk to representatives from political parties on all three levels, including the youth organisations. We wanted as much knowledge as we could get about the population and aimed to find out which concepts and formulations to use. There are huge differences between the different types of party organisations, among other things when it comes to accounting competence. Most central party organisations have many millions in income, their own accountant and other full-time employees, whereas the smallest party organisations consist of a group of volunteers who use their spare time on political activity in their local community. Quite often the latter do not even keep accounts.

It took a lot of work trying to find the best definitions, expressions and formulations; achieving the right balance between precise and exact on one side and simple and self-explanatory on the other, was not easy.

We found it necessary to design three different versions of the paper questionnaire, one for each level of party organisation. They ended up rather text-heavy, mainly consisting of yes/no- and follow-up questions asking for an amount.

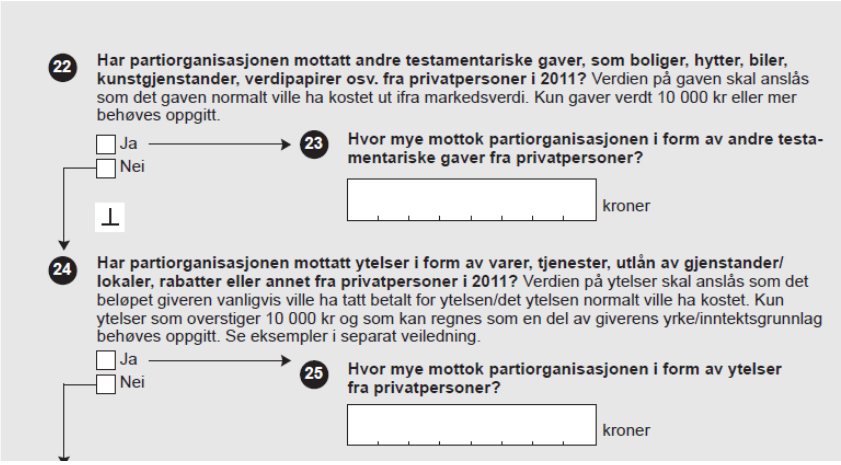


*Figure 2 Two of the yes/no- and follow-up questions from the paper questionnaire.*

[1] The Political Parties Act, see https://www.regjeringen.no/globalassets/upload/fad/vedlegg/partifinansiering/political_parties_act.pdf for more info

[2] More about Altinn on https://altinn.no/en/about-altinn/what-is-altinn/

## Altering and improving the questionnaire

The data quality was not always satisfactory. For example we saw that some respondents confused internal transfers with public subsidy. The subject matter division, as well as the user service people in SSB, have contact with many of the respondents during each data collection period and receive valuable feedback on the quality of the questionnaire. Every year people from SSB take part in large meetings where representatives from most political parties participate and give their opinions on the data collection instrument. The questionnaire has thus been evaluated and attempted adjusted and improved, year by year.

## Enter the web survey

As the web version was built, during 2013-2014, we were determined to try and take advantage of the possibilities the technology and electronic format gave us. We chose to continue using yes/no-questions with follow-ups like in the paper version, but took care so that each respondent is only exposed to the questions that are relevant to him, according to what organisational level his party belongs to and what he answers to the different filter questions. All three versions were now built into one and we made use of prefill and code lists to route the different types of respondents through the different parts of the questionnaire. Most of the separate user guide used with the paper questionnaires was incorporated in the web questionnaire, either as part of the question wording itself, as explicit help text right next to the question or as hidden help text available to the respondent by clicking a question mark icon placed by the relevant question.

Up until 2014 focus was on income and funding. From 2015, questions about costs were added. We first laid out the expenditure questions the same way we had designed the income and funding questions, i.e. as yes/no-questions with follow-ups. This way we made sure to avoid two questions in one and – since the questions were made obligatory – we eliminated the chance of item nonresponse. This single-questions-approach also made room for explanations and definitions and sometimes even examples with every question, something we deemed necessary. This did not sit well with many of the respondents, though. They found it circumstantial and hard to get a good overview and understanding of how the different sums relate to each other. For the more professional and bookkeeping accustomed, the lack of a proper annual account setup was not at all advantageous. We therefore changed the design before the survey was done again in 2016:

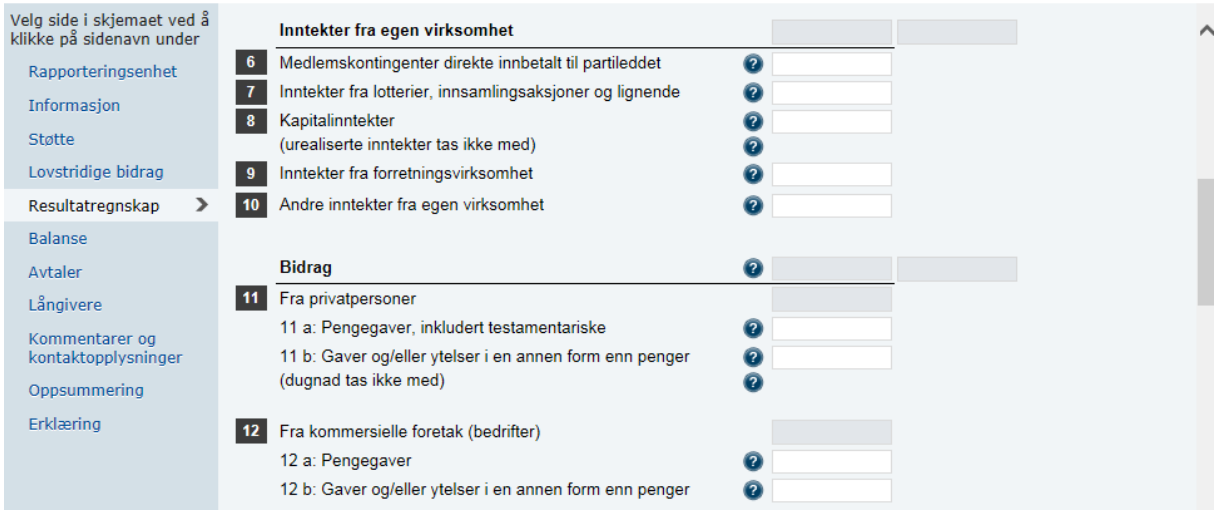


*Figure 3 Part of the income statement page in the web questionnaire anno 2018.*

### Validations and controls

Validations and controls are useful and necessary, but should be used with care. We experienced that some of the controls we used in the early version of the electronic questionnaire were too strict. For instance, a control checking the sum of costs by activity with the sum of costs by type said that the two sums had to be exactly the same, i.e. the rest amount had to be 0. This led to trouble for some respondents and was therefore later altered. Now the rest sum can be between -10 and 10 NOK and one can still send inn the questionnaire. If the rest sum is smaller than -10 or bigger than 10, one will get a message explaining what is wrong, why its wrong and where one can find more information and help. Since many of the respondents are not accustomed to accounts it is particularly important that we try to help and guide them through the cost-part of the questionnaire.

### The introduction of a summary

As the first electronic version was developed we added a summary at the end of the questionnaire. This was done to compensate for the slightly fragmented yes/no-question-approach used in the income part of the questionnaire, and to give the respondent an overview of all the main amounts and/or sums reported. The respondent is asked to check if all is correct and to go back and change the particular responses if not.

## To be continued

If possible, we would like to ease the response burden further by enabling the respondents to upload their income and expenses records to the questionnaire. This can only be achieved if they have used the standard bookkeeping template provided by the public authorities.

In stead of prefilling the questionnaire by copying and uploading the existing data that we have, we might be able to provide the user with a view of what he has already reported by looking it up in the original source. This way we can avoid duplicating data and sending data back and forth the way we do today, and thus decrease the risk for error related to this.

The signing functionality is a chapter of it's own. There is still some work to be done on this before we can call it user friendly and straight forward.

**COMBINIG DATA FROM ADMINISTRATIVE AND STATISTICAL SOURCES IN PRODUCING LABOUR MARKET STATISTICS** – workshop background paper

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In order to harmonize activities with European methodology, the SORS has been working constantly on modernization of statistical production processes. SORS has recently made a significant progress regarding the use of administrative data in the statistical production, especially in the area of labour market statistics. Labour market statistics is an important input for governmental decision-making processes, and significant indicator of economic development. This document aims to familiarize the workshop participants with the process of introduction of new sources and new activities. Furthermore, it displays a general overview, featuring past situation, current status and future plans in producing labour market statistics.

## PAST SITUATION

### Calculation of average salaries and wages

The Monthly survey on employees and their salaries and wages (RAD1) has been carried out for decades on a purposive sample of legal entities. The units of observation and reporting units at RAD1 survey, were legal entities (enterprises, institutions, cooperatives and other organisations), as well as their territorially separated units. All territorially separated units of an enterprise or another organization submitted a single report, according to their municipality and NACE activity. The survey was conducted on the sample that covered approximately 8,000 reporting units, and involved some 800,000 employees (about 65% of the total number of employees in legal entities). The sample provided a data representativeness on total average wages and salaries on municipality level, while for regions (territorial level NSTJ2) they were representative on the level of NACE divisions (two-digit CA 2010 level). The data collected at the level of observation units, were aggregated data on the total number of employees and the total mass of paid wages.

Since 1997, the average wages and salaries were calculated by dividing the payroll, paid in a reference period, by the number of employees registered in the human resources records at the end of a reference month. The data on average wages and salaries referred to all the employees registered in the human resources records, regardless of being remunerated or not in a reference month.

From January 2009, the data on salaries and wages paid to employees working for entrepreneurs were taken from the records of the Tax Administration and joined to those from the monthly survey. Approximately 65% of entrepreneurs were covered.

In RAD1 survey, the collected data were total wages and salaries, taxes and contributions paid out in a reference month. Since April 2011, a survey questionnaire was modified to collect the data on hours worked, to be compliant with the international regulations on short-term statistics. This additional data allowed providing not only average wages and salaries paid in a month, but also data essential for calculation of average wages and salaries paid for the month.

The collection of monthly data imposed an overwhelming response burden on Serbian businesses. It also required the engagement of a significant number of employees in the SORS (the employees of the Division of Employment and Earnings Statistics in the head office, as well as those employed in the 15 regional offices), as well as substantial financial resources.

**Formal employment statistics**

In addition to the monthly survey RAD1, the SORS simultaneously conducted a regular semi-annual survey (in March and September each year) on employees and their salaries and wages (RAD1/P). It was carried out on an enlarged sample. This survey provided the data on the level of education and gender. The survey also establishes the coefficients necessary for monthly estimation of the number of employees in legal entities by activity sections.
Furthermore, the two additional surveys, supplementing the semi-annual survey (RAD1/P), were carried out:

- (ARAD1/P) Sami-annual survey on the number of employees in small legal entities;
- (RAD15) Semi-annual survey on entrepreneurs and their employees;

Only the persons who had a formal employment contracts with an employer for a fixed or indefinite time, irrespective of working full time or part time, were considered as employees.

**PRESENT SITUATION**

**Formal employment statistics**

Administrative data of the Central Register of Compulsory Social Insurance (CRCSI – hereinafter **CROSO**) became available, as a source, for Labour market statistics in 2014. The analysis of the quality of these administrative data started immediately, as well as all necessary actions needed for adapting data for statistical needs. During 2015, SORS switched to a data source for monitoring registered employment – CROSO.

The new source of data provides more up-dated coverage of all enterprises, thus a better coverage of employees, and it broadens the definition of employment too.

Hence, all modalities of employment are included and taken into calculation:

- Long-term employment;
- Temporary and occasional employment;
- Registered individual agricultural producers (farmers);

The objective of the survey on registered employment is to obtain data on the number of employees in legal entities, entrepreneurs and employees working for them, number of self-employed, as well as the number of farmers included in the system of social insurance.

The use of administrative data poses major challenges. For example, two important information are not available in the CROSO:

- Municipality of a working place (There is an information on the municipality of the head office, while the data on the municipality, where an employee works, is not always specified);
- NACE activity code (the CROSO database does not have information on the activities of an employee, i.e. NACE activity of a local unit where the employee works);

It is very important to obtain data that are represented on municipality level.

The national *Law on regional development* obliged statistics to provide data at the municipality level, in order to define degree of development of the municipality.

In order to overcome these shortcomings, the SORS has introduced a new methodology for computing the registered employment. The new methodology combines data from the CROSO and the Statistical Business Register (SBR).

Upon request of the Labour Force Department, the SBR has modified the question of the number of employees in its annual Survey on local units of large and middle-sized enterprises, hence the Total number of employees in the local unit had been split in three modalities ("long-term employment", "temporary and occasional employment", "rented employees").

Every month, the SBR creates two consultation databases.

The first one includes all active enterprises on the last day of the month. That first dataset is being paired with the CROSO dataset. The matching data from these two datasets denotes the set of enterprises; employees from CROSO, belonging to these matched enterprises represents the base population for calculation.

Also, the SBR creates the second dataset, which comprises of all local units. In this dataset, the number of employees is segmented by the NACE activities. This file allows the creation of STRUCTURE file, intended for distribution of employees from the enterprise to the L-KAU level, where the number of employees in enterprises, are presented by the local units and by the NACE activities of local units. Finally, based on the SBR STRUCTURE, the number of employees from the CROSO database can be broken down by municipalities and the NACE activities.

Benefits given by using Administrative sources in calculating registered employment:

- Better coverage – (Include employees in the Ministry of the Interior and the Ministry of Defence)
- Modalities of employment (temporary and occasional employment, farmers)
- Employees by categories in The Public Sector

**Calculation of average salaries and wages**

Although the survey on the registered employment had switched to new sources, the monthly and semi-annual surveys (RAD-1 and RAD-1/P) continued until 2018 in providing the data on earnings. As from January 2018, the SORS has started using the Tax Administration (**TA**) to calculate average wages, which are collected in electronic form for tax return. The TA data covers all the earnings for which an employer has submitted a tax form.

Wages and salaries are payments to employees to which the corresponding taxes and social security contributions are paid, and include all payments to employees under fixed-term and indefinite-term employment contracts as well as remuneration for work of employees under temporary and occasionally employment contracts.

Average salaries and wages are calculated by dividing the total mass of calculated salaries for the reporting month with the number of employees calculated for the full-time equivalent (relying on work hours). By this approach, each employee is assigned a coefficient (between 0-1.5), and there is no multiplication if the employee works for several employers. Additionally, the earnings are calculated for the NACE activity and in ownership type in which it had been realized.

TA data lack important information needed for earnings statistics: NACE activities of the local unit (LKAU), municipality of working place, educational level etc. This challenge has been overcome, also, by the significant changes in methodology. Additionally, the annual survey on employees and their salaries and wages RAD-1/G is conduct, aiming to

obtain the additional data needed for detailed analysis (such as, average salary due to NACE activities and educational level), and also to acquire data needed for distribution of earnings and employees by units of observation, by the NACE activities.

Major differences between survey and register based calculation of average salaries and wages:

| ***Till 2018*** | ***From 2018*** |
|---|---|
| Included wages paid **during the reporting month** (regardless of the month in which they were realized) | Included all calculated wages **for the reporting month** |
| Average wages were available at the level of the **municipality of work** of employees. | Average wages by municipalities relate to the **municipality of residence** (not to the municipality of work) of employees. |
| Payroll paid was divided by the number of **employees from the human resources records** | Payroll paid now is divided by the number of **employees calculated for the full-time equivalent** |
| Average monthly wages reports were available **25 days** after the end of the reference month. | Average wages will be available **55 days** after expiration of the reference month |
| ⊖ | Include wages of employees in **the Ministry of the Interior and the Ministry of Defence** |
| ⊖ | Include salaries of employees **under temporary and ocasionaly employment contracts** |
| ⊖ | **New statistical indicators** are available: median wage, wage distribution, gender pay gap, average earnings by age, average earnings in public sector, etc. |

**FUTURE PLANS**

Administrative data, despite all of its shortcomings, secure better efficiency, reduce the response burden on reporting units; it also diminishes financial expenditures, enables better coverage and more up-to-date data, as well as improving the quality of statistical output. The statistical producers with the SORS are faced with arising challenges, in an attempt to fit administrative data to the statistical needs. Serbia still does not have some of the important administrative registers (i.e. population register), while the existing administrative registers are often not of satisfactory content, format and scope to be used in the official statistics. Additionally, the current (SQL server) database system for storing and processing data in our Office cannot completely satisfy the data processing needs, and the continuing anticipated extensions will contribute to further complications.

Therefore, the reorganization of the register system of the administrative data is inevitable, in order to create a system within which different registers can be linked on the basis on clearly defined keys. The integration of microdata from different sources would efficient the data storage and usage. One of the basis registers, planned to be established next year, is the Activity Register. This Register would be a link between the Business Registers and the Statistical Population Register (it would be formed based on data from several Administrative registers). The main types of activity registers are job registers.

The Activity Register should contain: job activities, study activities, and other activities relating to labour market. The activity is the statistical unit and one person can have many jobs and study activities during a specific period.

The personal information on an employed person (gender, age, place of residence, education etc.) as well as the basic information of an establishment (industry, location etc.) will be part of the job register that would greatly facilitate the work of the labour market statistic producers.

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# Extending the Use of Administrative Data in the Production of Business Statistics in TurkStat

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## Abstract

Turkish Statistical Institute (TurkStat), as the coordinator and the prominent actor of Turkish statistical system, aims at ensuring the quality indicators such as timeliness, accuracy, accessibility, comparability, relevance and coherence when producing statistics to meet user needs in compliance with international methodological standards. TurkStat's quality assurance framework is based on the European Statistics Code of Practice. Within these principles and the corporate strategic plan, the entire statistical process, from the generation to the dissemination of data, is configured in a quality-oriented manner.

Another factor that should be taken into consideration in the production of statistics, just as well as the sustainability of the process cost-wise, is using the less burdensome mode for the respondents. These constraints taken into account, it could be said that whether or not the official statistics possesses desired attributes can be associated with data source used and data collection mode preferred, as well as the other methodological choices. Data sources in the statistical production process could be censuses and surveys conducted mainly for statistical purposes (primary data) as well as records already accumulated for different purposes within institutions (secondary data).

The vast economic, social and technological changes have necessitated that TurkStat improve quality and timeliness while reducing the response burden in data collection process. In order to meet this requirement, TurkStat has prioritized the use of administrative data for statistical production in its plans and programs and expedited the work thereon. TurkStat has set out to extend the use of administrative data in statistical production. The major motivators of TurkStat to redesign and modernize business statistics based on administrative data has been decreasing the response burden and improving data integration.

This document explains the details of TurkStat's motivation of integrating new data sources into Turkish Statistical System, its experience along the process and redesign of the "Business Statistics" as a result.

## Introduction

Turkish Statistical Institute (TurkStat) aims at ensuring the quality indicators such as *timeliness, accuracy, accessibility, comparability, relevance* and *coherence* when producing statistics to meet user needs in compliance with international methodological standards. Data sources in the statistical production process could be censuses and surveys conducted mainly for statistical purposes (primary data) as well as records already accumulated for different purposes within institutions (secondary data).

It is of crucial importance that statistical production process to be sustainable cost-wise and allowing a decrease in response burden. For this reason TurkStat has set out to extend the use of administrative data in statistical production. The major motivators of TurkStat to redesign and modernize business statistics based on administrative data has been decreasing the response burden and improving data integration.

## Integrated Administrative Records

Within the legal mandate to collect data stipulated by the Statistics Law of Turkey No. 5429, TurkStat realizes data transfers from public institutions on needed domains. The number of institutions from which data is transferred is increasing every year, and new administrative records are included in the production of statistics. Administrative records are made use of in many statistical domains such as population, demography, education, foreign trade, and business statistics.

Under the cooperation and data exchange agreements between TurkStat and administrative authorities and for the purpose of increasing and expanding the use of administrative data in business statistics, records from Revenue Administration (RA) and Social Security Institution (SSI) have been shared with TurkStat. This has been a milestone for TurkStat's official statistics on business and economy, thanks to which, using administrative data directly or indirectly in the production of indicators in especially short term and annual business statistics and national accounts have been started.

## What is new?

With the integration of new administrative data sources into Turkish Statistical System, domains in TurkStat affected most by the process of extending the use of administrative data in business statistics have been business registers, short term and annual business statistics and national accounts.

**New Business Registers System after the Adaptation of RA and SSI Records**

| Business Registers | Before | After |
|---|---|---|
| Source | RA Registers | RA Daily Transactions |
| Means of Data Transfer | Electronic File Transfer – FTP | Web Service |
| Period of Data Transfer | Annual | Daily |
| Output | Annual Business Registers Framework | Daily Business Registers Framework |

### Short-Term Business Statistics

Within the scope of Short-Term Business Statistics (STS); production, employment, hours worked, gross wages and salaries, labor costs, retail sales, producer prices indices and building permit statistics have been calculated for the industrial, construction, services and trade sectors for monthly and quarterly periods. In the current case; only the building permit statistics have been generated from administrative data, and surveys have been conducted for all other statistics. The use of administrative data for short-term indicators started by the beginning of data collection process from RA and SSI, with an exception of producer prices indices. Thus, forecast errors resulting from the use of fixed base year and limited number of observations are eliminated.

While the base year of the previously published indices is 2010, the new series will be published with the base year 2015.

**Short Term Business Indicators in the New Case**

| New Series | Data Source | Period | Timeliness |
|---|---|---|---|
| Turnover Indices | Value Added Tax and Special Consumption Tax Returns | Monthly | T+47 |
| Retail Trade Indices | Value Added Tax and Special Consumption Tax Returns | Monthly | T+49 |
| Industrial Production Index | Value Added Tax and Special Consumption Tax Returns, Monthly Industrial Production Survey | Monthly | T+47 |
| Labor Input Indices | SSI Monthly Premium and Service Return, Withholding Tax Return | Quarterly | T+60 |

### Annual Business Statistics

Annual Industry and Service Statistics (AISS) aim at producing information that contributes to define enterprises according to their structural characteristics. The statistics produced within the Structural Business Statistics constitute the main components of the product structure and the economic structure that feed the system of national accounts in particular. AISS are planned to be produced by TurkStat based on administrative records.

TurkStat started to work in 2016 to produce AISS, which has been calculated from data compiled by enterprise level by survey since 2003, based on the administrative records of RA and SSI. With these works, the application of AISS 2016 survey, which had been planned to be carried out with about 180,000 enterprises and imposes a high level of response burden on the enterprises, has been terminated.

### National Accounts

RA and SSI data at macro level have been started to be used in 2009 based GDP series that were published on 12 December 2016. With the production of Annual and Short Term Business Statistics data from Administrative Records, the STS indices and AISS data are used instead of macro level RA and SSI data in GDP estimates. Thus, in addition to increased coherence

between annual, short-term, national accounts indicators, the response burden on enterprises will be reduced, resources will be saved and data quality will be increased.

### Conclusion and Remarks

The increasing use of administrative data in production of official statistics, led TurkStat to adopt new approaches regarding compilation, processing and dissemination processes of data. These new approaches, which require close cooperation between TurkStat and other data provider organizations will extend the quality of official statistics, improve analysis skills in the related institutions and contribute positively to the quality of registers, themselves.

Efficient use of existing data sources became more of an issue with the intention of decreasing operational cost of statistical researches and improving the quality of registers. There are two reasons why the use of registers is indispensable for statistical offices including TurkStat: Firstly, the use of registers is more cost efficient compared to censuses while establishing and updating the frames. Secondly, the difference between primary data compiled by surveys and secondary data provided from administrative authorities is not observed to be significant.

The strength and weaknesses of data derived from administrative data compared to survey data impels statistical offices to determine the effective use of these data sources. Administrative data directly or indirectly replaces survey results and they are currently used for establishing frames and data analysis. Henceforth, the use of administrative data penetrates most of the statistical domains in TurkStat and it is expected that their usage will expand further in the near future.

The era of digitalization with a new data environment and ecosystem, provokes a raise in data demands from TurkStat both in terms of volume and variety. TurkStat is in an effort to generate solid coordination mechanisms and use multiple data sources (surveys, administrative data) when producing official statistics. Integrated statistical production process is only possible through upgraded analytical skills and training human resources as data scientists. It is now an obligation for TurkStat to adopt procedure-oriented and process-motivated approaches, as currently, in statistical production, the data tables measured in “megabytes” are replaced with those measured in “gigabytes”. Being aware of all these, TurkStat handles its studies by continuously and carefully monitoring its international peers and investing both in human-resources and technological infrastructure.

In TurkStat’s current practice, the data which had been previously collected from enterprises by survey are now partly or completely compiled from administrative records of Turkish Revenue Administration and Social Security Institution. Consequently, the coherence between the data sets of annual and short-term business statistics and national accounts has been ensured along with maintaining a decrease in response burden on enterprises, saving of time and labor and increase in data quality, as well.

The existing administrative registers in other data provider institutions are established for the purposes other than statistical production. Therefore, some differences occur in data regarding coverage, classifications, reference dates etc. In the meantime, TurkStat continues its efforts to keep a sustainable cooperation with other data provider organizations in order to

eliminate these issues by improving and upgrading administrative registers and to maintain continuity of data delivery.

Anna Niemelä

# *Response Burden Measurement Project in Statistics Finland*

According to the European Statistics Code of Practise (CoP), the national statistical authorities are obligated to keep the response burden of data collections proportionate to the needs of the users and not excessive for respondents; minimizing the response burden of data collections is included in Statistics Finland's current strategy as well.

Statistics Finland monitors the response burden of enterprise surveys regularly. The follow-up is made at the level of individual survey and all surveys in total. The burden is calculated based on the average responding times, survey rounds per year and the sample sizes. The result is converted into staff years. In 2017, the estimated total response burden to enterprises was 144 staff years.

Statistics Finland conducts ca 50 direct enterprise surveys yearly. In 2017, 98 per cent of the respondents answered electronically whereas the remaining enterprises responded using other means, such as paper questionnaires or phone interviews. Majority of business surveys are conducted with XCola (XML-based Data Collection Application), an in-house developed survey tool. Besides, there are a few outsourced web questionnaires and some collections that are made by phone or email. In 2016, 68 % of all enterprises received one collection and 7 % received five or more.

Reduction of response burden is aimed e.g. by minimizing sample size and number of variables, making responding as easy as possible and developing the websites, cover letters and other communication related to data collections. Assessment of questionnaire design and usability testing with end-users is done regularly.

Information on responding times is mainly collected by feedback surveys that are attached to web data collections. If data is not collected in web, the time is estimated in Statistics Finland, but the main source of data are the estimations of business respondents. The results are analyzed e.g. by enterprise size and field of business.

The data obtained by response burden surveys is stored in the Register of business data suppliers. In the register, the information on frequency whereby a business is included in samples is also available. Thus, the total response burden of individual business or e.g.the enterprises of a certain size category can be measured by number of surveys and by the time spent on responding altogether.

My presentation focuses on the perceived response burden (PRB) measurement. The aim is to describe the implementation of a response burden measurement project and the challenges met in data collection. In addition, some preliminary results are presented.

A comprehensive perceived response burden measurement that covered most of Statistic Finland's direct enterprise data collections was last carried out in 2008-2009. The results were used e.g. in choosing questionnaires in a usability development project. After that, the measurement has been renewed in several collections. The counts of the actual burden have also been re-evaluated considering changes in survey forms, content, samples etc.

To update the measurements, during 2018 the PRB questionnaire is attached to all our enterprise data collections in the web. The questionnaire is voluntary and the respondent are directed there after filling the actual inquiry. 30 collections have been included in measurement up to the present and analysis of burden times and other feedback is going on.

The data is gathered by a voluntary feedback survey where the respondent is directed after filling the mandatory inquiry. The respondents are asked to estimate the time spent on collecting the needed information and to fill in the questionnaire, and how burdensome or easy they regard responding. In addition, there is an open question for other feedback. A commercial online survey tool Webropol is used to collect the data and the analysis is done by SAS EG. As the project is still in progress, the focus is on the data collection stage and challenges in receiving feedback data.

Questions for further discussion:

- How to activate the business survey respondents to participate the PRB survey?
- Any experiences of using a raffle or other intencives with PRB/other feedback surveys?

# SHOULD WE APPROACH DIFFERENTLY TO DATA COLLECTION FROM LARGE BUSINESSES?

**Name of author:** Vojko Šegan

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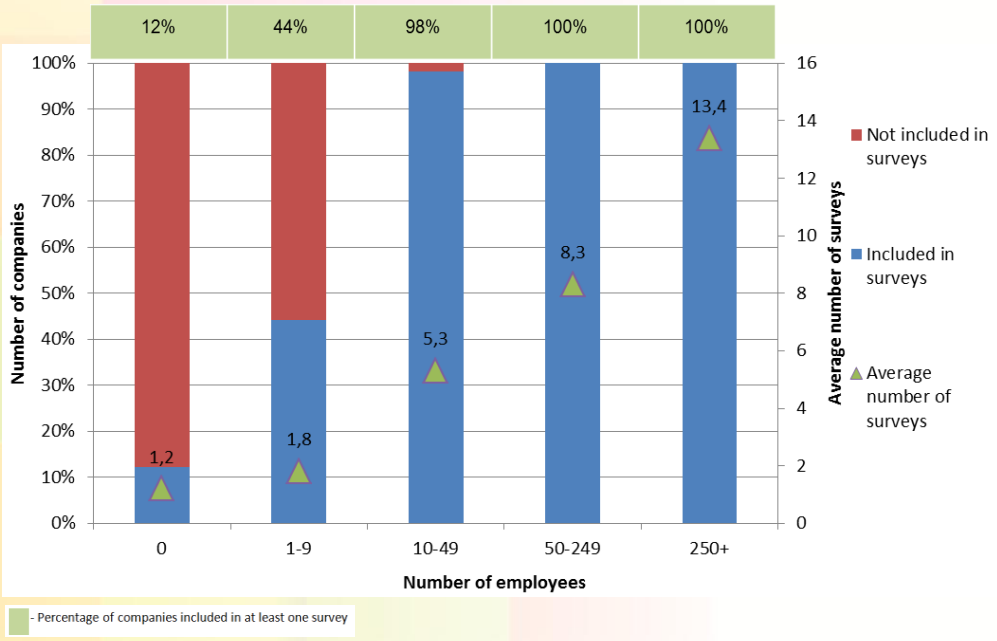
## The inclusion of large businesses in statistical surveys at SURS

In 2016 there were more than 200,000 companies in the Business Register of Slovenia, of which 324 were businesses with more than 250 employees. These large companies are annually on average included in 13.4 statistical surveys, and have to answer on average 190.5 questionnaires, which is much more than the average for all businesses (2.3 surveys and 4.6 questionnaires).




## Special approach to different businesses at SURS

When collecting statistical data it is natural to use different approaches for different types of reporters, including when it comes to their size. SURS distinguishes key reporters from other units and gives them greater importance in the data collection and the data control. In data selection partial coordinated sampling is used to reduce multiple inclusions in statistical surveys. SURS also has a system for measuring actual burden of reporting units and a central help desk. In addition, a special project for selective data editing is currently underway in

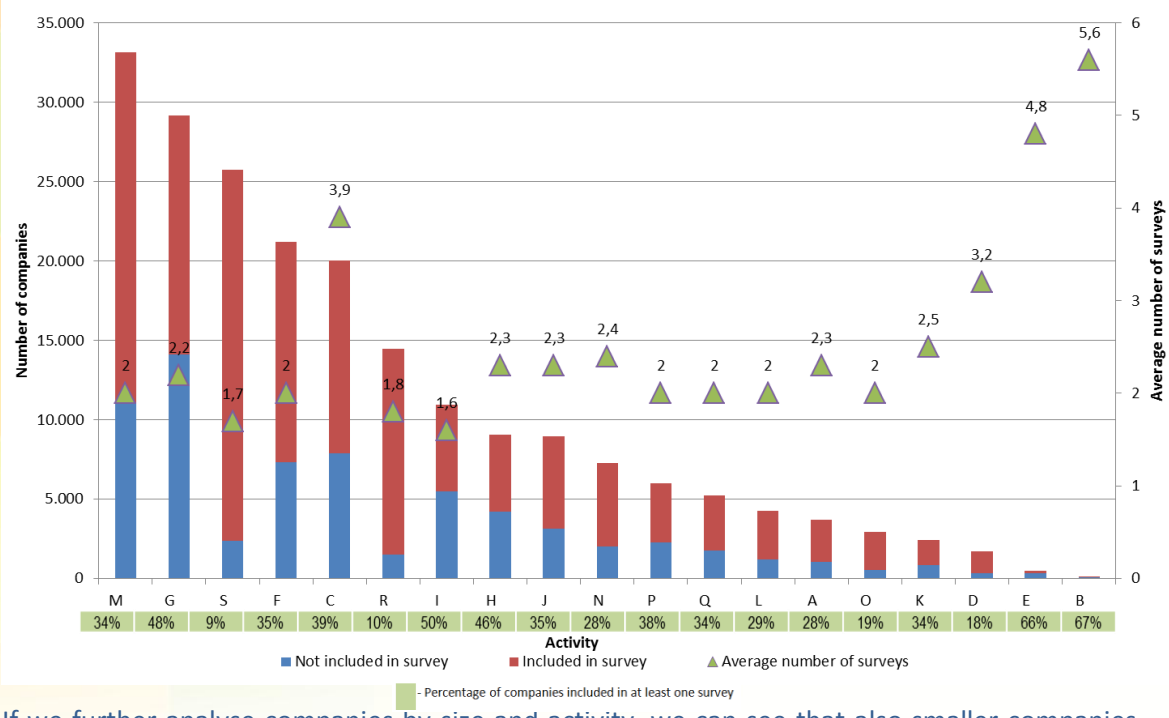
which larger units will have special attention in data editing. However, SURS does not use a special management system for the overall treatment of large businesses.

### Additional possibilities for handling larger companies

A special approach to large companies could be considered in all processes of data collection. We can start with sampling and review if large companies could be selected less frequently. The second area is communication, where we could consider an individual approach to large businesses. Data collection itself is a wide area with lots of possibilities, including adjustment of data collection to reporters' systems (pull instead of push approach). Furthermore, if we were to decide for a special strategy for large businesses, we should choose a wider approach, including also the questions of confidentiality, non-response, etc.

### Other problematic groups of companies

On the other hand, we have to realise that large businesses are not the only important survey respondents. For example, economic activity is also an important factor of including companies in different surveys.




If we further analyse companies by size and activity, we can see that also smaller companies registered under specific economic activities are heavily burdened (e.g. A – agriculture, forestry and fishing; B – mining and quarrying; C – manufacturing; F – construction), while

others are burdened moderately regardless of size (e.g. O – public administration; P – education; Q – human health and social work activities; R – arts, entertainment and recreation). Furthermore, individual companies are included in an above-average number of surveys even though they are smaller and registered in activities that are otherwise less burdened.

**We are interested in experiences and opinions on additional activities and strategies regarding different approaches to large companies. Some starting points on this subject:**

- Identifying large reporters

  We could take a bottom-up approach, where we could first identify individual large reporters and try to gather them into homogeneous groups. We could then prepare different strategies for different focus groups. Also different categorization of important businesses could be considered.
- Coordinated approach in communicating with key respondents

  This does not mean that one person should always contact an individual business. One person cannot efficiently manage different subject areas for which data are collected and it is usual that in businesses more than one person completes statistical reports.
- Further development of coordinated sampling
- Using predefined datasets instead of web questionnaires

  SURS would prepare the structure of an electronic record for individual statistical surveys. Businesses would prepare reports from their information systems. Such a solution would be particularly useful for businesses that are involved in some statistical surveys with certainty.
- Use of data from reporters' information systems

  We could, for example, arrange with businesses to export their data from their accounting information systems from which we can obtain authentic information on assets, liabilities, revenues and expenses as shown in the general ledger. It would first be necessary to obtain precise information about the used businesses chart of accounts and internal bookkeeping rules.

# Harmonizing Economic Surveys

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**Organization:**

## Backgrounder

The US Census Bureau Economic Directorate's (ECON) central mission is to provide statistics on the health of the United States (US) economy. Like most National Statistics Institutes worldwide, ECON is faced with many challenges as it strives to achieve (1) its mission of collecting quality economic data and providing an ongoing portrait of the economy and (2) its general vision of being the leader and trusted source of comprehensive and timely economic products. Sources of these challenges are both external and internal to the Census Bureau, and include:

- Desire from stakeholders and sponsors to produce relevant, timely data products, at differing levels of detail for geographic capturing the changing US economy
- Limited ability to share and produce aggregated data products across subject areas
- Emerging technology trend to collect and retain alternative data sources (e.g. big data) for deeper analysis, insight, and respondent burden reduction
- Increased competition from emerging external economic statistics services and firms
- Increased budget scrutiny, fewer resources, and declining response rates

It is challenging to address these issues, while maintaining the methodological rigor required to produce statistically sound data products for ECON's major stakeholders.

To proactively address the challenges, ECON began building a business architecture that integrates programs, shares services, and reimagines the operational, information, and technical environment for producing official statistics, while taking a respondent-centric approach to data collection. It is intended to provide a framework that describes a desired target state for ECON. The primary goals are:

- produce timely, relevant products/services
- reduce respondent burden
- improve quality of products/services
- increase ability to share data and resources across surveys
- increase the agility and efficiency of economic programs
- maintain a high level of trust with data users and respondents

To determine what the reimagined state would look like, the business architecture team followed a six-step process:

1. Develop a high-level vision.
2. Document current state and related activities.
3. Describe target state.
4. Conduct gap analysis.
5. Define transition activities.
6. Sequence transition activities and identify dependencies

This analysis revealed that core collection components differed across programs. Programs have different collection units, inconsistent content, varying methodologies, and differing item naming conventions. To fully realize operational efficiencies and reduce respondent burden, these foundational survey components require alignment. Projects were launched to harmonize these components. Two of these projects, which are the focus of this presentation, are Business Unit Harmonization and Content Harmonization. Additionally, efforts to create single data and metadata repositories, govern the style of the instruments, and research alternative data sources (including Big Data) have begun.

ECON's various programs set up different units that represent a single company for several reasons including:

- to capture information about how companies are organized,
- to facilitate the processing and storage of administrative data,
- to maintain a dynamic business register, and
- to produce required data tabulations

Therefore, the optimal unit structure for one purpose, such as processing administrative data, may not work well for another purpose, such as collecting data for a current survey. As a result, surveys set up different units to meet their own needs. Due to incoherent units, surveys are unable to share the data with the frame or other programs. Differences in how units are set up lead to inefficiencies and barriers for sharing data, developing common approaches, and using enterprise-wide solutions.

Additionally, this causes a cumbersone process for companies in multiple programs. When one program defines the reporting entity differently from another, the companies are unable to establish a common reporting unit within their accounting records to facilitate reporting the requested data. Therefore, respondents are forced to re-calibrate their data, which is rather burdensome, or introduce reporting errors. As ECON shifts to a respondent-centric paradagim, developing a harmonized unit across all programs, aligning to company records is essential.

The Business Unit Harmonization team was tasked with researching business units to recommend options for a set of harmonized units that best align with the operating structure/accounting records for the majority of businesses.

During the pilot phase of Business Unit Harmonization, the team analyzed 52 of the most complex companies in the U.S., and concluded that a singularly defined reporting unit structure will not meet the needs of all companies researched. As a result, the team recommended that these companies receive a full service account manager. These will be discussed in the presentation.

In the second phase of Business Unit Harmonization, the team was tasked with extending the research to focus on the "typical" multi-unit company in order to determine if a harmonized

business unit for a majority of companies existed. The team created a "complexity indicator" based on the number of establishments, industries, states, and tax reporting entities the company has. This helped narrow the focus of the research. After reviewing the surveys that would be using this unit, the research concluded that a Kind of Activity Unit (KAU) should be implemented as the harmonized unit. The KAU is based on the industries in which the company conducts business. This will also be discussed further in the presentation.

Currently many programs collect the same or similar data items for different reference periods (e.g., monthly or annual retail sales) or different types of populations (e.g., wholesale trade, retail trade, establishment or company, etc.). However the question wording and instructions used to collect the data varies across the programs, resulting in incoherent data for data users and additional reporting burden for business respondents.

This variation across survey programs causes confusion for the respondents and data users, as well as inefficiencies for ECON processes. The goals of harmonized content are:

- Increase the use of data from alternative sources
- Utilize a respondent-centric approach to conducting surveys
- Decrease response burden
- Maintain and/or improve quality of reported data
- Ensure published statistics meets data user needs
- Reduce cost and eliminate redundancy

Efficiencies are gained when content is harmonized across programs. This includes applying cognitive testing to multiple programs, increasing data coherence across programs, which in turns improves data quality and streamlines benchmarking processes. Analyst and programmer time is reduced during instrument creation as content is re-used rather newly developed. Most importantly, content is collected from the respondent's perspective. Questions align to accounting records, and are consistent across survey programs.

The Content Harmonization team was launched to develop an agreed upon set of content for collection and publication. The team used a sequential approach for evaluating and harmonizing key concepts across programs They began with concepts that are common across surveys and most critical for economy-wide statistics, and then they plan to move to less-central concepts. The common concepts are:

- Inventory
- Payroll
- Sales
- Certification by respondents of the correctness of the reported information, and the authority to release the response to the Census Bureau

For exmple, the table below illustrates the different ways programs currently ask for 'total inventory', along with the proposed wording for the harmonized question.

| Program | Question Wording | Proposed Harmonized Wording |
|---|---|---|
| Monthly- Advanced Retail | What was the value of merchandise Inventories, regardless of where held, owned as of the end of the month? | What was the value of inventories (if applicable, before Last-in, First-out (LIFO) adjustment) owned by this (establishment/firm) as of XX/XX/XXXX. |
| Monthly- Retail | What was the value of inventories (before Last-in, First-out (LIFO) adjustment) as of the end of the month? | |
| Monthly- Wholesale Trade | What was the value of inventories (before Last-in, First-out (LIFO) adjustment)? | |
| Annual- Retail, Wholesale, Services | What was the value of merchandise inventories as of December 31 in 20XX? | |

| | | |
|---|---|---|
| Annual Manufacturing | What was the value of inventories owned by this establishment as of December 31 before Last-in, First-out (LIFO) adjustment (if any) for: | |
| Economic Census-Mining | What were the value of mined products and supplies owned by this domestic reporting unit as of December 31 before Last-In, First- Out (LIFO) adjustment (if any) for: | |
| Economic Census- Island Area's | What was the total value of merchandise inventories owned by this establishment? | |
| Economic Census- Manufacturing | What were the value of inventories owned by this establishment as of December 31 before Last-in, First-out (LIFO) adjustment (if any) for | |
| Economic Census- Information | Report inventories owned by this establishment as of December 31 before Last-in, First-out (LIFO) adjustment (if any). | |
| Economic Census- Construction | Using current cost, what was the value of inventories owned by this establishment as of December 31? (If using Last-In, First-Out (LIFO) method of evaluation, adjust to obtain First-In, First-Out (FIFO) or current cost.) | |
| Economic Census- Wholesale, Transportation | What were the inventories and Last-in, First-out (LIFO) adjustment, if any, for products owned by this establishment as of December 31? | |
| Economic Census-Mining Sector | Report inventories and Last-in, First-out (LIFO) adjustment, if any, for products owned by this establishment as of December 31. | |
| Economic Census- Information | Report inventories owned by this consolidated reporting unit as of December 31 before Last-in, First-out (LIFO) adjustment (if any). | |

The team will continue to work, topic by topic, ending when the following criteria are met:

- Programs are harmonized to use the same definition and instructions at a conceptual level; however, the language used in questions will be customized by industry using terms respondents understand.
- General content is harmonized across businesses, governments, and international trade, where applicable
- Industry specific wording is based on data driven decisions
- Program specific content is harmonized within programs (businesses, governments, etc.); industry specific content is harmonized within industries
- Evidence from record keeping studies illustrate common terminology and industry specific language
- Harmonized content is determined by looking at the measurement objectives and uses of the data (publication requirements)
- Governance is established to maintain the harmonization and ensure that the amount of non-harmonized content does not grow
- Managers think across survey programs when considering content
- Subject matter expertise and decsion drvining evidence is gained

Questions we would like to discuss include:

- What are challenges, successes and opportunities that others have experienced during harmonization efforts?
- How are business units defined for data collection purposes in your organizations? What is their relationship with statistical units?
- Are they consistently defined across survey programs? Why or why not?
- What benefits do you see in harmonizing survey content and collection units? What are some (potential or realized) obstacles to harmonization?

# STATISTICAL BUSINESS REGISTER SURVEY ON THE LOCAL UNITS OF LARGE AND MEDIUM SIZED ENTERPRISES – Workshop background paper

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**Organization:**
Statistical Office of the Republic of Serbia

Statistical Business register (SBR) has been founded in 2006. Formerly, in Statistical office of the Republic of Serbia (SORS), existed only administrative sources named as the Register of classification units and the Register of the Entrepreneurs. They were in charge of registering all the legal and natural persons that were performing economic activities on the territory of the Republic of Serbia (companies, other legal persons and entrepreneurs). During that time, all the business surveys had used data from mentioned administrative sources for creating sample and population frames. As SORS started with approaching to the family of EU statistical institutes, methodologists of the statistical surveys that have been conducted in the SORS took effort in providing full implementation of the EU methodology. That led to the rapidly growing of stakeholders needs for establishing a single framework for all business surveys that will be based on the ground of standardized statistical units, created by as the result of implementing the EU methodology. This was a spark which eventually guided to the creation of the SBR, as a single and unique framework for all business statistics.

The SORS SBR family of statistical units compiles Enterprise, Local Unit and Enterprise group. It consists of little above 454 000 active Legal units, 448 000 Enterprises, 500 000 Local units and 8695 Enterprise groups. SBR is the main supplier of Business data for various Business statistics in SORS. The main administrative sources used in updating SBR are:

- **Serbian Business Registers Agency (SBRA)**

It is the most important administrative source of the SBR, and it is responsible for the registration and managing administrative data of companies, entrepreneurs and other legal entities which perform economic activities on the territory of the Republic of Serbia. SORS is connected with the SBRA through the optical link. The data from the SBRA updates SBR database on a monthly basis (legal unit name, address data, contact data, legal form, date of registration, cessation and changes, registered NACE economic activities, responsible persons, registration status, etc.). It is a fruitfull source with a potential data that still are not the subject of obtaining. It is a next task for the SBR experts.

- **Register of classification units (RJR)**

This administrative source is placed at the SORS. Over the years, it gradually lost its jurisdiction and transferred them mostly to the SBRA and now is responsible for the registration and managing administrative data of Religious Organizations, Political Parties, Unions, Institutions, Ministries and various state bodies. Data from this administrative source have been transferred in SBR on a monthly basis (legal unit name, address data, contact data, legal form, date of registration, cessation and changes, registered NACE economic activities, responsible persons, registration status, etc.).

- **Tax office**

This source provides SBR with the data of economic activity status of the Enterprises, as well as Value added tax register data, VAT paying year etc. It transfers data to the SORS on the monthly basis. Cooperation has to be furtherly improved.

- **Central Register of Compulsory Social Insurance Payers (CROSO)**

CROSO collects data on the employees in legal entities and registered natural persons in the Republic of Serbia. Its aim is to facilitate the way of registering the social contribution payers by the companies itself. The SBR obtains data from CROSO on a monthly basis.

Data collected through conducting various statistical surveys are also the very important input for the SBR. Consequently, SORS board of directors adopted as mandatory Procedure for updating the SBR with data collected performing statistical surveys. This procedure defines the activities of the all sides in collecting data and in updating SBR, including defining the request for establishing survey frame.

SORS, for the classification of statistical units in NACE economic activities, uses the broadly adopted standard NACE Rev. 2 and monitor the activities of statistical units at the lowest level of classification - the four-digit level of activity classification (the class of economic activities).

So, during the registration of the Legal entity or the Natural person in the administrative source, the founder fills out the basic registration data in the application form. Registration data are then forwarded to the SBR, during the monthly obtaining data from administrative sources. It is a ground base for creating a Legal unit in SBR, and, if the newly created Legal unit shows any economic activity (Tax office is the source for this information), corresponding Enterprise taking place in SBR database. Accordingly, the local unit, the location on which activity is performed, and which address corresponds to the address of the Legal unit, is created as well. NACE activity code of the just created local unit is the same as the one in the Legal unit. Existing administrative sources are not developed enough to fulfil the needs of the SBR stakeholders. Business surveys, apart from SBR, provide some information on the data on the local unit level, but it is just not enough. Database on Local unit level is not fully covered with required data. Therefore, the need of establishing an SBR survey is emerged. The data targeted are the ones on the local unit level, considering

- Existence and activity status of the local units in the SBR database
- NACE economic activities performed on the belonging local units, and
- Distribution of the employees over the NACE activities performed at the local unit level.

The first SBR survey took place in 2010, and since then survey is carried out on the yearly basis. Data have been collected twofold – by web questionnaire and by filling data in Microsoft office excel format (for large Businesses with an extensive network of local units). The targeted population are big and medium sized Enterprises. Accordingly, the frame is based on the population of Enterprises that are in focus of SBR stakeholders. These are the significant units, considering the number of employees and the number of local units on which Enterprises conduct its activity. Usually, the annual survey frames compiles about 3000 Enterprises, but the last one was extended in the sense that the scope included 8000 Enterprises. The aim is that all-important Enterprises have to be covered and contacted at least once in two years. It was decided regarding the burden on units, in order to reduce it as much as it is possible, and, at the same time, to provide SBR with data that will be usable for different statistical surveys. SBR users express their needs and had marked the Enterprises that should be surveyed. SBR included them all in the scope.

SBR survey frame eventually consisted of

- all active Enterprises with 20 and more employees, and
- with more than one belonging local units, as well as
- the ones added by the SBR users.

After the survey frame is established, the paper form of the invitation letters is sent to the Enterprises local unit head office. It addresses the general manager of the company, with the basic information on the forthcoming survey, such as

- the goal of the survey,
- the most important requested data,
- the starting and the closing date (duration time),
- legislation reference,
- web address to the IT application,
- the user contact details, etc.

The paper form of the invitation letter is confirmed as a more effective starting communication tool between the SBR and the survey participant, then sending the invitation for participating in the survey in the electronic form, to the email addresses.

The primary SBR survey data collection instrument is the IT application for entering data, especially designed to, for one hand, provide user friendly IT environment for users, and, for other hand, to grant fast, and for SBR point of view, secure access to SBR data. The second one, aimed for the Enterprises with the large number of belonging local units, is Microsoft Excel, regarding previously designed format of data and logic control. Excel questionnaires are designed for the Enterprises with a very large number of local units and the ones that have a well-organized database of employees. It is a lot easier for them to, in cooperation with SBR IT experts, define data output and export data in excel format. It was noticed earlier, that there is an increasing demand for this kind of response to the survey, especially by large Enterprises, with an extensive network of local units. Of course, other file formats can be used as well.

The paper form questionnaire is abandoned. It is defined that the users of the IT application for entering data (data providers) are the responsible persons from the Enterprises. Following the web address of IT application provided in the invitation letter, responsible person assigned to fill out the questionnaire is addressed to the IT application screen with requested contact details of the IT application user (name and surname, telephone number, email

address). Beside the fact that SBR collects data of the contact units, this is a kind of security measure. The entered email address become a password for further logon to the IT application. If more than one person enters data for the same Enterprise, then all the entered email addresses become the passwords for IT logon. The way of login is twofold and it depends if is the user from SORS or it is an external one. The SORS employees engaged in conducting SBR survey have administrator role and password is not needed for them, except their personal payroll ID.

IT application is predesigned to apply previously created logic controls during the entering data for the Enterprise. For instance, all the Enterprises have to have at least local unit which is at the same time head office of the Enterprise; In every local unit, Enterprise have to perform at least one NACE activity; The number of the employees has to be assigned to all entered NACE activities, and so on. The name and surname, as well as the email address and telephone number of the person who entered data, have to be provided, also.

SBR unit in SORS employs three persons. Since SORS structure is divided into central office and 15 regional offices which main task is to collect data for statistical surveys from their territory, every territorial unit is focused on collecting data for their portion of the survey frame, considering address of the Enterprise head offices. Furthermore, their obligation is also to check the data entered by the responsible person from the Enterprise, and, if there is a need, to require specific clarifications or more information. It is something new, but it was done regarding improvement of quality of collected data. So, the final confirmation of entered data by the responsible persons from Enterprises is, actually, on SORS employees.

The filling data for Enterprises starts with the entering company ID. If this ID is matched with the ID of the observational unit (IT application checks if this Enterprise is part of the survey), then the user provides its contact data and opens the panel in which the basic administrative data of the observational unit are presented (Company ID, Company name, Company address, Registered number of Employees, Legal form and NACE activity code), as well as the belonging locations (local units) on which Enterprise performs its activities. Local units are the part of the statistical world and it can differ from the administrative data, but it is actually a goal of this survey – to collect, among others, data on NACE activities and employees on the local unit level, since administrative sources failed in providing these kind of data. Local units data that were presented to the user origin from the SBR database and only active and non-active Local units are shown (ceased local units are excluded from the view). The dilemma posed regarding the SBR data that will be presented to the IT application user. Should SBR Local units be presented with blank data, so the user has to enter all data for the Local units from the list and to add the ones that are missing, or the user will see the current SBR data on his Enterprise and to approve or update it. It is decided that user will have to check data on activity status of every local unit from the list, and to update or to approve the data that SBR has on these local units. It is far more convenient to the user, then starting from the scratch. A compromise was made regarding the data on the NACE activities and the number of the employees engaged in its performing – user will see the current state of this data in SBR database, but even though, he will have to enter it again, just to make sure that proper attention is given to this information. The similar situation is with activity status of the local units. Presented local units do not include data on activity statuses, and user have to check it in the drop box – active, non-active or ceased. The minimum data that every local unit has to have is the name, address, date of starting of activity, Enterprise head office indicator, NACE activity code, number of employees in local unit and in NACE activity, activity status (if the activity status is non-active or closed then the date of ceasing of activity have to be entered as well). In order to provide additional data to the Labour force department, SBR included data on the type of the employment, such as long-term employment, temporary and occasional employment and rented employment. It is more burden on the reporting units, but it is something that is very important to the SORS. These data are furtherly matched with the data from administrative sources and used on in producing statistics on employees in the Republic of Serbia.

During its work on updating data of presented local units, the logic control created by the SBR experts will be activated after confirmation of imputed changes. IT application will show the suitable message that will inform the user what is wrong or what is missing. After correcting the data, user can save the data and get to the other local unit. After the all work on local units is finished and if the logic control shows that everything is all right with the local unit data, then the user can finish its work by confirming that all data for its Enterprise are entered.

The next step is approving data entered by the SORS employees in the Regional offices, who are in charge of collecting data for the SBR survey. After they check data for the Enterprises that are on their territory, they finally approve or disapprove the transfer of the data which are provided by the Enterprises itself in the SBR database, through IT application. Of course, they are provided with the different reports from the second IT application, which is used for monitoring the survey flow. IT application for monitoring survey flow is a specially designed application for monitoring data entered through collecting data for SBR survey. Its intent is threefold

- to provide the SORS employees that are in charge with information on the number and percentage of the units that are responded and are in the process of data entering, still not responded, and that are finished with the data input for the survey. Also, to show the number and percentage of Enterprises for which data

are approved and transferred into SBR database, structured by the Regional offices which are in charge on them
- to provide a view of data extracted by using mentioned criteria (responded, in the process of data entering, finished the survey, already transferred data to the SBR database) by the regional offices
- to provide control by comparing just collected and the current SBR data, by selecting one of the predefined queries, considering increasing or decreasing the number of employees, its matching with the administrative sources, control Enterprises that are stated as inactive. Also finding inconsistencies in entered data

SBR survey experts provide methodological papers explaining all the terms and variables used in IT application for entering data. It is far more than a simple booklet and it is also aimed to describe the statistical units that are managed in the SBR database. The point is especially on the local units, since the Enterprises provide data at the local level. Specific cases that may happened had been also explained. During the years of conduction of the SBR survey, a lot of new specific cases were occurred. Therefore, the methodological papers were updated after every survey with the solutions for these cases. The methodological papers have been followed by the answers to the frequently asked questions. It consisted of the practical examples of different situations that can happen on the field.

Specified duration of the SBR survey is 15 days. Also, Enterprises are requested to appoint a responsible person for data entering in not more than a few days, to log in to the IT application and to leave the user contact details. It is very important because it is used later on by the SBR experts in contacting and reminding Enterprises on respecting the deadlines for the SBR survey. Urgencies are not sent to them in paper form, only by the email (using user contact details), and for some, depending on the level of significance and the amount of entered data, through telephone calls.

Working with data in IT application is completely explained in IT application manual, which is attached to the login page.

SBR experts in charge of data collection keep predefined diary, in which they taking notes on the problems and their solutions in managing SBR survey. Also, since the low oblige Enterprises in providing data for this survey, dealing with the units that refuse to give data have to be carefully noted, due to its further use on possible process on the court. For the Enterprises that resolutely refuse to take part in the survey, the fine is regulated by the law.

As it is already said, the last SBR survey consists of almost 8000 Enterprises. Eventually, response rate (share of Enterprises that provide data for the SBR survey) was around 97%, what is really a very good result. The problem is that this result is actually achieved with the great effort of the Regional offices, who constantly reminds reporting units to provide data for the SBR survey. Otherwise, the response rate will be smaller. For some of the Enterprises, for which SBR has correct contact data in the database, CATI interviewers were involved also, and they collected data for a couple of hundreds of Enterprises.

The next SBR survey is planned for October 2018. The sample frame will include about 13500 Enterprises. What is new is that this year, Labour force and SBR will conduct joint survey, due to the fact that labour force department is the main user of the SBR data on employees engaged in performing NACE activities on the local units. Labour force will add their set of questions to SBR IT applications. Collected data will be later matched with administrative sources. By doing this, the burden on the Enterprises will be significantly reduced – data from both surveys will be provided by just one questionnaire.

Since SBR data have been constantly updated with the information from administrative and statistical sources, priority in updating SBR variables from different sources is established. Data for the minor Enterprises are not checked before entering into SBR database, but data for middle and bigger sized Enterprises are in focus during every update. Of course, data obtained as a result of conducting statistical sources, are of high priority. Therefore, a standalone IT application has been developed. The aim is to facilitate approving or disapproving entering the new data into the SBR database, by providing the clear overview of the source of the current data in the SBR database and for the new data as well.

The most Enterprises come from the largest region – Belgrade. So, they are exposed to the largest pressure. The decision is that SBR employees provide back up to the colleagues from the Belgrade office in all activities in collecting data from the Enterprises headquartered on their territory. These are actually the biggest ones, so establishing direct contact by visiting its head office is of vital importance and it is something that has to be done in the future.

SBR is constantly challenged with: how to fine new administrative and statistical sources that will satisfy the increasing user needs, how to match data from various administrative sources, how to influence other business surveys to add new variables needed for SBR and how to conduct own ad hoc and regular surveys. It still has a lot of improvements to be implemented in order to improve the quality of SBR data. The most important is the introduction of the SBR survey. Quality report for the survey is planned, and it is the next task for SBR. Also, the plan is to provide to the users a video which will describe the working with IT application.

The introduction of the business register survey is a significant and important step in gaining direct access to the units of observation. The plan is to leave web questionnaire open online. In that way, Businesses will be enabled to update data when any change in their data occurs. Therefore, expertise in providing data through the web questionnaire will be achieved, and the costs of the survey will be significantly reduced. Of course, these changes and their transfer into SBR database have to be approved by the SBR experts.

# Wait! Before you go, just a few more questions:

# Pilot test of a piggyback survey

Jennifer Edgar, Micheal Dalton

U.S. Bureau of Labor Statistics

## Annual Refiling Survey Background

The Bureau of Labor Statistics' Annual Refiling Survey (ARS) is a web survey that asks approximately 1.2 million businesses to review and verify or update their industry and geographic information each year. The information is used to ensure that each establishment is assigned to the correct industry and that each address geocodes the correct geographic location of the establishment. The ARS also asks employers to identify the locations of new worksites they have established in the state, information that is used to survey those locations.

The ARS is conducted on a 3-year cycle, with approximately one-third of all in-scope business establishments sampled each year. Respondents are sent survey invitation asking them to go to the data collection website and provide their information. Following two email survey invitations sent to all respondents for whom an email address is available, 2 additional paper mailings are sent. One strength of the ARS is the speed at which large numbers of responses are collected (see Table 1 for 2018 numbers).

| Time Period | Number of Additional Responses Collected |
|---|---|
| 3 weeks after 2 email blasts | 114,000 |
| 3 weeks after 1st mail out | 250,000 |
| 3 weeks after 2nd mail out | 97,000 |

## Piggyback Survey Approach

As a short survey that collects information from a large audience electronically, the ARS offers the opportunity relatively easily to append additional surveys after respondents complete the ARS. This approach, sometimes called a 'piggyback' survey allows for new information to be collected without having to select a new sample, do address refinement, develop data collection procedures, etc. Depending on the information of interest, subgroups of the ARS respondents could be targeted, providing the opportunity to collect information from special populations that might otherwise be hard to locate (e.g., large businesses in rural locations). Using the ARS to do the screening, eliminates the need to do a screening survey or oversample to ensure that you're reaching the population of interest. Additionally, this approach would leverage the ARS' relatively high response rate, leading to more data than might be collected from a stand-alone survey that respondents are not familiar with.

## Business Research Survey (BRS) Design

After completing the ARS on the secure website, respondents were shown a transition page and asked to complete a few additional survey questions. They had to actively click 'continue' to move into the Business Research Survey (BRS). This was to ensure that the ARS response would be captured by the system, and that respondents were clearly informed that they were being asked a separate survey request. Respondents could simply close the web browser on the transition page, and their ARS data would be stored and they'd not see the BRS questions. It was technically possible for respondents to log into the ARS data collection page after submitting their ARS data, in which case they'd be shown the BRS transition page. All units were sent 2 mailed survey invitations to mirror the standard ARS procedures.

In this first pilot test, the Business Research Survey, BRS did not ask substantive questions (e.g., How many job openings did your company have on August 12$^{th}$?). Instead, in the interest of gaining insight about the types of respondents who answer the ARS, we asked questions about the information the respondent had access to. BRS respondents were asked if they could or could not report the following for the sampled establishment:

- How job openings are advertised
- How many job openings the company is currently trying to fill
- Total revenue from sales, shipments or receipts in a given year
- The top three revenue producing products or services in a given year

- The number of 1099-MISCs that were filed in a given year
- Whether there were any permanent layoffs in the last three months and reasons for the layoffs

Two additional questions were asked to understand the respondent's relationship to the sampled company and the department in which they work.

## BRS Sampling

Two sampling approaches were tested: random sampling and quota sampling. The goal of testing both was to determine how representative of the target population the resulting data would be. For the random sample, units were selected from the ARS sample frame and flagged to be included in the BRS. Those respondents were flagged in the data collection system to be shown the BRS when they completed the ARS.

Additionally, as the ARS does not collect data from all types of businesses in the US economy, the test included some "BRS-only" units, those that are out of scope for the ARS (e.g., , businesses with an annual average employment of 3 or less, and some industries considered to be low-change, such as cemeteries). This was to reflect the likelihood that any production implementation of a BRS would likely not be targeting only those in-scope of the ARS; the results of a BRS based on only ARS respondents would be of far less interest than one representative of the whole U.S. economy. To include businesses with these characteristics, a BRS-only sample was drawn from the QCEW sampling frame.

For the quota sample, a quota was defined based on the desired number of total responses. Individual establishments were not selected ahead of data collection, for a specified period of time all ARS respondents were included in the BRS. Once the quota was completed, the BRS was ended.

## BRS Evaluation

There were several unknowns that will determine the success of the BRS piggybacking approach. Attrition rates, or how many respondents complete the second survey, will determine the true efficiency of the approach. Since the ARS only asks respondents about their industry and location, we do not know who the respondents are and what type of information they could provide about their establishment. This limits the type of information that could be accurately collected with this approach. In 2018, BLS conducted a pilot test of BRS that asked respondents 8 questions after completing the ARS. Rather than

collecting substantive information (e.g., number of job openings or type of ownership), the questions asked what type of information the respondent would be able to provide about their establishment (e.g., could you tell us the top three products produced by your company).

There are some unknowns that will be important to evaluate prior to implementing a BRS, or any piggyback survey. Since respondents are asked to complete the ARS once every three years, the impact of the BRS on future ARS response rates is a factor that needs to be considered when making decisions. Additionally, since survey topic is known to be related to respondent burden and response rates, it seems likely that the topic of the BRS questions will impact the response rates and potential impact on the future ARS response. Given that the goal of the BRS is to collect information more quickly than traditionally possible, it is not feasible to do a field test for each new set of questions prior to BRS fielding. Another way of pretesting new BRS topics and questions would have to be identified.

## BDCMW Presentation

In the presentation, we will present results from the BRS pilot test. Results will include ARS response rates, click-through rates, and BRS unit and item response rates. Results for both types of sampling methods will be shown, looking at time required to collect the data and differences in response rates and respondent characteristics. Finally using information from the ARS, we will explore if there are patterns of nonresponse that would limit the effectiveness of this approach. We will end with recommendations, both for the next steps for the BRS as well as for other agencies considering this type of approach.

# DATA COLLECTION AND INFORMATION FLOW MANAGEMENT IN STATISTICAL SURVEYS CONDUCTED WITH THE USE OF REPORTING PORTAL.

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## Background paper

Proper circulation of information is necessary on every stage of statistical survey, but especially during data collection. This phase includes not only information flow within the statistical organization, but first and foremost exchanging information between statisticians and data providers.

In the Polish statistical system, overwhelming majority of data from and about business are now obligatorily collected via Internet. So-called "electronic questionnaire" is a basic information carrier used by companies participating in surveys for the purpose of submitting data to the official statics service (only a small percentage of them submit data on paper; surveys with the participation of households are conducted usually in the form of sample survey in which interviewers gather data directly from respondents).

First steps towards building the online reporting system were taken in the first decade of the 2000s. Partly in response to expectations of enterpreneurs interested in contacts with public administration with the use of Internet, Polish statisticians launched a redevelopment of organization of surveys, with a view to building a system capable of replacing data collection on paper questionnaires. Due to large amounts of data collected on a regular basis from numerous respondents, Statistics Poland decided to build the system designed exclusively for statistical purposes and independent from another public administration systems of this kind. In 2007 an Internet platform referred to as the "Reporting Portal of Statistics Poland" was set up, initially only as an option for respondents (companies) interested in delivering the data in such a form.

Enormously popular among respondents from its very beginning, Reporting Portal became an obligatory tool for submitting the data (at least for the vast majority of respondents) as a result of changes in legislation that came into force two years later (in 2009). Since then, only the smallest companies (with a number of employees up to 5) have been allowed to deliver data on paper questionnaires (provided that they inform in advance the statistical office about their preference). Reporting Portal (together with its website address: https://raport.stat.gov.pl/) is usually indicated as a place of data provision in descriptions of business surveys, contained in

the annual programme of statistical surveys of official statistics[1]. As regards legal basis for collecting data online, relevant regulations are also contained in the Law of 29 June 1995 on Official Statistics, the most essential legal act for the Polish statistical system. According to the Article 28a of the Law, the President of Statistics Poland shall run a tele-information system comprising an electronic platform for statistical data collection (i.e. the Reporting Portal), which shall enable, among other things, submitting the data by respondents as well as maintaining communication between the official statistics services and respondents[2].

The Polish system of online reporting is based on individual respondents' accounts: the number of accounts has been rising steadily since the start of the Portal, reaching as many as 871,000 accounts at the beginning of July 2018. Access to the user's account on the Portal is possible directly from the website of Statistics Poland but, for safety reasons, authentication data (login and password) are unique for every user and generated automatically by the statistical office. Every respondent (in most cases: a company obliged to participate in statistical surveys) designates one employee as a "person in charge of reporting" (in Polish: *osoba zarządzająca sprawozdawczością*) responsible for the whole of statistical reporting from this particular company and authorized to use the Reporting Portal. "Person in charge of reporting" is allowed to access every functions and resources of the Portal relating to his/her company. Nevertheless, he/she can delegate some of his/her powers to other people entitled only to a strictly limited number of activities connected with reporting (e.g. filling-in only specific parts of a questionnaire). Statistical questionnaires are available for users within a limited period of time. In case the respondent doesn't meet the deadline for submitting the data[3], questionnaire is made available to him once again for some time. In order for respondent to fulfill the statistical obligation, it is necessary to fill-in the questionnaire and accept it (acceptation is possible only on condition that automatic logical and mathematical control of data doesn't report any error). In 2017, about 3,050,000 statistical questionnaires were collected by the Reporting Portal[4].

Data, collected by the Portal, are then processed in regional statistical offices[5], according to their specialization in particular areas of statistics. Statistical office is responsible for the entire process of collection and data-processing of statistical data from all over the country,

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[1] *In Poland, annual programme of statistical surveys of official statistics comes into force in the form of regulation of the Council of Ministers. Statistics Poland (in Polish: Główny Urząd Statystyczny), established in 1918, is the central statistical office of the Republic of Poland, subordinated to the Prime Minister.*

[2] *Full text of the Law on Official Statistics is available on the website of Statistics Poland (http://bip.stat.gov.pl/en/law/law-on-official-statistics/).*

[3] *Deadlines for data provision are specified (for every questionnaire) in the annual programme of surveys.*

[4] *A total of 174 different kinds of questionnaires, used as a source of information in around 90 statistical surveys.*

[5] *Apart from Statistics Poland, there are 16 statistical offices, located in capitals of voivodeships (regions); directors of statistical offices are subordinated to the President of Statistics Poland. Organizational structure of the Polish statistical services reflects administrative division of the country.*

regardless of respondents' locations. For example, collection and processing of nationwide data concerning social economy, healthcare, culture etc. are organized and conducted by the statistical office in Cracow, collection and processing of data in the field of labour market statistics – by the statistical offices in Bydgoszcz and in Gdańsk, collection and processing of fuel and energy statistics – by the statistical office in Rzeszów etc. Tasks performed during the data collection phase include, first of all, preparation of nationwide list of respondents obliged to participate in the survey and contacts with respondents. Data-processing is performed with the use of IT system dedicated to the particular survey and include: advanced control of collected data (preliminary control takes place, as it was mentioned above, in the process of filling-in the questionnaire), sometimes comparing data with results of another survey and preparation of tables presenting output data for the purpose of statistical publications. Those activities are performed in close cooperation with experts from the headquarters of Statistics Poland, specialized in methodological issues.

Most of the activities involved in statistical production (at least during the data collection and data-processing phase) are performed strictly in accordance with plans and schedules prepared in the Programming and Coordination of Statistical Surveys Department located in the headquarters of Statistics Poland. Typical data collection schedule and data-processing schedule sets the deadline for every activity as well as indicates organizational unit and employee responsible for this activity. It's practically impossible to imagine effective completion of those numerous tasks performed by numerous people without proper information flow among stakeholders involved in statistical production. In particular respondents (companies participating in surveys) need to be informed in detail (and, if possible, well in advance of the survey) about their statistical obligations. In consequence, organization of information flow is one of the most important elements of the planning and preparation phase.

Two-way communication between respondents and statisticians includes:

- typical announcements sent automatically by the Reporting Portal and delivered directly to respondent (letter informing about statistical obligations, information about the forthcoming deadline for submitting the data, admonition letter for those who missed the deadline),
- information intended only for particular respondent (concerning the current and next statistical obligations), available for this respondent after logging-in to the user's account on the Portal,
- information intended for all respondents, available on the website of Reporting Portal (guidelines concerning using the Portal, graphic designs of questionnaires along with instructions about their filling-in and deadlines for submitting the data, other messages etc.),
- instructions given to respondents by some "electronic questionnaires" in the process of filling-in the questionnaire (and list of errors, in case of any error detected by an automatic control of input data),
- help desk for respondents: in case of any problem connected with filling-in the questionnaire, respondent can contact the authorized employees of statistical offices and ask for explanation,

- another help desk organized for users of the Reporting Portal having technical problems (lost authentication data, difficulties connected with logging-in to the account etc.).

In addition, exchange of information with respondents comprises also direct contacts (phone calls, e-mails) between staff of statistical offices and respondents in the event of errors found in already collected data as well as typical correspondence with companies obliged to participate in surveys (complaints, requests for additional explanations etc.).

All of those above-mentioned activities require perfect organization and planning, and involve a number of people permanently engaged in contacts with respondents. Particular aspects of information flow (with a focus on using the Reporting Portal as a channel of communication with respondents) will be discussed in more detail during my presentation.

# Transforming short-term statistics: the business perspective

Dr Kate Thorsteinsson and Dr Robert Edmunds, Office for National Statistics

## Background

The Office for National Statistics (ONS) is taking forward a programme of transformation to deliver improvements to the UK's economic statistics, the first suite of which being the short-term economic indicators. ONS's transformation goals include improved use of non-survey data sources and implementation of updated systems, methods and operational processes. This paper describes the work that is underway for transformation of the short-term outputs of the retail, motor trade and wholesale industries, providing the background to the main proposals for change to the current outputs (with a focus on data collection) and the research being carried out with businesses to explore the feasibility of these changes from a business perspective.

ONS currently publishes short-term economic data for the retail, motor trade and wholesale industries as separate statistical outputs. Retail sales data are published as the basis of the monthly Retail Sales Index, whereas wholesale and motor trade activity is published as part of the Index of Services suite of statistics. Under transformation, the proposal is to merge these industries together and publish a Distributive Trade output. This combined statistical output comes in line with the Eurostat Framework Regulation for International Business Statistics (FRIBS) as outlined in the European Business Statistics Manual (unofficial pre-release) and recognises the cohesion between these three sectors, publishing statistics for the entirety of Section G of the United Kingdom (UK)'s Standard Industry Classification (SIC) system (2007)[1].

A key element of the transformation work for the Distributive Trade output is to integrate non-survey data into the statistical process where possible. ONS is exploring whether it is feasible to use the non-survey administrative data source of Her Majesty's Revenue and Customs (HMRC) Value Added Tax (VAT) turnover data instead of relying on survey data. Research is promising in that it may be possible to use VAT turnover data in replacement of survey data for some of the smaller businesses across Section G. Using VAT data would bring considerable benefit for small businesses in terms of burden as well as serving operational efficiencies for ONS. This is work in progress and outcomes will be published in the future.

The remainder of this paper describes the rationale behind possible changes to the short-term questionnaires to meet the revised output requirements established as part of transformation. We will provide an overview of the qualitative research conducted exploring the feasibility of implementing changes, investigating the potential impact on businesses, as well as possible implications to data quality. Findings have provided evidence to inform the decision-making process. The short-term statistics transformation is a live research package and it is important to emphasise no final decisions have been made.

[1] The UK's SIC (2007) is broadly comparable to the European classification system: 'Nomenclature statistique des activités économiques dans la Communauté européenne.(NACE), (2008)'

## Surveys

ONS conducts two surveys that collect data from the retail, motor trade and wholesale industries for the short-term outputs:

1. **Monthly Business Survey – Retail Sales Index (RSI)**

   Retail sales data are collected from a representative sample of the retail sector in Great Britain (GB), sampling approximately 5,000 retailers via the RSI questionnaire. The specific figures requested via RSI are:

   - total retail turnover including VAT
   - internet sales

   A small sub-group of businesses receives a more detailed RSI form type (the Monthly Commodity Inquiry (MCI)) which, in addition to total retail turnover and internet sales, asks businesses to provide figures relating to specific commodities such as household goods, clothing and footwear, and automotive fuel sales. RSI and MCI run on a 4-4-5 week reporting cycle.

2. **Monthly Business Survey (MBS)**

   Data from the wholesale and motor trade industries in Great Britain (GB) are collected via the MBS, sampling approximately 5,600 wholesalers and 1,200 motor traders. In contrast to the retail sector, these businesses are asked for:

   - 'total turnover exclusive of VAT' on a calendar month reporting cycle
   - there is no requirement for internet sales data

ONS is in the process of moving all business surveys from paper to an online mode of collection. RSI successfully switched and has been running online for approximately one year. MBS is in progress, with a large part of the sample now receiving an electronic version of the questionnaire.

## Rationale for potential redesign

One driver of transformation is to increase coherence and comparability across sectors so that data are consistent at the point of collection; improving quality and reducing the need for methodological adjustments. As seen above, there are notable differences between the data collected from retailers compared to the wholesale and motor trade sectors: there being differences in reporting cycles, the turnover data collected and internet sales information. In addition, geographical coverage differs in the retail, wholesale and motor trade industry surveys compared to other sectors.

### Coverage and economic ownership

The proposal for the Distributive Trade output is to change from collecting data at GB-level (England, Scotland and Wales) to collecting data for the United Kingdom (UK), adding Northern Ireland businesses into the sample. This would bring coverage in line with the production industries.

Alongside changes to the sample, ONS plans to update the coverage statement on all the short-term business surveys, starting with the Distributive Trade questionnaire. The coverage statement on RSI and MBS questionnaires reads:

- Data should relate to all sites in England, Scotland and Wales.

Rather than collecting data relating specifically to a UK 'site', the proposal is to update guidance to instruct businesses to provide turnover following economic ownership principles to build consistency, coherence and comparability in line with international guidelines.

The System for National Accounts (2008) gives a definition of economic ownership: *The economic owner of entities such as goods and services, natural resources, financial assets and liabilities is the institutional unit entitled to claim the benefits associated with the use of the entity in question in the course of an economic activity by virtue of accepting the associated risks (Par. 3.26).*

The principle of economic ownership is not where the physical presence or movement of goods occurs but rather relates to the economic ownership of the goods: that is, who bears the risk and rewards – in theory, this concept should be understood by company accountants. This means that a UK-registered retailer could have economic ownership for the production and sales of goods that occur outside of the UK. Conversely, a UK business may be acting as a conduit for the retail of goods in the UK but not actually holding the associated economic risks and benefits, for example, they may not own the physical inventories in the UK (Mahajan, 2018).

The concept of economic ownership could be complicated to convey in accessible terms on a questionnaire. We have investigated current reporting practices relating to the coverage statement and are developing and testing new guidance to best convey economic ownership instructions to businesses.

### 'Total Turnover' versus 'Total Retail Turnover'

The RSI questionnaire ask for retailers to provide 'total retail turnover', whereas wholesalers and motor traders (via MBS) are asked for 'total turnover.' This variance in wording could result in data inconsistencies. Retailers may only be providing turnover generated from retail activity, whereas wholesale and motor trade sectors are instructed to, and therefore may, include turnover from all activities. This could result in missing or misclassified turnover data should businesses have activities outside of their industry classification. We explored whether businesses had more than one activity, and if so, what those activities were.

### 'Turnover inclusive of VAT' versus 'Turnover exclusive of VAT'

Another difference between MBS and RSI is that retailers are asked to provide turnover **including** VAT, whereas wholesalers and motor traders provide turnover **excluding** VAT. The reason for this is two-fold:

1. Retail sales data are used in the compilation of ONS's household expenditure statistics. The current methods of production of these statistics rely on retail figures inclusive of VAT.
2. Historically, it has been assumed that retailers find it difficult to report sales figures with VAT excluded, particularly pertinent for smaller businesses. To ease respondent burden, ONS therefore collects retail sales data inclusive of VAT. Adjustments are then made to produce outputs exclusive of VAT for Gross Domestic Product (GDP) and Eurostat purposes.

We were tasked to test the assumption of whether retailers do, in fact, have difficulties providing turnover exclusive of VAT. Given that HMRC VAT turnover data may be used for the smallest

businesses instead of survey data, then the current solution in place to enable retailers to provide turnover including VAT may not be needed in the future. Findings are being used to help decide whether a change in VAT instruction would improve data quality for RSI, balancing this with any impact on household expenditure outputs.

### Internet sales

ONS publishes internet sales figures as part of the RSI release. The growth in online versus in-store sales over recent years is a notable phenomenon. Measuring internet compared to high-street activity helps to understand consumer behaviour and the potential impact on the retail sector.

The online RSI internet sales question is:

**Of the £3,200.00 total retail turnover, what was the value of internet sales?**

**Include**

- VAT
- sales from orders received over the internet, irrespective of the payment or delivery method

As previously mentioned, internet sales figures are only collected for the retail industry and not wholesalers and motor traders, however, ONS is keen to extend knowledge of the online economy. We investigated the concept of 'internet sales' with retailers, wholesalers and motor traders to improve understanding of what this means to businesses, whether it was relevant for one or all sectors, and whether businesses could provide figures if requested.

### Reporting cycle

We examined whether retailers could provide data in calendar month, as opposed to 4-4-5 reporting cycles as the proposal is to bring consistency across sectors and collect data based on calendar months. This proposal for change would not necessarily have a great impact on retailers, as RSI is designed now to enable businesses to enter data for the closest dates to the requested reporting period. If a business cannot provide figures for the exact dates requested, there is an option to provide different dates. However, it would not make sense to change to calendar month reporting if all businesses then had to use the option to provide different dates as this would increase respondent burden.

## Research questions and methods

We carried out qualitative research with businesses across the retail, motor trade and wholesale sectors to better understand the figures they currently provide to ONS via the short-term surveys and to investigate the feasibility of businesses providing additional or different figures as proposed under transformation. Through in-depth interviews, we explored the topics discussed above, specifically asking:

- How do businesses interpret the current coverage statement?
- Do businesses have turnover generated from secondary activities outside of their industry classification, and if so, what are these?
- Can retailers provide turnover excluding VAT?
- Do wholesalers and motor traders have internet sales activity, and if so, could they provide figures?
- Are retailers able to report on a calendar month reporting cycle?

Evidence was gathered about how easy or difficult it is for businesses to provide the current data and how any changes may affect respondent burden.

Findings have informed the development of a new online 'Monthly Turnover Survey (MTS)', the planned replacement questionnaire for RSI (for retailers) and MBS (for wholesale and motor trade industries). The MTS is now going through iterations of cognitive testing and user research to test businesses understanding (for example testing new guidance in relation to the economic ownership) and digital usability.

## Workshop objectives

This paper has provided the backdrop to our workshop presentation, where we will:

- present findings from the feasibility research
- show elements of the latest content and design of the draft MTS
- highlight some successes and challenges we have experienced during the research process
- seek discussion on the concepts of internet sales and economic ownership, as well as more broadly around any of the topics raised in this paper or presentation.

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FIFTH INTERNATIONAL WORKSHOP ON
BUSINESS DATA COLLECTION METHODOLOGY
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# STANDARDIZATION OF THE DATA COLLECTION OF BUSINESS STATISTICS IN BELGIUM

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*Introduction*

Since the beginning of the century governmental public services are confronted with less means in terms of budget and people. Beside the limited state budget context, there was also a growing demand and a political willingness to reduce the administrative burden. Apart from the more classic burden reducing techniques, the Belgian NSI decided to draw the card of e-government. In the aftermath of the succesful transformation of the structural business survey, all other business surveys would be migrated and fitted into a single system.

*Use of XBRL for SBS*

A study in 2007 had pointed out the structural business survey as the most expensive business-survey organized by the NSI. Several administrative simplification technics were applicated on the survey. These technics where avoiding gold-plating (checking to what extent national survey are in line with European statistical demands), questioning fewer enterprises (the treshold for exhaustive surveying had been increased and a rotation scheme was introduced for SME's) and avoiding double questioning by prefilling the questionnaire with figures of the entreprises annual account. The latter, the re-use of national accounts data, paved the way to introduce XBRL as an e-government tool and as the standard for data collection amongst enterprises in Belgium. In 2008 Statistics Belgium decided to develop an xbrl-based websurvey. The idea of XBRL (eXtensible Business Reporting Language) is to identify each concept (e.g. 'turnover') and add it to a 'taxonomy', which is similar to a dictionary. These concepts, brought together in a structured way, can be recognized, processed and represented in different ways, depending on the intended use (e.g. 'annual accounts' or 'SBS').

*Adaptation of business process model of other business statistics*

The successful use of XBRL technology for SBS formed the base for a transformation and standardization of the process of data collection of several other business statistics. Until 2010 data collection and data processing in the Belgian NSI had been organized per survey. This organization of different production lines (stovepipes) had resulted over the years in the implementation of a great variety of data collection tools and software: Blaise, xls files, txt files, xml files, coolgen, cobolt, Java, XBRL… This mix made the entire data collection process inefficient and rigid, since every statistic had its own specific programs, format, licenses, IT-specialists.

In order to standardize the data collection and processing, some lines were drawn out, resulting in the following action plan: All surveys should be web based using only 2 tools: Blaise or XBRL. All existing surveys that did not use one of these two formats would be converted. In accordance with the rationalization of the web survey tools, the number of internal processing systems would also be reduced as much as possible. A single declaration platform would be created for all web surveys. The integration of surveys in existing software systems would be further investigated and implemented. The B2G information flow should be web-based as much as possible. Paper forms should gradually disappear. The use of XBRL for the collection of statistical data had to be expanded further (e.g. Structure of earnings, tourism, road transport,…)

In 2017 the standardization process was finalized. Since then the Enterprise section of the data Collection Department Section has 22 surveys in XBRL format, monitored in one single system 'StatData' which is directly connected with the Business Register. Also all the surveys follow the same standardized process in terms of loading the sample, loading data to prefill forms, creation of follow-up, creation of user-ids, creation of web forms and the export of data. Apart from the cost reduction, all these 'identical' steps also allow more flexibility in terms of human means, as input, output and data-processing of different surveys have similar characteristics.

*Conversion of existing surveys and standardization of export of processed data in Data Warehouse*

As the data collection section of Statistics Belgium now had some xbrl-knowledge, it was possible to re-use existing concepts and create new specific concepts for each survey. Interesting whas the fact that the 'organizer' of the survey could directly make changes and add controls (business rules) to the form by himself, a task that in the past could only be carried out by a computer scientist. Since all surveys would be organized in a similar way, they should be logically processed similarly and also the data had to be stocked the same way in a data warehouse. For each survey, data are daily transferred and stocked in a library. Since all these libraries contain similar tables with identical variables it is made much easier to have access to data of other statistics, because the same software and the same structure of data is used.

*A single monitoring system 'StatData'*

All business surveys, questionnaires are monitored in a single system called 'StatData'. The system has an internal component to follow up / manage a survey, to open xbrl-form and to add comments. The internal component is directly connected to the business register which contains entreprise information (activitiy, legal information, adress, contact person). The external component of StatData is the platform where an enterprise can login and fill in or upload a form. Access rights to the external component can be directly verified, modified, blocked. Every employee of the business datacollection section has (restricted) access rights to this system. Since all the business surveys make use of the same modus operandi, it's easy to switch employees within a relatively short period of time. The activity of internal and external users on StatData is logged and some useful metadata are also exported to the data warehouse.

*Standardization of the preparation of a survey*

At the moment all business surveys were transformed to an xbrl-based survey and the monitoring could be done in the StatData-system, every step in the preparation phase of a survey still had to be done manually (e.g. a csv-file with sample had to be created, sent to IT, loaded and verified by a responsible of the business section).

Since there were again similar steps and actions to do for each business survey apart, the automatization of these tasks was further investigated. This resulted in a new subsystem, linked to StatData from where general 'jobs' in the preparation phase could be executed. The single condition to make use of these jobs is that every file to load needs the predefined structure (e.g. legal unit number, reference period,...) The jobs permit to load the sample, verify and adapt the actual situation of the loaded units in the business register, create a status for a form, load prefilled data, create a userid and password and access rights to every form and to create the xbrl-forms and export parameters. Similar to the export of the collected data and the metadata, there is also an export to the data warehouse of results of these jobs.

*Summary*

In a context of budgetary limitations and with a heritage of all different production lines, the Enterprise section of the data Collection Department Section managed to reorganize the data collection process in a positive way by offering web forms through a single platform. The gradual implementation of a new system has brought more standardized processes, flexibility and less dependency of personnel, but the perception about expiry dates of IT-systems has been changed a lot since the start of the century.

# SIMPLIFIED BUSINESS INFORMATION – THE WAY FORWARD

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## 1. IES – The beginning

In 2006, the Simplified Business Information (IES stands for "Informação Empresarial Simplificada") was created within the framework of a government program for the simplification and modernisation of Public Administration named the SIMPLEX program.
This measure, which resulted from a joint effort of all the public administration entities involved (the Ministry of Finance, the Ministry of Justice, Statistics Portugal and the Portuguese Central Bank), aggregates the fulfilment of several legal obligations by the enterprises in a single act that were previously dispersed and that implied the provision of information materially identical to different organisms of the Public Administration through different channels.
With the IES, the various obligations, namely the annual accounts of the enterprises, are fully complied with by electronic means and in a totally dematerialised form, carried out in a single occasion. The delivery of the IES specifically allows the fulfilment of the following obligations: delivery of annual accounting and tax statements to Tax Authority, responsibility from the Ministry of Finance, delivery of annual accounts for Public Register under the supervision of the Ministry of Justice, provision of statistical information to Statistics Portugal and the provision of information on annual accounting data for statistical purposes to the Portuguese Central Bank.
This measure had a significant impact on enterprises, covering around 400,000 enterprises in Portugal, as well on the different entities of the Public Administration responsible for collecting this information.
Particularly for Statistics Portugal, the main advantages were as follows: complete coverage of the business universe (from 50,000 to 400,000); reduction of information availability from 12 to 6.5 months; information received automatically by electronic means; and a significant increase in the detail of the information. With the implementation of the IES, it was possible to eliminate one of the most costly surveys carried by Statistics Portugal.
In 2015, a new body of the public administration, the Directorate-General for Economic Activities (DGAE) of the Ministry of Economy, integrated the IES with the objective of having access to information on business establishments, necessary to update its commercial register of establishments.

## 2. IES – The way forward

In 2018, following the simplification process initiated in 2006, which led to the creation of the IES, the government launched the SIMPLEX + program, once again to simplify and modernise

public services, improving people's lives and businesses' activity in their relationship with the public entities.
In this context, a simplification measure of the IES is foreseen, by pre-filling this declaration with data extracted from the standardised file of tax audits, designated SAF-T (PT) - Standard Audit File for Tax Purposes (Portuguese version), regarding the accounting and also eliminating tables and fields of the current forms, in cases in which the information can be obtained through SAF-T (PT). This measure will simplify not only the submission of the declaration by enterprises, but also the access to the accounting records of enterprises by the entities to whom the information must be legally provided.

The submission of the information will happen in two moments:
**First moment:**
Enterprises will have to submit the SAF-T (PT) accounting file - which contains all the accounting movements made on a daily basis - and indicate a set of specific information on the declaration, namely the type of normative used, the type of entity, etc.
The Tax Authority will validate this file, within a maximum of 10 days. This validation aims to measure the compliance of the data in the file. It is mandatory to send this file to proceed to the second stage of the process.
**Second moment:**
Following the submission of the SAF-T (PT) accounting file and validation by the Tax Authority, the enterprises must proceed to the submission of the IES declaration. This declaration includes the pre-fulfilment of the financial statements: Balance Sheet and the Statement of Profit and Loss by activity and some fields in other tables of the IES, using the data extracted from the SAF-T (PT) related to the accounting submitted in the first moment. The remaining fields and tables of the IES must be completed by the enterprise. The IES comprises all the information required for accountability and all the extra accounting tables which contain information that cannot be extracted from the SAF-T (PT) file on accounting required for fiscal and statistical purposes.

### 2.1. SAF-T (PT)

In 2007, a standard file format for tax audit for exporting data was approved, the so-called SAF-T (PT) - Standard Audit File for Tax Purposes, whose data structure has been adapted in the light of accounting and tax changes. This file, regulated by international standards defined by the OECD, was also adopted in several European countries as a way of presenting accounting and fiscal information by the use of electronic means. Under decree 321-A/2007 of March 26, all enterprises that use a computerised accounting system are obliged to generate this file.
The experience in the usage of the SAF-T (PT) showed that the current structure was insufficient for a complete understanding and control of accounting information due to the flexibility in the use of accounts by different entities. In this perspective, and in order to simplify the IES and allow the automatic completion of the Balance Sheet and the Statement of Profit and Loss included in the IES, in December 2016, the SAF-T (PT) file structure was adjusted, with the creation of taxonomies, i.e. correspondence tables that allow the characterisation of the accounts according to the accounting regulations used by the different enterprises.

Two types of taxonomy have been defined, considering the existing charts of accounts in the Accounting Standardisation System (SNC), namely one for entities that adopt the Microentities regime - Annex III of decree 302/2016 of December 2 and another for other entities - general regime and small entities - Annex II of the same decree. The entities that adopt International Accounting Standards are also covered in the last annex.

Taxonomies do not only include the codes of accounts provided in the SNC. With the taxonomies, more details than those presented in the SNC were created. Situations such as the definition of the debtor or creditor nature of some accounts; the disaggregation of some "current" and "non-current" assets and liabilities and the specification of some classes of accounts that are omitted or not defined (to be added, if needed) in the chart of accounts are examples of additional details obtained with the taxonomies, thus allowing for the automatic filling of the Balance Sheet and the Statement of Profit and Loss included in the IES. Details on depreciation, amortization and impairment by asset classes and losses were created, with the purpose of automatically filling some fields of other tables from IES and simplifying the filling by the entity.

The SAF-T (PT) file must be generated by information systems in a standardised format, in the XML language, respecting the approved structure. These changes required a reformulation of the accounting programs of the enterprises, with implementation starting from January 1, 2017.

### 2.2. IES

As previously mentioned, the IES declaration shall be pre-filled automatically by the IT system of the Tax Authority with the data extracted from the SAF-T (PT) file relating to the accounts (validated file) and with the information provided by the entities when submitting the file. The IES fields that are automatically filled in by the Tax Authority are not editable and can be modified by changing the data provided by the entities when submitting the SAF-T (PT) and/or delivering a new SAF-T file (PT) file. The remaining fields of the IES, i.e. fields with information that cannot be obtained directly through the SAF-T (PT) file, must be completed by the entity, in the same way as previously. Once fully completed and validated, the IES statement must be submitted on the Tax Authority portal.

The following table shows the current IES field numbers, the percentage of fields deleted and the percentage of fields to be filled by the entity in the "new" IES:

| **Annex A** | | **2017 and previous years** |
|---|---|---|
| Total of fields | Other entities than microentities | 3,527 |
| | Microentities | 2,197 |
| | | **2018 and following years** |
| % of fields deleted between 2017 and 2018 | Other entities than microentities | **58%** |
| | Microentities | **61%** |
| % of fields to be completed by the entity in 2018 and following years | Other entities than microentities | **72%** |
| | Microentities | **73%** |

### 2.3. Working group

The IES working group, made up of all the Public Administration entities involved, has regular technical meetings. The greatest challenge with the "new" IES, besides the reformulation of the current forms and the redefinition of the validations included in the IES submission application, was the definition of taxonomies that would automatically fill a significant part of the declaration. As a side note, it is estimated that for the new IES, 50 meetings were held.

## 3. Conclusions

The delivery of the IES with automatic filled fields through data extracted from the SAF-T (PT) accounting file, represents a significant change, with advantages at several levels:

- 40% reduction in the number of the requested fields;
- Two month anticipation of most part of the information;
- Annual information, broken down by quarters;
- Greater accuracy in detail variables;
- Implementation of a process that may simplify the collection of infra-annual information.

However, this process also presents some challenges:

- Complete redesign of the database infrastructure;
- Deep change in the programming that supports the production of statistics;
- Higher investment by the need to adapt the technicians to a new reality and expenses in training.

## 4. The following steps

**Infra-annual administrative information**
With the implementation of this new system, all enterprises will be able to produce a SAF-T (PT) file, which they must send annually for this purpose. However, since the creation of this file is fully automated, the development of monthly and quarterly files will require a small investment. In this way, it would be possible to sustain the production of infra-annual statistics, leading to the elimination of current business surveys.

**Exploitation of other information in SAF-T**
There is a set of information included in the SAF-T accounting file that is not yet fully exploited, namely information about products, customers and suppliers. The investment in the harmonisation and analysis of the requested information at product level could bring significant advantages in simplifying the statistics of industrial production.

**Creation of other SAF-T modules**
The OECD has also developed a module about wage payments which has not yet been implemented in Portugal. The development of this module, in a joint effort between Statistics Portugal, Tax Authority and Social Security, would be an excellent opportunity to eliminate duplication of requests for information in this area and also to streamline statistical production processes.

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# Smartphone Usage in Establishment Surveys: Case Studies from Three U.S. Federal Statistical Agencies[1]

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**Organizations: NSF/NCSES, USDA/NASS, BLS**

## Introduction

Many years ago, survey organizations were focused on converting paper instruments to web questionnaires (Couper 2000). These days, offering respondents the ability to complete self-administered surveys online rather than mailing back a paper questionnaire is a fairly standard practice (Snijkers and Jones 2013; Barlas 2015). Internet data collection is often thought to achieve higher or comparable response rates and data quality at a lower cost than other methods.

Unlike paper surveys, however, survey designers do not have complete control over how the questionnaire appears to the respondent. A respondent can access the online survey in a variety of ways beyond the desktop or laptop the survey designer likely intended. As one prominent researcher notes, "if you're doing an online survey, you're doing a mobile survey" (Link 2013).

This lack of control has led to research into the impact of smartphones on online survey data collection, including effects on data quality and response rates (e.g., Antoun et al. 2017; Barlas 2015). Overall, this research shows that unit and item nonresponse tends to be higher on smartphones compared to PCs and tablets, response error tends to be higher due to visibility issues related to small screens, and smartphone users provide shorter answers to open-ended questions and take longer to respond compared to tablets and PC users. However, differences in response error tend to be small and respondents using smartphones tend to provide similar responses to those responding via a tablet or PC (Tourangeau et al. 2017).

To account for the increase in smartphone usage, more surveys are being "mobile-optimized," where the survey takes advantage of best practices for rendering questions on small screens. This also allows for the survey to be displayed appropriately on tablets and other types of

[1] The material in this paper represents the opinion of the authors and not their respective agencies. The findings and conclusions in this preliminary publication have not been formally disseminated by the U.S. Department of Agriculture and should not be construed to represent any agency determination or policy.

devices. Whether this approach changes the impact of the screen size on response is generally unexplored, however.

Thus far, most of the research on smartphone usage in surveys has been focused on household or social surveys, but, as with many other features of survey design, establishment survey respondents can have a very different response experience and also need to be considered. In particular, survey mode may have more of an impact on the response process for establishment respondents than household respondents as response to establishment surveys tend to a) rely on records, b) involve multiple individuals who are involved in completing the survey request, and c) be lengthy and complicated. Establishment survey respondents are often assumed to use desktop or laptop devices to complete surveys, though we have not found empirical evidence supporting this assumption. Although establishment surveys have been pushed to web reporting as a cost savings measure, they have not experienced a push for mobile optimization as have household surveys.

This leads us to wonder if establishment surveys should be concerned about data coming in via mobile devices. We know that not all business respondents sit behind a desktop computer for the majority of their day, and as the workforce gets younger and the nature of the economy shifts, it seems likely that more respondents may be interacting with our survey requests via devices other than their computers, including their smartphone. Not optimizing establishment surveys for a mobile device could negatively impact response rates and data quality.

The United States features a decentralized statistical system with 13 principal statistical agencies. This means that each agency sets up its data collection differently. There is no consistency in survey design across agencies and there can, in fact, be considerable variation among surveys within a particular agency.

We have chosen five surveys from three U.S. statistical agencies that highlight differences in the complexity and length of surveys administered by each agency. Some surveys chosen are mandatory and others are voluntary; some are long and others are short. Using paradata, we will examine the frequency at which respondents are using mobile devices to complete these surveys and if there is variation in these rates by agency, survey and/or type of respondent. We hope that these case studies will prompt participants to examine their own surveys, evaluate how prevalent mobile device usage is and if design changes should be made to accommodate this new type of survey response.

## Surveys

### Bureau of Labor Statistics Internet Data Collection Platform

The Bureau of Labor Statistics (BLS) has a central internet data collection platform that serves as the entrance point for all establishments reporting via the web. This platform is designed to allow respondents to easily report their requested data over the internet. Instruments on the platform have undergone usability testing. All development and evaluation work has been done using desktop computers, and currently the platform is not optimized for mobile devices (e.g., the screen will render the same way regardless of the device used to view it).

There are two versions of the platform -- one that presents data from a prior wave to the respondent and one that does not -- that have implications for the login process. For the former, respondents are asked to enter a BLS-assigned account number and password and on their initial login to enter their contact information (including business mailing address and physical location address) before selecting from a list of surveys they have been sampled to complete. For surveys that do not present prior wave data to respondents, the security requirement is less stringent: respondents are asked to enter only a BLS-assigned account number and complete a CAPTCHA task. No password or confirmation of contact information is required.

BLS Annual Refiling Survey

A mandatory survey in 26 states, the BLS' Annual Refiling Survey (ARS) is sent to 1,200,000 establishments with at least three employees but only one location. Firms with multiple locations are given a different survey to allow them to report on all their locations. ARS respondents only have one question to answer. After reading a description of the industry that BLS has assigned to their establishment, they are asked to confirm or correct it. Establishments are sampled once every three years. Respondents receive an email or letter (depending on the information available) with the login information and a link to the data collection website. No paper or phone collection is offered to respondents; they must report online.

BLS Job Openings and Labor Turnover Survey

The Job Openings and Labor Turnover Survey (JOLTS) is a voluntary monthly BLS survey of 16,000 nonagricultural establishments. Letters are sent to respondents each month requesting their participation. The initial mailing includes a paper questionnaire to show respondents what type of information they'll be asked to provide (number of employees, job openings, hires, and separations), and gives them a place to record their monthly data to facilitate reporting. For the first six months, respondents provide information via the telephone (CATI). At that point, after learning the data elements and definitions, respondents are given the option to report via the web, fax, email, or mail. CATI is offered to respondents who are not willing or able to self-report. Respondents stay in the JOLTS survey for 24 months, typically using the same reporting mode for months seven through 24. The length of the JOLTS survey is dependent on the number of employee hires and separations occurring within a given company.

National Agricultural Statistics Service Web Data Collection

The National Agricultural Statistics Service (NASS) recently developed a new questionnaire development platform, *Survey Designer*. This platform allows methodologists to build web surveys that are dynamic and user friendly. Surveys built in the new platform will have interactive features such as skip logic, edit checks, and piping of currently reported data. Web surveys will also utilize responsive design to ensure respondents are provided a user friendly questionnaire no matter what device they are using. The 2017 Census of Agriculture was the first survey instrument created in this new system. All surveys conducted after August 2018 are required to be built in this new platform.

To access web surveys, respondents log in to NASS' Mobile Optimized Survey Tool (MOST) using the link and unique survey code found in the initial mailing. Upon logging in and updating their contact information, all surveys for which they have been sampled will be displayed in a list. Respondents then select the survey they wish to complete and are transferred to the Survey Designer platform to complete the survey.

NASS 2017 Census of Agriculture

The Census of Agriculture (COA) is a complete count of U.S. farms and ranches and the people who operate them. It is conducted once every five years and participation is mandatory. The COA questionnaire is lengthy (24-page paper form) and complex and collects information on land use, production practices, income and expenditures, and farm operator characteristics. An invitation letter and paper questionnaire are mailed to approximately 3 million known or potential farms and ranches. In the invitation letter, respondents are instructed to respond via a self-administered paper instrument or the web. Nonresponse follow-up is conducted using self-administered paper questionnaire, web, phone and in-person enumeration.

NASS 2018 June Crops Agricultural Production Survey

The Crops Agricultural Production Survey (APS) is a voluntary, quarterly sample survey. The survey provides estimates of crop acreage, yields and production, and quantities of grain and oilseeds stored on farms, though the data collected on those topics varies with the season. In March, farmers' planting intentions are collected. In June, the number of acres planted and acres expected for harvest are collected. Data on small grains acres harvested and produced are collected in September, while row crop and hay production data are collected in December. Information on grains or oilseeds stored on the farm are collected during all four quarters. The Crops APS survey is relatively short compared to the COA (9-page paper form). As with the COA, respondents are sent an invitation letter instructing them to respond via a self-administered paper instrument or the web. Nonresponse follow-up is conducted using self-administered paper questionnaire, web, phone and in-person enumeration.

National Center for Science and Engineering Statistics Data Collection Platforms

The National Center for Science and Engineering Statistics (NCSES) is a federal statistical agency within the National Science Foundation (NSF). As one of the smallest of the 13 principal federal statistical agencies, most of the surveys are conducted not by the agency itself, but by contractors to the agency. Each contractor has its own data collection system; as a result, surveys are not consistent in look and feel. Though each survey instrument has undergone usability testing, the amount of testing has varied by survey (and by survey contractor). Though some NCSES surveys have been optimized for collection from mobile devices, none of the agency's establishment surveys have undergone this process.

Regardless of platform, respondents are provided with the necessary information for logging in and creating an account. Some platforms allow for coordination among multiple individuals within an establishment. In these cases, the main contact is capable of giving limited or full access to others within their company or organization. For example, the main contact can delegate the completion of specific sections to User A, and other sections to User B.

NCSES Higher Education Research & Development Survey

The Higher Education R&D (HERD) Survey is the primary source of information on R&D expenditures at U.S. colleges and universities. The data collection agent is a privately-owned contractor. Conducted annually, it is a census of all institutions with at least $150,000 in R&D expenditures that have been accounted for separately in the fiscal year. Approximately 900 institutions are in HERD, and though the survey is voluntary, response rates in recent collections have consistently exceeded 95 percent.

Institutions receive one of two questionnaires: the Standard form (for institutions with at least $1 million in R&D expenditures), and the Short form (for institutions with less than $1 million in R&D expenditures). The HERD-Standard questionnaire asks respondents to report detailed R&D expenditures on a wide variety of topics such as funding source, field of research, type of research, funding from foreign sources, and data regarding clinical trials and medical schools. It also collects headcounts for R&D principal investigators and all other R&D personnel. The HERD-Short questionnaire is a much smaller data request. It asks respondents to provide details on R&D expenditures by funding source and by field of research, and asks a few other background questions.

When the survey is launched, respondents are sent an email that contains a link to the survey, and their institution's identification number. Since the population remains fairly stable over time, respondents can use their password from the prior survey cycle to log in or request a new one. Respondents can report via web or paper instrument; non-response follow-up is conducted via telephone and email.

Case Studies: Response by Mode

We thought it would be useful to include a high-level table that illustrates how our case studies vary in terms of response by mode (Table 1). Our presentation in Lisbon will provide additional details on the various devices used at several points in the response process.

Table 1. Response by Mode

| | Overall Response Rate | % Web | % Mail | % Interviewer (CAPI, CATI, etc.) | % Other |
|---|---|---|---|---|---|
| **BLS:ARS** | 79% | 100% | Not offered | Not offered | Not offered |
| **BLS: JOLTS** | 65% | 59% | Not offered | 34% | 5% (email) |
| **NASS: Census** | 65%* | 24% | 69% | 4% | 3% (email, fax, incoming call) |
| **NASS: APS** | 54% | 3% | 23% | 72% | 1% (email and fax) |
| **NCSES: HERD Short** | 96.5% | 100% | 0% | Not offered | 0% |
| **NCSES: HERD Standard** | 97.8% | 100% | 0% | Not offered | 0% |

*Interim response rate as of June 30. Data Collection ends July 31.

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# USE OF COMPUTING MOBILE DEVICES IN THE ECONOMIC CENSUSES FOR UPDATING THE MEXICAN STATISTICAL BUSINESS REGISTER AND GEOREFERENCING ESTABLISHMENTS

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## Background paper

Information obtained by Economic Censuses has several uses in public, private and social projects, since it is the only source in Mexico that presents, in high detail, the characteristics of the national economy, that is, it reports geographical data at different levels: country, state, municipality, locality, by basic geostatistical area, neighborhood, and even by sets of blocks; at sector level, it contains data of all the economic activities (except agricultural) in the country (around a thousand different activities), and thematically publishes around 1300 variables on economic units surveyed.

One of its most relevant uses is the updating of the Mexican Statistics Business Register, as well as the National Business Directory derived from it, the National Statistical Directory of Economic Units (DENUE, its acronym in Spanish). The DENUE is the most consulted product of INEGI (the National Institute of Statistics and Geography in Mexico), with more than 60 thousand accesses per month. It is a highly demanded product by users due to its characteristics:

- All businesses of the country are located there, uploaded in a GIS,
- Businesses are classified according to their economic activity, based on an international classification system,
- It contains data on every single business in the country concerning identification, location, contact, establishment's size, and the activity they carry out,
- Every business appears represented in the digital cartography, at the very precise place where it corresponds, identified by means of a dot. The dot appears in the block where it is located, but not only that, it is also in front of the corresponding block and closer to the corresponding place in that front.

With all these characteristics, the user is able to consult the exact subuniverse of his or her interest, by choosing the specific activities, specific sizes and/or the specific geographical zones he or she wishes to consult. And, since they are uploaded in a GIS, the user can both obtain the list and visualize them. That GIS also provides around 250 layers of information that help to complement the directory, such as layers of highways or railways, relief, bodies of water, population according to age range, handicapped population, households, among many others.

For making this possible, it is necessary to allocate each business with its "dot", and since data of Economic Censuses is the main source for updating the DENUE, during the collection of information the dot of each establishment is allocated (or updated).

This is done by taking a Mobile Computing Device (DCM its Spanish acronym) to the field, and using the digital cartography generated by INEGI. But the story of using a DCM it is not simple, and what comes next is a summary of such story.

**The beginning of the story… Economic Censuses 2004**

Economic Censuses are conducted every five years in Mexico, since 1930. 18 Economic Censuses have been carried out up to date, of which, only in the last three, the DCM has been used. Its utilization has had as a goal to provide the Economic Censuses with higher quality and efficiency, as well as higher timeliness for publishing results.

Experimentally, a DCM was first used in the census of 2004 for partially collecting data: 10% of the geographical areas were covered by means of a DCM. The DCM employed was a PDA (Personal Digital Assistant). That time, it was possible to compare the results obtained from data collected in paper versus data collected using a PDA, and improvements were observed in several aspects, mainly the fact that re-enquiries were done right at the moment of the interview since the system provided messages informing the interviewer if an incongruity had been found and that was immediately corrected or clarified with the respondent.

With this experiment, the project of the Mexican Economic Censuses became a pioneer in the use of Mobile Computing Devices for collecting census data. As of that project, other INEGI's censuses and surveys started to adopt the use of a DCM.

**Evolution of the use of the DCM**

Going back to 2004, the PDA had a very limited capacity that allowed to introduce only a few criteria for validation of the collected information, and it cartographically enabled to conduct only basic actions, such as selecting the block that each interviewer would cover, capturing the name of the roadways surrounding the block (not digitized then) and thus automatically allocate the block key and the name of the roadways to each census questionnaire, in a homogeneous way, for all establishments and dwellings in the block.

Even with the PDA limitations in capacity, **the objective of the experiment was achieved: to prove that the use of DCM was feasible and convenient for collecting census data.**

For 2009, once functioning was proven, the same PDA was used but now for all the data collection activities of the Economic Censuses and with a substantial improvement: the inclusion of the digitized cartography created by INEGI's own account. With this innovation, the interviewer was able to find his location in the field with the PDA and conduct the cartographic updating that was previously done on paper.

Probably the most important achievement of including the digital cartography inside the PDA was the possibility to allocate a dot for each establishment of the country in the cartography, representing its location. This way, user could have access to a product with the directory of all establishments in two perspectives: the list of establishments on one hand and their geographical representation on the other.

Geographic representation of an establishment required accuracy concerning being in the block where it is in reality and, once in the block, in the right front of street, and as close as possible from where it is exactly located in reality.

Before deciding to use digital cartography in the PDA for allocating the dot of each establishment, it was proven that this method provided better results than using a portable GPS: dot allocation using a portable GPS resulted in dots that were not necessarily located in the right block, but in front, or dots in the middle of the street, and it was uncertain if they corresponded to one block or the other. It also depended of not having high buildings that interfered with the adequate satellite signal transmission, or too many tress, among other problems.

Digitized cartography in the PDA, on the other hand, was self-sufficient for allocating the dot, since it contains all land features that allow the interviewer to have certainty about his or her location (line and key of the block, name of surrounding streets, median strips, parks, arbors, churches, schools, statues, position, among other features), and therefore allocating the dot with minimal error; it also has a development that does not allow to include a dot out of the digitized line that demarcates the block (in order for the dot not to be in the middle of the street, or in the middle of the block, for example).

All the above resulted in a high level of quality for geographical reference of establishments and dwellings, with a high confidence level about positioning of the dots in digitized cartography, much higher than the one that could have been obtained using a GPS.

This way, it was assured that dots were in the right block, in the right front of block, and in the right order in that front of block.

Additionally, using the PDA for the Economic Censuses 2009, allowed:

- That the interviewer visualized in the PDA the his or her whole corresponding responsibility area, therefore he or she did not need to have a map in paper
- To visualize the name of the streets that demarcated the block and, by clicking, selecting the name of the street where the establishment of interest was located (the name was already digitized)

- To conduct the cartographic updating directly in the digitized cartography,
- Allocating cartographic data to the questionnaires and counted dwellings, considering even the cartographic updates conducted, such as: name of roadway, block, neighborhood, zip code, locality, municipality, state,
- Registering the direction of the roadway.

The total of questionnaires was captured through this method (excepting Large Enterprises, that had the option to provide their answers to the questionnaires via internet), with huge success and with the aforementioned savings. Data quality did not discredit, on the contrary, the amount of required re-enquires decreased due to validating information at the very moment of the interview, although the number of validation was still small because of the limited capacity of the PDA.

For Economic Censuses 2014, with the development of new technologies, a new device for collecting information was used: a tablet-type device (which in reality was a subnotebook changeable to tablet) that added even more technological advancements.

INEGI aimed for higher working memory capacity, a bigger screen (although the DCM should have been light in weight) and characteristics for "heavy duty". The main technical characteristics of the DCM chosen in the Economic Censuses 2014 are:

- Central Processing Unit Intel Celeron 847 Dual Core with 2 Gb of RAM
- 1.72 kilograms of weight
- Battery with 6 hours of continuous operation
- Heavy duty physical characteristics (drop resistant case from a meter in height, portability, resistant to heat and weather humidity, discreet for avoiding temptations...)
- Power cord
- Light pen
- 11' touchscreen
- Windows 7

The characteristics of the DCM utilized in 2014 allowed improvements in capturing information, as well as in both data processing and transmission, that provided higher speed, agility, efficiency and quality when compared with the PDA from the previous censuses. Specifically, the characteristics of higher processing capacity and memory, and also a bigger screen size, enabled to incorporate the DENUE to the DCM, which allowed a follow up in field for each establishment included in the directory mentioned.

In this way, the tools added to the DCM were:

- Responsibility area for each interviewer
- Directory of economic units
- Questionnaires
- Digitized cartography
- Satellite images
- Catalogues of products
- Operative manuals
- Helping tools for the interviewer such as the possibility to open a touch keyboard; help regarding concepts in the questionnaire; calculator: option for backing-up transferring information, warning messages for the interviewer to verify the process being carried out
- Registration of advance of blocks and establishments
- Cartographic module system, operative routine, questionnaire's validation, economic classification, as well as data security's protocols for encrypted data, regulated by INEGI

With these benefits, the interviewer could locate, in a systematic and ordered way, the block he should walk by (inside the digital cartography), to obtain automatically geographic reference data such as state, municipality, locality, neighborhood, roadway, and allocate them to the questionnaire, also automatically.

Concerning the interview, the capturing system of the questionnaire enabled a set of filters according to the answers of the respondent, which helped the interview to be quickly and fluently developed, which avoided unnecessary or out of place inquires.

In regards to validation of economic information, the validation system was much more complete (due to higher memory capacity of the DCM), to review consistency and integrity of collected information. If inconsistency appeared or if information was missing, the screen of the DCM showed messages asking for some clarification right at the moment of the interview, which avoided future re-enquiries and annoyance for the respondent.

The operative control and advances were pretty detailed, both in geographical terms (from block up to national level) and per interviewer (head of field, zone, state or national). With this, a timely and accurate follow up to census data collection was given.

It was also possible to update the cartography from all the modifications found in the field (division, fusion, creation or elimination of blocks, changes in names and direction of roadways, openings and closings of roadways, etc.) in the digital cartography. In addition, all the lands with no establishments or dwellings were registered in the system and classified according to their use or what was found there.

All the above allowed georeferencing more than 5 million establishments that form the productive plant of the country, as well as almost 26 million of dwellings, and all the empty lands, during the Economic Censuses of 2014.

**Resulting implications of using DCM (complications and savings)**

Coming to this scenario had, of course, important considerations regarding the traditional way of collecting information in paper, that can be seen as disadvantages. The most important one is that the change from paper to DCM **implied to define and design, with a lot of time in advance, everything**: the questionnaire, validation criteria, operative strategy, logistics for collection, detailed planning, logistics of supervision and following up, training strategy, and all the systems. For example, when collecting in paper, the follow up systems can be finalized the very same day in which data collection starts, while in DCM, such systems should be developed along with the capturing system of the questionnaire, that is, highly in advance to the collection itself.

However, it clearly represents getting savings in the censuses projects, that have to do with a series of topics:

- Saving paper (and tress), and in printing questionnaires, as well as transporting them,
- Saving wages of persons that validate information in the field, since they would not be required,
- Saving wages of typists since they would not be needed,
- Saving wages of supervisors of capturing
- Savings in rents of spaces for capturing; and buying computers for that activity
- Savings in storing questionnaires for five years at least,
- Reducing the number of re visits for the interviewer, since re-inquiries can be done right at the moment of the interview, by using the validation criteria incorporated in the DCM,
- Among others.

When comparing all these savings against the cost that represents buying all the necessary DCMs, net savings are of 20%, not considering that the DCM bought are used later for many other projects during several years.

In addition to savings, and based on the census experiences described, there are other benefits that have to do more with the improvement of collecting processes and that result in higher data timeliness and quality. The following are highlighted:

- ✓ Homogeneity in the development of the interview
- ✓ Increasing speed and accuracy in obtaining and updating data
- ✓ Immediate transmission of information
- ✓ Higher timeliness for the treatment and subsequent publishment of information
- ✓ Facilitating control and following up of the data collection
- ✓ Facilitating staff training

**Conclusion**

The use of Computing Mobile Devices is wider each time, but using them in a census has been essential for saving resources and improving data quality, control of data collection, treatment of information, training, timeliness of results, as well as for generating new products such as the directory of establishments in the digitized cartography.

Changing from paper to DCM is a complex process but it worths it in all aspects regarding data collection of the significance of a census.

# The Migration of the Canadian Census of Agriculture to an Integrated Business Program Without Contact with Respondents

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**Abstract**

Since 1956, the Canadian Census of Agriculture (CEAG) has used a collection model based on the complete enumeration of farms and on data reported by respondents. However, this environment is rapidly changing.

Farms have become increasingly integrated and complex businesses. These businesses are best handled using Statistics Canada's business survey processing infrastructure, rather than the traditionally used social survey processes. Additionally, data requirements are becoming progressively more complex and include linkages beyond the primary production sector. Information from CEAG must be integrated with data from other sectors of the economy (e.g., the environment, food manufacturing, energy, transport, international trade and prices) to measure program efficiencies and to identify broad issues affecting one or more sectors.

The ability to complete the CEAG online has reduced the burden imposed on farm operators. Now, the increasing availability of administrative data and satellite imagery gives Statistics Canada the opportunity to eliminate all or almost all contact with agricultural producers by 2026. This would significantly reduce collection costs and preserve the level of detail and quality of information required by stakeholders. This modern approach is being implemented as a response to changes in agricultural businesses and stakeholders.

The new model will be implemented by combining remote-sensing and geospatial information, data from approximately 300 available administrative sources, data from other harmonized business surveys, and data from the introduction of models. Other non-traditional alternative sources of information, such as web scraping or precision agriculture, will also be considered.

This new model will be deployed progressively with the 2021 CEAG. A proof of concept will be produced using the new model by predicting all the census variables (nearly 200 variables) for the whole population (close to 190,000 units). In addition, up to 10 questions will be replaced by alternative data in the 2021 CEAG, using an agile collection instrument that allows data to be "smartly replaced" when the alternative source is of sufficient quality. The objective is to reduce the response burden by 100,000 hours for the 2026 CEAG.

This paper describes the long-term strategy adopted by Statistics Canada's Agriculture Division to implement its vision—CEAG-0—with the ultimate goal of eliminating all or almost all contact with agricultural producers. It also discusses how administrative data will be used for the 2021 CEAG and the challenges the team is facing.

Keywords: Administrative data; alternative data; smart replacement; response burden.

1. Disclaimer: This paper is released to inform interested parties of research related to the Canadian Census of Agriculture and to encourage discussion. The views and opinions expressed by the author should not be construed as those held by Statistics Canada.

# 1 Introduction

Since 1956, the Canadian Census of Agriculture (CEAG) has used a collection model based on the complete enumeration of farms and on data reported by respondents. The ability to complete the census online has reduced the burden imposed on farm operators. Now, the increasing availability of administrative data and satellite imagery gives Statistics Canada the opportunity to eliminate all or almost all contact with agricultural producers by 2026 (i.e., the CEAG-0 project). This would significantly reduce collection costs and preserve the level of detail and quality of information required by stakeholders. This vision is in line with Statistics Canada's modernization agenda and the innovative approaches routinely applied by the agency.

The second section of this paper provides a general description of the CEAG and introduces how administrative data are being used in the Canadian agricultural program. It also identifies how a combination of remote-sensing and geospatial information, data from administrative sources, data from other harmonized business surveys, and data from the introduction of models will be used to derive the estimates of the 2021 CEAG. Section 3 presents an agile personalized collection instrument, while Section 4 shows some challenges and workarounds in implementing this project. Finally, Section 5 provides a brief conclusion, suggestions for future work and discussion questions for the panel.

# 2 The Canadian Census of Agriculture

## 2.1 Description

Agricultural data have been collected in Canada since 1666, and 2021 will mark the 23rd CEAG since Confederation.[2] The census paints a sweeping picture of the agricultural sector. It tracks changes in crops and livestock, as well as the evolution of farming practices and mechanization.

Statistics Canada has the legal obligation under the *Statistics Act* (R.S.C., 1985, c. S-19) to conduct the CEAG every five years. It provides a comprehensive picture of the agricultural sector at the national, provincial and subprovincial levels. The CEAG directly supports decision making and analysis at detailed geographical levels and is the only source of standard national information for small areas. It is used to support a number of important legislative requirements.

## 2.2 Use of alternative data sources in the Agriculture Statistics Program

Just like many programs at Statistics Canada, the Agriculture Statistics Program has been using an increasing amount of administrative data for statistical purposes over the last several years (Brackstone, 1987). Several factors contribute to the use of administrative data, including budget constraints, response burden reduction, an increased demand for estimates for small domains and more granular statistics, advances in technology that make processing large datasets more effective, and declining response rates. CEAG analysts use the administrative data for updates to the survey frame, data validation, edit and imputation, direct replacement of data, and estimation. Detailed information on revenues and expenditures in the 2016 CEAG content has been replaced in its entirety by data from the Agriculture Taxation Data Program (Hunsberger and O'Neill, 2016).

The Agriculture Division has long been one of the largest users of administrative data within Statistics Canada, with over 300 separate administrative datasets (both public and private data sources) among its holdings. A number of its programs are completely driven by administrative data. These data sources include sources from the Canada Revenue Agency (e.g., tax data) and supply-managed sectors (including dairy, chicken, eggs and turkey), where datasets include quota and production figures. Another data source is crop insurance agencies, which detail what crops have been planted and insured, as well as their yield at the field level.

2. Confederation: Canada became a country, the Dominion of Canada, in 1867.

The Agriculture Division also has a long history of employing satellite imagery in its programs, with the release of a crop condition assessment over two decades ago. This innovation has made Statistics Canada the first statistical agency to replace a survey by a satellite-imagery-driven model, with the replacement of the September Field Crop Reporting Series (Reichert et al., 2016).[3] These major datasets complement a range of diverse data obtained from administrative sources, including land valuations, grain marketing, goat-milking parlour registrations, honey bee permits, winery establishment grants and food processor data.

## 2.3 Alignment of concepts and definitions

As a first step, considerable efforts are being made to harmonize concepts and definitions within the Agriculture Statistics Program to facilitate the use of data between programs (validation and replacement). The Agriculture Statistics Program includes close to 40 surveys. Moreover, for the first time, the CEAG will be using Statistics Canada's business survey processing infrastructure, which will help harmonize methods, concepts and processes not only with the other agriculture surveys, but also with other economic statistics programs (nearly 200 surveys).

When the concepts or definitions from the CEAG are different than the ones from an alternative data source, one option is to work upstream in partnership with the data owner to see whether they can be harmonized. This improves the coherence and the relevance of the data, facilitates the file linkage, and reduces the cost. For example, there are many certifying bodies for organic food and farming in Canada, and the administrative data files they provide to Statistics Canada differ significantly (format, concepts, definition, coverage, quality, reporting period, etc.). The CEAG team is thinking about developing a collection and reporting tool in Microsoft Excel and providing it for free to the different certifying bodies. Another option is to change or modify the CEAG questions so that they better align with the administrative data sources.[4]

## 2.4 2021 Census (a hybrid approach)

The increasing availability of administrative data and satellite imagery provides Statistics Canada with the opportunity to eliminate all or almost all contact with agricultural producers by the 2026 CEAG. The objective is to reduce the response burden by 100,000 hours.

CEAG analysts are developing a new model that will be implemented by combining remote-sensing and geospatial information, administrative data, data from other harmonized business surveys, and data from the introduction of models. Other non-traditional alternative sources of information, such as web scraping or precision agriculture, will also be considered. This new model will be deployed progressively with the 2021 CEAG.[5] A proof of concept will be produced using the new model by predicting all the census variables (nearly 200 variables) for the whole population (close to 190,000 units). The CEAG concepts and definitions are being used as a framework for developing the CEAG-0 project.

3. Work is underway to replace the November Field Crop Reporting Series (produce estimates on harvested field crop areas, average yields and production) with alternative data sources and to develop a weekly yield model.

4. For example, the total number of employees receiving a wage or a salary reported in the 2016 CEAG might include employees that were not reported to the government (e.g., family members working unpaid hours). To better align the CEAG data with the administrative data, the question has been changed to ask about the total number of employees receiving a wage or salary as reported to the Canada Revenue Agency.

5. The key drivers in planning the 2021 CEAG are the following:

- reduce the agency's costs and the response burden put on agriculture operators while still maintaining a high-quality product
- maintain data coverage, relevance and quality
- reduce response burden by evaluating and adopting new data production and collection methods that go beyond the traditional survey approach by optimizing the use of existing functionalities in the electronic questionnaire
- further harmonize CEAG methods, concepts and processes with the economic statistics program to make analyzing and accessing integrated data easier for users, and to help them make informed, evidence-based decisions.

## 3 The new data collection strategy

### 3.1 An agile collection instrument—the inclusion of on-off switches in the collection instrument

Just like in 2016, the primary collection mode for the 2021 CEAG program will be the electronic questionnaire (EQ). Its functions will be maximized to reduce response burden by decreasing the time required to complete the questionnaire. The EQ will also improve data quality. For example, question flows will be optimized to limit the number of questions for respondents. This will be done by incorporating information coming from multiple sources (e.g., the Business Register) with an initial module in the EQ collection module regarding the type of activities (production) on the farm. This merger of information will ensure that only relevant questions are posed to the respondent. It is estimated that 70% of respondents will use the electronic collection mode, up 55% from the 2016 Census.[6] Paper questionnaires will be provided to respondents only upon request. Since some basic edits will be embedded in the EQ, fewer follow-ups with respondents are anticipated. This new collection instrument will be tested in May 2019, and adjustments will be made to the collection and follow-up systems thereafter.

When an alternative data source is of sufficient quality, the questions will be hidden using an agile collection instrument that allows data to be "smartly replaced."[7] The collection tool is built in such a way that the census team can choose whether a question will be asked directly to the respondent or whether an alternative data source will be used instead (i.e., the "on-off switches"). In essence, this would become a personalized EQ. Therefore, the number of questions to be answered will vary from one farm unit or respondent to another, and the final estimates for a specific variable might be the result of a hybrid of survey and administrative data. A shorter CEAG questionnaire will reduce the burden on respondents and should result in a lower number of incomplete questionnaires (partial response).

### 3.2 Smart replacement

To determine whether the quality of an alternative data source is good enough to potentially replace survey or census data, 2011 and 2016 CEAG estimates are being reproduced using these alternative data sources. A data confrontation exercise will then be performed at the micro and aggregate levels to measure the accuracy of these new sources. Any discrepancies will need to be explained (e.g., definition, concepts, reporting period and imputation), and, if they are deemed important and there is a business case, then a reconciliation process will take place. The challenge is to remove these differences from the microdata files or the calculation of the estimates.[8] Once the CEAG team has determined that the quality of an alternative data source is good enough and it can directly replace the survey or census data, the results are presented to the CEAG steering committee. The committee members either approve or reject the new approach. In the latter scenario, these estimates will still be used to either validate census data or impute in cases of non-response.

One of the biggest advantages is the fact that the model is personalized and works at the farm-unit level, question by question. The decision to use an administrative data source is made at this level. Therefore, the model is not restricted to administrative data files that have complete population coverage. The replacement model is flexible enough to allow the CEAG program to use the strengths of each data source.

Another advantage is that once the process to replace census data with alternative data has been established and approved, the estimation and validation processes can begin when the data are available. This will help to improve timeliness and disperse the analysis over a longer duration. Surprisingly, the approach developed using alternative data sources was found to sometimes provide better quality data. This is particularly the case when the concepts and definitions are not always understood by the respondents. The CEAG team also realized that the cost of

6. The option of completing the CEAG questionnaire online was first given in 2006. The Internet response rate was 5% at that time. It increased to 11% in 2011.
7. The working assumption is that up to 10 questions will be replaced in the 2021 CEAG by alternative data.
8. For example, the CEAG might directly use data coming from the "quota" files (e.g., dairy, chicken, eggs and turkey), but adjustments would be required to take into account the undercoverage.

producing the estimates for some variables is negligible once the approach is well established. Therefore, estimates for these variables could be released annually instead of every fifth year.

## 4 Challenges in moving forward with this new model

The biggest challenge CEAG-0 presents relates to the linkage of multiple data sources. In other words, how can CEAG-0 establish relationships between farm business units for which we have alternative data and farm business units to be surveyed from the Business Register (BR)? Luckily, the BR contains many variables that can be used to match records from different sources (business number, legal name, operating name, address, name of the farm operator, etc.). Most of the administrative data sources match relatively well, since they contain information about the same business unit or farm, but sometimes there are inconsistencies (false links or missed links). One of the advantages of the record linkage is that it increases the number of variables not found on the CEAG questionnaire, which help draw a more accurate picture of the agriculture industry and increase the relevance and usefulness of the census.[9] Note that Statistics Canada undertakes microdata linkages only in cases where the public good is clearly evident and outweighs the privacy intrusion. Moreover, the confidentiality of information relating to farm units used in microdata linkages is strictly maintained, and the results of the microdata linkage will not be used for purposes that can be detrimental to the farm units whose information is involved.

Administrative data have their own problems, since they are not necessarily collected for statistical purposes. Therefore, before administrative data can be used for the CEAG or any other surveys, they have to undergo a number of processing steps that transform them into data suitable for survey use or more appropriate for statistical use. Statistics Canada is working to develop strategies to overcome these shortcomings. For example, the Administrative Data Division (ADD) has been developing and maintaining databases of processed tax data and other databases of administrative data that have been used at Statistics Canada for more than 20 years. ADD is also helping the CEAG program to acquire administrative data by providing a corporate approach and common tools to rely on. Statistics Canada has also launched the Administrative Data Pre-Processing Project. The objective of this project is to create a corporate pre-processing service for administrative and alternative data with supporting solutions. This centralized corporate service will support all areas of Statistics Canada and will help reduce the need to create stand-alone solutions for a specific program. The project will implement the administrative data pre-processing framework with the ability to receive, capture, transform (format and standardize) and code (classify) administrative or alternative data records while consistently applying standard validation rules.

Last, but not least, the investment costs required to execute the CEAG-0 project are estimated at $“x” million. However, once completed, CEAG-0 could generate savings between $“y” million and $“z” million for each subsequent CEAG, producing a positive return on the investment of public funds.

## 5 Conclusion, future work and discussion questions for the group

A prudent approach has been adopted to implement the CEAG-0 to ensure that the quality of CEAG estimates are maintained. Efforts continue to be made to

- seek ways to maximize the use of administrative and alternative data sources to reduce response burden and ultimately reduce costs
- identify and evaluate the use of other potential administrative and alternative data sources from the public and private sectors
- develop partnerships with potential data providers
- enhance the processing and analysis of these sources to transform their data into data that are fit for survey or census use or more appropriate for statistical use

9. The CEAG links its information with the variables obtained from the Census of Population to produce a rich and detailed socioeconomic representation of the farm operators in the country at a detailed level of geography.

- improve the statistical methods that can be used to combine data from different sources (record linkage)
- harmonize the concepts and definitions from different data sources (i.e., improve data coherence)
- improve the overall quality of the CEAG estimates.

Here are a few discussion questions:

1. What are your experiences in the use of multi-source data? What are the main challenges that your organization has faced?
2. What are your experiences in measuring the quality of estimates from a hybrid of survey and administrative data sources?
3. What are your experiences and lessons learned in working with data providers or owners (e.g., building partnerships with them and collaborating in a mutually beneficial way)? Have you made any attempts to standardize and harmonize some concepts and definitions?

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# Integrating survey design and data quality management

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## Data quality issues in applied survey research

Survey research aims at producing error free and comparable data. However, the reality holds restrictions that hinder the realisation of this ideal. The comparability of data can be limited because different survey projects do not follow a coherent framework and variables that measure the same construct are operationalised in different ways. Other issues may result from changing measurement quality of items in case of repeated surveys, for instance due to changing connotation of words in a language. An effective data quality monitoring helps to recognise these issues and to implement proper countermeasures in future projects.

The implementation of data quality monitoring depends on the way projects are managed and how data quality monitoring is considered in the workflow. Often, survey projects are conducted autonomously with changing staff or contractors and the documentation of projects is likewise implemented individually by storing a jumble of information in different files and formats. This approach leads to various consequences, such as:

1. Survey designs and operationalisations of different studies are incoherent and thus limit the data comparability (as aforementioned).
2. From 1 it follows that knowledge accumulation is excluded, because every survey starts from the scratch.
3. From 2 it follows that process rationalisation is limited. In-house resources are repeatedly stressed, because all work has to be redone, such as operationalisation, conceptual work etc. Thus, also cost savings are exacerbated. For instance, reusing translated items could save translation costs.
4. Tracking data quality over different survey projects or in a longitudinal perspective is practically excluded. Even if we assume that an item is reused in the same way in different projects, it is hardly realistic that after some years the required data will be reanalysed considering the necessary research in the codebooks, questionnaires, files and folders.
5. It is hardly possible to link items, data and survey documentation or to add further information such as meta- or process data from fieldwork if everything is stored in software specific formats (such as word, pdf, statistical software files or excel files).

6. Replicability of results is likewise exacerbated if scripts of statistical analyses are not documented and stored in a coherent system but scattered over subfolders of individual expert's computers.

Altogether it turns out, that a documentation of single projects might enable analysing and retracing data quality in theory. Yet, practically data quality monitoring and accumulating knowledge in the organisation becomes increasingly difficult in practice with the number of surveys.

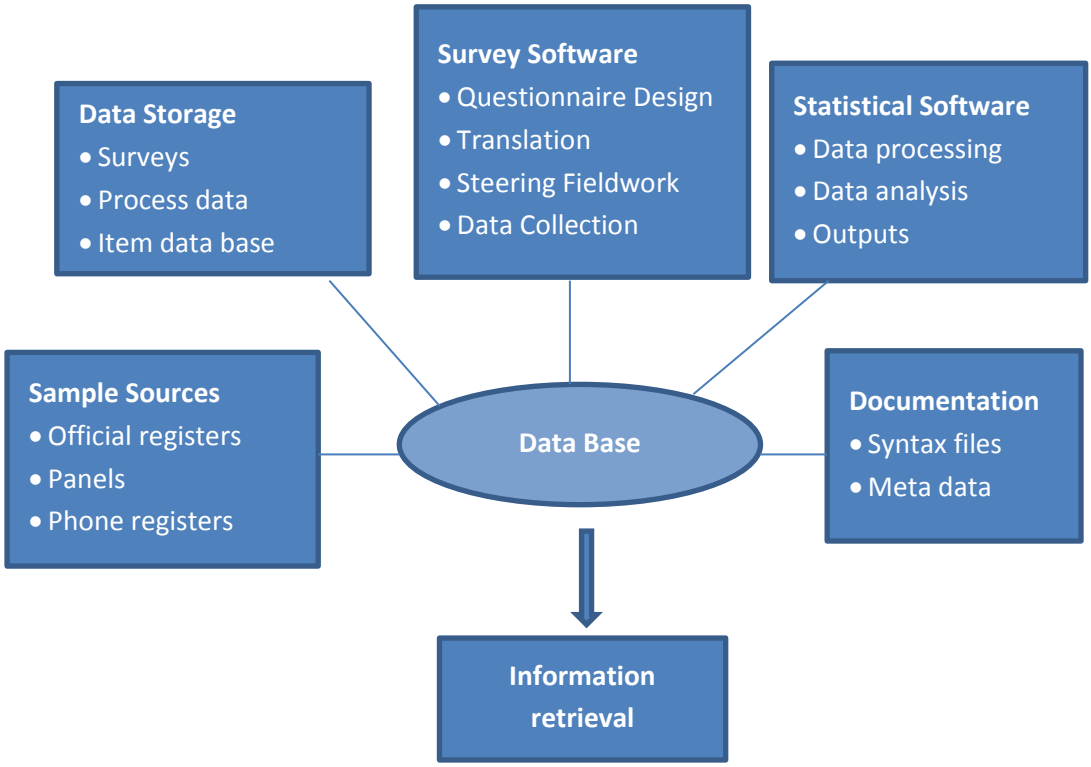
A solution to these problems could be a framework that integrates all work steps of a survey project in the current workflow.

## The solution

Such kind integration of workflows can be achieved with relational data base applications that allow adding, merging and storing the information in a defined data scheme. Once the information is stored, a data base only requires knowing the structure of the data schema to assemble the desired information. In case of recurring information requests this can even be automated with SQL scripts.

Likewise, a data base also allows integrating the outputs of different work steps by linking the respective data and applications. Data can be matched with meta-data, statistical software can connect to analyse survey data, surveys can be linked over time or levels and so on. These properties of data bases are particularly interesting when connecting it with survey software that allows questionnaire design (question wording, filters, loops etc.), sampling administration, fieldwork administration and reporting. Survey software offers its functionalities in user friendly frontend menus, yet, basically it is a data base in the backend. Thus, it is possible to integrate the survey software with a data base application, link it with any other information of interest and also import information from the data base into the survey software (such as stored items).

To sum up the following graph exemplifies the relations of information in the system:




## What's the benefit?

Any organisation has particular needs and therefore particular benefits of this integration approach may vary over organisations. Yet, some general gains can be identified:

**First**, the simplification of information integration basically provides the required infrastructure to setup an effective data quality monitoring.

**Second**, this procedure allows process rationalisation, saves resources and improves coherence of projects, because all information can be selected as needed for new projects repeatedly.

**Third**, such kind of system increases the independency and the control of the organisation over the workflow. In principle, the survey software allows to conduct a complete survey in most modes (CAPI, CATI, CAWI, PAPI). It is possible that a survey institute connects to the survey software, so that it can directly conduct the survey as programmed (see applied

examples in the links below[1][2]). In such a case, the data base system serves as a hub were contractors dock to only for the fieldwork. This allows establishing a standardized work flow in-house that remains identical no matter which external contractor is chosen.

The presentation will demonstrate with a practical example the implementation of this concept using *Limesurvey*[3] (see a demo[4]) as the survey software and *MariaDB*[5] as the relational data base application. Both applications are open source and allow the implementation for an organisation with any budget. Further, both applications provide the flexibility to tailor them to the particular needs of an organisation.

## Questions

What kind of problems might appear regarding the practical implementation?

[1] http://www.kai-arzheimer.com/cati-survey-cloud
[2] http://www.kai-arzheimer.com/cati-cloud-quexs/
[3] https://www.limesurvey.org/
[4] https://demo.limesurvey.org/index.php?r=admin/authentication/sa/login
[5] https://mariadb.org/

*Quality assurance for the 4th European Company Survey*

**Sophia MacGoris, European Foundation for the Improvement of Living and Working Conditions (Eurofound), Dublin, Ireland**

## *Introduction*

Eurofound has been running comparative cross-national EU-wide surveys since 1995.[1]. The surveys reflect Eurofound's commitment to answer to the needs of its tripartite[2] stakeholders with a remit to conduct European policy-oriented research in the fields of living and working conditions.

The European Company Survey (ECS)[3] is a questionnaire-based survey among a stratified, random sample of establishments in Europe. Traditionally, an overview report is produced, as well as secondary analyses focussing on themes of research and policy interest. The results of the ECS are published and disseminated widely.

The ECS has been carried out every four years since 2004 by the European Foundation for the Improvement of Living and Working Conditions (Eurofound)[4] which is based in Dublin. The next edition is being organised jointly, for the first time, with Eurofound's sister agency in Thessaloniki, the European Centre for the Development of Vocational Training (Cedefop)[5], and will go to the field in early 2019

Both Eurofound and Cedefop were established in 1975 as tripartite European agencies set up to produce comparative socio-economic research. While Eurofound focuses on living and working conditions and industrial relations, Cedefop focuses on vocational education and lifelong learning. Both agencies have between 90 and 100 staff and they each have a small representative office in Brussels.

## *4th European Company Survey*

The objectives of the ECS 2019[6] are to provide evidence relevant to the agencies' stakeholders and support policies for EU competitiveness and EU initiatives, e.g. the New Skills Agenda for Europe, the EU Industrial policy, the Digital Single Market Strategy, the social dialogue relaunch initiatives.

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[1] European Working Conditions Survey (EWCS) – started 1995, seventh edition 2020; European Quality of Life Survey (EQLS), started 2003, 4th edition 2016; European Company Survey (ECS) – started 2004, 4th edition 2019

[2] Where the Board is composed of representatives from national governments, employers and trade unions. It also includes representatives of the European Commission

[3] https://www.eurofound.europa.eu/surveys/european-company-surveys

[4] https://www.eurofound.europa.eu/

[5] http://www.cedefop.europa.eu/

[6] https://www.eurofound.europa.eu/surveys/european-company-surveys/ecs2019

It will build on the work done in the ECS 2013[7] and will look at workplace practices in terms of work organisation, human resources management, skills strategies, digitalisation, employee participation and social dialogue. This should allow for the identification of those bundles of workplace practices that work particularly well in creating win–win outcomes, linking these issues to business strategy and performance: situations where workers are facilitated and motivated to use their skills to the full, share their knowledge and insights with colleagues and management, and identify opportunities to improve both themselves and the work process as a whole, allowing establishments to thrive.

The target population are establishments with 10 or more employees in all economic sectors (except NACE Rev. 2 categories A, O, P, Q, T and U) in all the EU Member States and 4 Candidate countries (Macedonia, Montenegro, Serbia and Turkey). Within the establishment the survey targets the most senior manager in charge of personnel and, where present, an official employee representative.

In a change from previous editions, which were administered by telephone, the ECS 2019 will use a push-to-web approach and will be the first large-scale, cross-national survey to apply such a method. Nearly 28 000 establishments across 32 European countries will be contacted via telephone to identify a management respondent, and, where possible, an employee representative respondent after which respondents will be asked to fill out the survey questionnaire online. This approach reduces the burden on respondents and is expected to improve the quality of responses. It is intended that moving the questionnaire administration fully online shall make the ECS well and truly future-proof.

Key challenges for the ECS 2019

- Coverage error
- Quality of sampling frames
- Screening of companies to get to the establishment level
- Screening within establishments to identify employee representative
- Response rates and response bias
- Measurement error
- Quality of the respondent
- Quality of the survey infrastructure
- Respondent burden

Timeline

| | |
|---|---|
| January-February 2018 | Cognitive testing in the United Kingdom, France, Germany and Poland |
| January-July 2018 | Sampling strategy and sampling plans for all countries |
| March-July 2018 | Translation |
| February 2018 | Introductory seminar with national fieldwork partners |
| September-October 2018 | Pilot testing in all countries |
| December 2018 | Pre-fieldwork seminar with national fieldwork partners |
| February-May 2019 | Fieldwork (telephone recruitment and on-line completion) |
| August 2019 | Delivery of final datasets, syntaxes and reports |
| September 2020 | Publication of results |

[7] https://www.eurofound.europa.eu/surveys/european-company-surveys/european-company-survey-2013

***Quality assurance, transparency and quality control***

Considering its impact at EU, international and national levels, Eurofound has a strong commitment to quality assurance and improvement. It is important that data collected are sound, robust and of the highest quality and that information on data quality is made available to stakeholders and the research community.

For the preparation and implementation of the ECS 2019, information will be gathered to assess it against a **quality assurance framework** devised by Eurofound and based on the quality concept of the European Statistical System as developed by Eurostat,[8] as well as other quality frameworks such as the Cross-Cultural Survey Guidelines[9] and the Total Survey Error Approach.[10] This information will be published in a report along with an external quality assessment report which will document the quality of the ECS 2019. Detailed methodological information will also be made to the public.

Eurofound's quality framework has three elements:

- Quality assurance: procedures and activities to ensure that the survey meets quality requirements
- Quality control: all the things that we actually do to make sure that that a quality job is being carried out
- Quality indicators: list of indicators through which we can monitor the survey and assess the quality

With preparations for the ECS 2019 well advanced, the presentation will provide an overview of the current quality standards and quality assurance measures that Eurofound and Cedefop are applying to ensure their commitment to quality improvement. It will look at the different phases and tasks required to carry out such a large survey and cover such tasks as questionnaire development, translation, sampling, fieldwork monitoring and reporting.

*Sophia MacGoris will present the ECS 2019 with a focus on the approach to quality assurance and quality control. Feedback from participants on the presentation is encouraged.*

[8] http://ec.europa.eu/eurostat/documents/64157/4392716/ESS-QAF-V1-2final.pdf/bbf5970c-1adf-46c8-afc3-58ce177a0646

[9] http://ccsg.isr.umich.edu/index.php/chapters/survey-quality-chapter

[10] Cf. Herbert F. Weisberg (2005). *The Total Error Approach. A Guide to the New Science of Survey Research*. Chicago: Chicago University Press.

# Frame Error Impact on Structural Business Statistics Surveys

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**Background**

This paper treats some details of the first data analysis of the Structural Business Statistics (SBS) concerning the frame error non-response rates and post-stratification as well as the analysis made in order to check and edit data for KAS. The analysis is done on the 'raw' data with higher overview on the frame error, editing, post-stratification, non-response analysis and the short overview on some findings on estimated numbers of enterprises, entrepreneurs and employees in Kosovo.

## 1. Introduction

The SBS is based on the use of the Statistical Business Register (SBR) as the reference frame. It represents the population of interest for the sampling of units and for the grossing up of sampled data. Quality of statistics produced by each survey is then related to the quality of the SBR. The level of errors in the register and the errors in the sampled-based estimation are then correlated.

The accuracy of estimates depends on their variability and bias. Their magnitude determines the overall error.

This paper aims to identify and measure the impact of principal frame errors on the sample-based estimations using auxiliary administrative variables.

## 2. Auxiliary administrative information for turnover: the fiscal turnover

The use of administrative sources for statistical purposes continues to be one of the strategic purposes of any statistical institutes. But the possibility to substitute direct information with available administrative data is dependant, where the needed information exists, on their quality

*(data from Tax authority of Kosovo).* On a yearly basis, businesses that are liable for VAT are obliged to present the VAT declaration at the Tax Authority offices. In our country, according to the law, subjects that must present yearly VAT declaration are whoever carries out an economic activity (any form of enterprise.

The fiscal turnover figure is going to be used as quantitative variable only in the last years thanks to an improvement of coverage and timeliness from the fiscal administration. Comparisons lead to some inconsistencies due to different reasons, first of all the lack of quality in the BR administrative variable (mainly a certain amount of outliers and missing data). But correlation between fiscal turnover and SBS turnover is very high in fact what a business declares to fiscal authorities is the same it declares in a statistical questionnaire. For this reason, before considering the possibility to substitute fiscal turnover to the surveyed turnover, we analyse results using it as an auxiliary variable in estimation, *(Fiscal turnover is refering the same reference period as the SBS survey data refer).*

**3. The frame errors implications on sampled - based estimation**

It is known that the purpose of each survey is to produce estimate as accurate as possible of a given unknown parameter. Sampling and non-sampling errors determine the level of quality of sample-based estimates in fact they cause bias and a loss of efficiency. Among non-sampling errors non-responses and coverage problems in the frame of reference represent the main sources of error.

These two factors are correlated because some non-responses can be attributed to errors in the frame such as the impossibility to contact the unit included into the target population as well as incorrect information in the frame determines the necessity to delete some unit in the sample reducing its size.

Frame errors and their impact of the overall error have been classified according to the following types:

a) under - coverage - BR does not reflect businesses within scope for that survey. Reasons for under-coverage errors are well known: omission (lags and leakage), errors in the determination of the state of activity of units (falsely not active units), and mistakes in stratification variables (out of scope units when they are in scope). BR under-coverage generally affects estimations increasing bias;

b) over-coverage - BR considers in scope businesses that are not. Reasons for over-coverage are

the opposite of the under-coverage ones: duplication, errors in the determination of the state of activity of units (falsely active units), and mistakes in stratification variables (in of scope units when they are not in scope). Over-coverage generally affects estimations increasing their bias; moreover if a sampled unit is correctly identified as ceased, a reduction of the sample size determines an increase in the sampling error, *in these case we exclude those enterprise from frame*. A specific attention has to be given to errors due to incorrect information held by units correctly registered. Coding errors typically affect stratification, variables such as principal economic activity codes, size in terms of employment, location variables and demographic data, *In case of wrong activity code we contacted recalling businesses in order to ensure the right activity code*. With regards to errors in the BR location variables when a .nit is localised in a different place, *here is mentioned to address or location of surveyed business*. This unit, apart from the fact that it is ceased or active, is located in some other place however this result is treated as a non-response. *It's treated as nonresponse if this unit wasn't part of a sample.* The impact of this error is both on bias (a respondent unit will represent the missing one but it can significantly be different) and sampling variance (reduction of the sample size. For each contacted unit (a response, both in presence of a well filled questionnaire and a blank one) it is possible to obtain information about the correctness of frame variables. In this way some over-coverage problems or inaccurate information can be detected and can give an overall idea of their extent to the whole frame. Errors are classified and grouped together in order to measure their impact on estimations.

**4. Some findings regarding the SBS survey in KAS**

- *Sampling and survey coverage* - the general rule is to cover at least 80 percent of activity, notably 80 percent of turnover from business register. Several levels were chosen for stratification: (i) first stratification level - by activity by NACE four digits (small activities were sometimes combined in one group); (ii) second stratification level - by size (initially three strata of size class by activity), which in standard SBS is measured based on the number of employees in the unit, but in our case is measured by size of turnover; (iii) third stratification level was within 4 digit by size within the third class. For each stratum initial sample level is defined (mainly 80 percent coverage, plus targeted confidence interval (e.g., the expected rate of non-response).

Thus, we used stratified random sample techniques. The resulted sample size is 3151 enterprises.

The main data source for the Business register is Ministry of Trade and Industry and Tax Authority of Kosovo the information are updated in quarterly basis.

The sample of the survey was designed in 2 fazes:

- one part exhaustive for all enterprises with turnover more than 50 000 euros
- sample for the enterprises with the turnover less than 50000 euros, detailed for each activity at 2 digits level of NACE classification which have more 10 worker.

In 2014, the frame of the survey was 36880 units, from which have been taken for sample 3151, which represent 8.54 % of all active enterprises. It's very important to say that all these enterprises which have been selected for survey should have met the criteria for the sampling. The enterprises which have more than 50.000 turnovers are obliged to pay the VAT, and the rest are not obliged to pay the VAT.

***- Collection of data***

Procedures to collect the data have been organised in that way, where we have consider that is best way to collect data.

**- Analysis of data -** In the process to estimate data from the survey, an important step is the analysis of information from economical point of view.

During the analysis we found some illogical data as following:

- Expenditure were higher than turnover;
- Wages and salaries for instance in some cases 50 euro/employee
- Turnover per employee 1000 euro whereas wages per employee more than 1200 euros, in such way those figures didn't make any sense.

In such cases we have used comparative method within the same sector for different enterprises and Comparative method in different time for the same enterprises also.

***- Intersection analysis***

Example: 500 = purchasing; 400 = Turnover; 300 = salaries; 200 = number of employees

Tab.1

| Stat. Units | NACE code | Turnover | Purchasing | Salary | No. of employee | Ratio 4/5 | Av. Salary |
|---|---|---|---|---|---|---|---|
| A | 46 | 3,452,165 | 2,456,152 | 75,850 | 25 | 0.71 | 252.83 |
| B | 46 | 16,356,145 | 10,556,085 | 95,851 | 30 | 0.65 | 266.25 |
| C | 46 | 15,467,154 | 10,587,095 | 85,851 | 25 | 0.68 | 286.17 |
| D | 46 | 12,158,250 | 17,850,950 | 72,850 | 18 | 1.47 | 337.27 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| E | 46 | 8,956,985 | 6,857,599 | 10,500 | 15 | 0.77 | 58.33 |
| F | 46 | 589,950 | 256,355 | 158,500 | 27 | 0.43 | 489.20 |
| total | | 56,980,649 | 48,564,236 | 499,401 | 140 | 0.85 | 297.26 |
| *taken into account | | 44,822,399 | 30,713,286 | 340,901 | 98 | 0.69 | 289.88 |

Looking at this we have three cases with illogical data:

**Enterprise "D**" the cost of buying goods it's higher than Value of Sale or 17,850,950.0 > 12,158,250. In this case we have observed that cost of buying goods has been exaggerated. What we did? We used Average method within the section.

$$\overline{X} = \frac{\sum Xi}{\sum Yi} = \frac{448223991}{307132860} = 1.45$$

Xi = turnover

Yi = purchasing

Based on the result of formula the ratio of Purchasing to Turnover should be 0.69 and not 1.45, after that we corrected the value from 17,850,950.0 to 8,389,192.5 to prove 8,389,192.5/ 12,158,250 = 0.69*100 = 69%

*Notice: were from we got the number* 8,389,192.5 *0.69** 12,158,250 = 8,389,192.5 *euro*

After the adjusted data the table will look like this:

**5. Main outcomes of the survey**

The SBS provide information about:

- number of employees;
- turnover;
- value of purchases and detail of these purchases;
- value of the inventories at the beginning of the year and at the end of the year;
- value of the taxes paid by enterprises;
- value and details concerning the investment;

This information's is detailed by activities using NACE classification SBS survey as the other STS surveys, get samples from the BR frame. The unique BR identification code is used as key to randomly select units for the sample.

Using the coding system applied in the registration of survey data, each surveyed units is attributed a response code allowing to identify errors both in the surveyed data (in the questionnaire) and in the business frame.

1) respondent unit, questionnaires came back with correct information (full response);

2) total non-response, questionnaires never sent back;

3) data are not useful for estimation;

4) rejected, unknown, moved (blank questionnaires came back);

5) units are ceased, not active, in bankruptcy, etc..

Only errors type 4 and 5 can be associated to a lack of quality in the register. While errors type 5 can be due mainly to the delay in the BR updating process causing over-coverage in the target population that increases sampling errors. Type 4 are errors in the BR that concern identification variables, in particular, localisation variables.

These errors increase both the cost of the survey, the bias (probably the not reached unit is out of the scope for different reasons) and the sampling error (variance) in fact it is a non-response. Both types will be treated as frame errors to measure their impact on sample estimations.

**6. Conclusions**

The unsatisfactory sampling survey response rate together with the availability of a huge amount of data from administrative sources (balance sheets and tax data) has suggested some adjustments in the SBS production process.

The integration of the original SBS sample with administrative sources has allowed both to increase the response rate and to measure the discrepancies in the final estimation due to unit non-response. Based on that we consider that we have good result for estimation on level of the Country!

Finally we tried to present some techniques which we have used from the beginning of process to the end of this process (sample, collection of data, analysis and the result of the data derived from the SBS survey 2016.

A further analysis on the informative contents of tax data could permit to extend this experiment to other SBS variables. While for other SBS variables which cannot be obtained from administrative sources it will be necessary to develop specific statistical imputation methods. For that aim, it could be desirable that KAS should have an more active role in designing tax forms harmonizing concepts and adding some information useful for statistical purposes. Finally it needs to remark that the use of administrative sources for statistical purpose will imply the continuity and the stability over time of the data flow in order to guarantee the requirements of the Eurostat SBS regulation.

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*Thank you for Your attention!*

*P r i s h t i n a;  20.05.2018*


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**Evaluating Mode Sequence When Email is used as the Initial Contact in Establishment Surveys**

Background Paper

Josh Langeland – U.S. Bureau of Labor Statistics

## 1. Introduction

The U.S. Bureau of Labor Statistics (BLS) Occupational Employment Statistics program has traditionally invited businesses to their survey through postal mail. But in the current survey climate of rising data collection costs coupled with stagnant budgets and faltering response rates, there is interest in converting to paperless options. With hopes of reducing costs, increasing web reporting and shortening time to response, the BLS is conducting a series of experiments to test the effectiveness of using Email as a method to contact businesses. The first experiment in the series compared Email invitations to postal mail invitations in a production setting. The second experiment, and the topic of this presentation, was conducted outside of production in a more controlled environment. It examines the effects of different mode sequences for non-response follow-up when Email is used for the initial survey invitation.

Section 2 describes the motivation behind the experiments. Section 3 is a brief overview of the Occupational Employment Statistics survey in which the experiments were conducted. Section 4 reviews results from the first experiment and Section 5 describes the design of the second experiment. The presentation will disseminate the results of the second experiment.

## 2. Motivation

By replacing postal mail with Email to deliver survey invitations, there is a potential cost savings through the elimination of printing and postage expenses. The use of Email as a mode of invitation may further decrease survey costs by encouraging online reporting since respondents only receive a link to the online version of the questionnaire instead of a hard copy of the survey packet. When units report online their data is already available in electronic form which reduces the need for analysts to key in the data. Online questionnaires also have the desirable attribute of employing real time edit checks to respondent data which may reduce reporting error.

While there are many potential benefits of using Email as a mode of invitation, there are possible downsides as well. One such limitation is that Email addresses are rarely provided on survey data frames. Even if there is an Email address on the frame, it's possible it isn't the Email address of the person in the establishment that is able to complete the survey request, but rather someone else in the company. And while paper copies can be passed around the office until the appropriate person is found, forwarding Emails can quickly bury the original request. Another potential problem with Email is trust in the survey request. Many businesses have cyber security awareness training that educate their staff about Email phishing scams and malware that is spread through Email in attachments or clickable links. This may render a legitimate survey request as appearing malicious.

Time until response is also an important consideration when choosing a particular survey design. Units that take longer to respond are often sent reminder materials that increase survey costs. By using Email as a mode of invitation, the questionnaire and responses are transmitted instantly which eliminate the delivery time of postal mail; so we may expect Email invitations to reduce time until response. However, postal mail invitations have the added benefit of acting as a physical reminder of the survey request. That is, a piece of paper will stay on a respondent's desk until they respond or throw it away. A survey request sent by Email may quickly get buried in an inbox and ultimately forgotten, even by a well-intentioned respondent. So it may be the case that sampled establishments receiving an Emailed invitation respond at a slower pace even considering the instantaneous delivery time.

**3. The Survey**

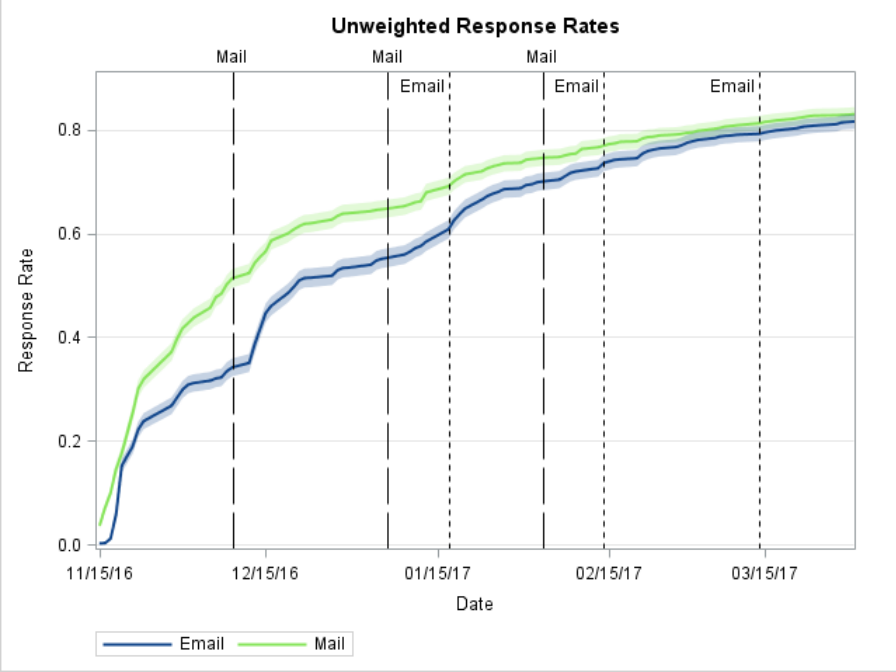
The experiments described in Sections 4 and 5 were conducted in the BLS Occupational Employment Statistics (OES) program. The OES produces employment and wage estimates for over 800 occupations. These are estimates of the number of jobs in certain occupations, and estimates of the wages paid to them. These estimates are available for the United States as a whole, for individual States, and for metropolitan statistical areas (MSAs), metropolitan divisions, and nonmetropolitan areas. The OES program is the only comprehensive source of regularly produced occupational employment and wage rate information for the U.S. economy. The OES program is conducted semiannually and surveys approximately 200,000 establishments every six months. Data collection is primarily through postal mail. See https://www.bls.gov/oes/ for more details.

## 4. Study 1 – Email vs Paper Mail Invitations

The first OES study the Bureau of Labor Statistics conducted to evaluate the use of Email as a mode of invitation in an establishment survey was implemented during the OES November 2016 data collection period. The purpose of the study was to evaluate the effects of using Email to invite respondents to the survey instead of the traditional postal mail invitations. All non-responding units in the experiment received the same follow-ups, both paper mail and Email. The outcomes of interest were response rates, time to response, mode of response and cost per response.

Figure 1 displays the unweighted response rates for the two groups across five months of data collection. The green and blue lines represent units that received the initial survey invitation via postal mail and Email respectively. We found the units that received the survey invitation by Email achieved an equivalent overall response rate to units receiving a paper mail invitation, however, they responded at a slower pace. Responding units in the Email group were much more likely to respond through the web instrument (74.3% vs 47.9%). Finally, assuming a fixed cost for each mailing and a processing fee for each response, the Email units achieved a 21% reduction in cost per response.

**Figure 1**



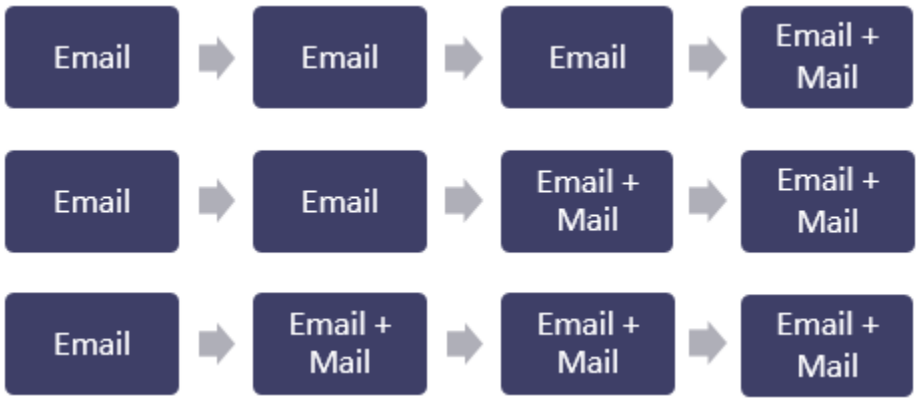
It is important to note that this experiment was conducted during production and after the first mailing to the non-responding units was sent, data collectors were allowed to contact units (through CATI or other means) to meet their production goals.

**5. Study 2 – Mode Sequence (current study)**

The previous study suggests that using Email as the initial mode of invitation is a promising alternative to postal mail. While the Email units responded at a slower pace, they achieved an equivalent overall response rate, were more likely to respond via the web instrument and were cheaper to collect per response. However, the previous experiment had the drawback of being conducted during production where data collectors may have introduced some confounding interventions in order to meet their production standards. This led to the design of a second experiment conducted outside of production which aimed to evaluate different sequences of modes for non-response follow-ups.

In the second study, business with Email addresses on the data frame were randomized into three groups. All units received the initial survey invitation by Email and the mode of contact for non-responding units varied by group with contacts taking place at one month intervals. Figure 2 shows the three treatment regimes.

**Figure 2**




The experiment was fielded in November, 2017 and data collection lasted five months. The outcomes of interest are again: response rates, time to response, mode of response, and cost per response. My presentation will disseminate the results.

Background Paper for the Fifth International Workshop on Business Data Collection Methodology – Lisbon 2018 September:

# The Impact of Invitation Mode on Participation in an Online Establishment Survey

Presented by

Joseph Sakshaug[1,2] and Basha Vicari[1]

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## Review of Literature

There is a sparse literature on the effects of contact mode on Web survey participation. Most of this literature is based on university populations and other Internet-savvy groups, which may not directly translate to establishment populations – we return to this point later. One of the earliest contact mode experiments in a Web survey was conducted by Birnholtz et al. (2004), who examined the effect of paper versus email invitations on a sample of engineering researchers. The invitations were sent along with a code to redeem a $5 Amazon.com voucher. Paper invitations were associated with a higher response rate than email invitations (40 percent vs. 32 percent), however, the difference was not statistically significant which the authors acknowledged could be due to small sample size. Kaplowitz et al. (2012) compared the performance of a postcard invitation to an email invitation in a Web survey of university faculty, students, and staff. Compared to the postcard invitation, the email invitation yielded a significantly higher response rate among students (22 percent vs. 19 percent) and faculty (40 percent vs. 33 percent), but no difference among staff (43 percent vs. 43 percent).

Bandilla, Couper, and Kaczmirek (2012) report the results of an invitation experiment in which respondents who previously took part in a face-to-face, general population survey in Germany were randomized to receive a paper or email invitation for a follow-up Web survey. The invitation mode was crossed with a prenotification letter and a single reminder was administered in the same mode as the invitation. Without the prenotification letter the paper invitation yielded a higher response rate than the email invitation (51 percent vs. 40 percent). However, with the prenotification letter the email invitation was associated with a higher response rate than the paper invitation (57 percent vs. 51 percent). Israel (2012) also examined the effect of crossing invitation mode with a prenotification letter in a Web survey of clients from the Florida Cooperative Extension Service. One group received a

prenotification letter followed by an email invitation and another group received the email invitation without prenotification followed by an email reminder. Although both groups received two contacts, the group with the prenotification letter had a higher response rate to the Web survey than the other group (24 percent vs. 18 percent). The effectiveness of using a prenotification letter (or postcard) to improve Web survey response rates is a common finding and consistent with the notion that prenotification letters make email invitations seem less unsolicited and less likely to be dismissed or considered as spam (Crawford et al. 2004; Kaplowitz, Hadlock, and Levine 2004; Porter and Whitcomb 2007; Harmon, Westin and Levin 2005; Dykema et al. 2011).

Building on the findings that prenotification letters are likely to improve response to a subsequent email invitation, one could posit that a paper invitation followed by an email reminder might have a similar effect. Dykema et al. (2012) examined this notion in a Web survey of university faculty. Faculty members were randomized to receive a paper or email invitation. Email reminders were sent to nonrespondents in both invitation groups. The paper invitation produced a slightly higher response rate than the email invitation before reminders were sent (13 percent vs. 9 percent), but the subsequent email reminder had a much larger effect on the paper invitation group, increasing the response rate to 27 percent compared to 12 percent in the email invitation group. In line with the prenotification literature, the authors attributed this result to the paper invitation which was "likely more successful at underscoring the legitimacy and importance of the study […] and likely served as a sort of advance letter that increased the likelihood sample members would notice and respond to the subsequent e-mailed requests to participate (p. 367)." However, this effect was not replicated by Millar and Dillman (2011). In a Web survey of university students, they compared the effectiveness of an email invitation with follow-up email contacts versus a paper invitation with follow-up email contacts (a strategy that they refer to as "email augmentation"). The difference in response rates between the paper (21.2 percent) and email (20.5 percent) invitation groups was not statistically significant.

**Knowledge Gaps and Research Questions**

The above literature review paints a mixed picture regarding the optimal choice of contact mode(s) for maximizing participation in Web surveys. Paper invitations are sometimes more effective than email invitations, and other times not. Similarly, the use of a paper invitation followed by an email reminder can improve response rates over an email-only contact strategy, but this is not a consistent finding. The mixed findings suggest that the effects of

contact modes are likely to be population-specific. Thus, it is questionable whether the findings reported from university populations and other Internet-sophisticated groups carry over to establishments.

Another reason why these findings may not translate to establishments is that they are based on populations for which postal and email addresses are known. Although postal addresses are usually known for establishments, an email address may be lacking for many. Even email addresses which have been provided by establishments through their participation in a previous survey – the situation considered in the present study – may be outdated because of turnover, name changes, or for other reasons. Different contact strategies may be considered for these situations. For example, in the case of an invalid email address, supplementary paper contacts can be used to deliver the survey invitation and any subsequent reminders. Establishments for which an email address is not available can be administered paper contacts from the outset or, alternatively, these establishments can be sent a prenotification letter with a request to provide an email address to receive an emailed invitation. It is unclear whether establishments are willing to comply with such a request, but even if not, the prenotification contact might increase the likelihood that establishments will notice and respond to a subsequent paper invitation and reminder versus a paper invitation and reminder strategy that does not include the additional prenotification contact. However, sending supplementary paper contacts and/or prenotification letters comes with additional costs to the survey organization. Whether these additional costs can be justified with a meaningful increase in the response rate is unknown.

Besides response rates and costs, it is also important to consider the effects of different contact mode strategies on nonresponse bias. In the household survey literature, response rates have been shown to be only weakly correlated with nonresponse bias (Groves 2006). That is, high response rates do not imply small nonresponse bias, just as low response rates do not imply large nonresponse bias. Rarely is it feasible to conduct a detailed examination of nonresponse bias due to the lack of relevant auxiliary information available for both respondents and nonrespondents. In the present study, we overcome this limitation by making use of detailed record information on the full sample of establishments.

Specifically, we address the following research questions:

(1) Do paper and email invitations differentially impact response rates to a Web survey of establishments?

(2) What combination of paper/email invitation and reminder contacts maximizes the response rate in a Web survey of establishments? Are supplementary paper contacts effective in eliciting response from establishments with invalid email addresses?

(3) Are establishments willing to provide an email address as part of a prenotification request letter? Does the strategy of requesting an email address via a prenotification letter, and sending a supplementary paper invitation and reminder to establishments that do not provide one, yield a higher response rate compared to simply sending a paper invitation and reminder without prenotification?

(4) To what extent do different paper/email contact strategies affect nonresponse bias and survey costs?

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# Leveraging Behavioural Insights to improve Construction Businesses' Survey Response

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## Background

### Behavioural Insights

Behavioural science provides a framework to understand what drives people's decisions: how and why people act the way they do in relation to themselves, others or a specific task. When applied to real world problems, behavioural science can help us predict how people will behave when "nudged" in a certain way in a specific context, thus endowing us with tools or "insights" to achieve behavioural change. In the public sphere, for instance, these insights have been used to get more people to register to be organ donors.

### Business surveys at Office for National Statistics (ONS)

Data collection for official business surveys is undertaken by ONS Business Data Operations Division (BDOD). Data are collected for over 80 surveys; the majority via paper questionnaires with an increasing number moving to electronic collection. Policy makers and other stakeholders across research agencies and the private sector use the resulting statistics (for example, GDP, distribution of income and services sector activity) to evaluate the status of the UK economy and monitor policy performance. Businesses also use these statistics to assess their own performance within the relevant sector. All these important activities require timely, accurate and comprehensive responses to these surveys.

### The Monthly Business Survey – Construction and Allied Trades

The Monthly Business Survey (MBS) – Construction and Allied Trades (to be referred to as "Construction Survey" from now on) collects information about the value of new work, repair and maintenance for both housing and non-housing projects carried out during the month, as well as quarterly information about employment [1]. Participation in the survey is mandatory.

The survey is relatively new to ONS and paper questionnaires are sent to business of all sizes, ranging from sole traders to large well-known building companies. The monthly survey sample is made of 8,000 construction businesses stratified by size (that is, number of employees) and industry type (for example, construction of domestic buildings, roofing activities) as follow:

- A random sample of approx. 6,000 businesses containing four size groups (0 to 4, 5 to 9, 10 to 19, 20 to 99 employees) and 14 industry type groups.
- A full enumeration of approx. 1,000 businesses with 100+ employees or turnover > £60m.

All businesses in the full enumeration are surveyed every month and they represent the "key respondents" to the survey (that is, the derived statistical estimates heavily depend on their data). The other businesses are surveyed every month for a period of either 27 or 15 months, depending on size. The allotted period is not constant for all businesses within each group (that is, the start and end date of the 15 months may vary across businesses). In addition, approximately 500 businesses join and leave the sample each month - with

[1] https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/monthlybusinesssurveyforconstructionandalliedtrades

these numbers being doubled every January. The January spike is due to the annual update of Inter-Departmental Business Register (IDBR) variables. See **Table 1** for a monthly survey sample example.

***Table 1*** *Survey sample size by size band for a case month (September 2017)*

| Size band | Universe (N) | Sample (n) | % Universe | % of tot.sample |
|---|---|---|---|---|
| "0-4" | 231,236 | 3,311 | 1.4% | 42.0% |
| "5-9" | 24,192 | 1,348 | 5.6% | 17.1% |
| "10-19" | 10,255 | 786 | 7.7% | 10.0% |
| "20-99" | 5,853 | 1,506 | 25.7% | 19.1% |
| "100+" | 855 | 855 | 100.0% | 10.8% |
| ">£60m" | 79 | 79 | 100.0% | 1.0% |
| **Grand Total** | **272470** | **7885** | 2.9% | 100.0% |

## The Problem

Many businesses do not respond to our business survey communications as we would ideally like: responses are typically late, and respondents complain that they are unable to provide the data. This leads to unnecessary administrative costs (up to £40,000 across all the business surveys) and increased respondent burden. After the "return by date" (RBD), which is communicated to respondents with their survey questionnaire, paper questionnaires are followed by paper reminders and then response chasing telephone calls to non-responders. These calls continue until agreed Service Level Agreement (SLA) targets are achieved (ONS's deadline to achieve these target is usually four weeks later than the RBD communicated to businesses). The volume of calls is monitored daily in the period running up to target date and resource levels (staff numbers) in our response chasing unit are distributed accordingly. Due to the ineffectiveness of these follow-ups, enforcement to return surveys may be necessary. We take sample sizes and the difficulty in achieving response into account when allocating resources and therefore in calculating survey costs.

In addition, across all business surveys, we receive 14,000 complaints and queries per year relating to our survey materials (letters, reminders). This causes additional expense such as follow up letters and calls.

When considering these factors, the Construction Survey is historically one of our most resource-intensive and expensive monthly surveys for response chasing (see **Figure 1** for an overview of historical response rates by RBD). This also raises quality issues for the Monthly Construction Statistical release as limited time is available for data quality checks and production of the estimates. For these reasons, the Construction Survey was identified as a good candidate for trialling some positive interventions.

There are several reasons why respondents in the Construction Survey might be late in providing their data or may not comply at all, despite mandatory participation. An analysis of the queries and complaints made by businesses to the survey enquiry line suggests four main possible obstacles:

a) The request is unclear and/or key information is not received in a timely manner (for example, "I have received a reminder but not an enrolment")
b) Perceived high cost associated with responding which ONS is not clearly recognising (for example, "I am receiving a lot of surveys")
c) Failure to understand/recognise the value of providing the information (for example, "What are my data used for?")
d) Perception that the ONS is not making full use of existing resources, and so it is wasting their time (for example, "Why not use administrative data?").

While this feedback is not the result of a direct investigation concerning the reasons why businesses delay their return of the survey[2], it strongly suggests that psychological and behavioural barriers may exist driving the slow compliance to the Construction Survey.

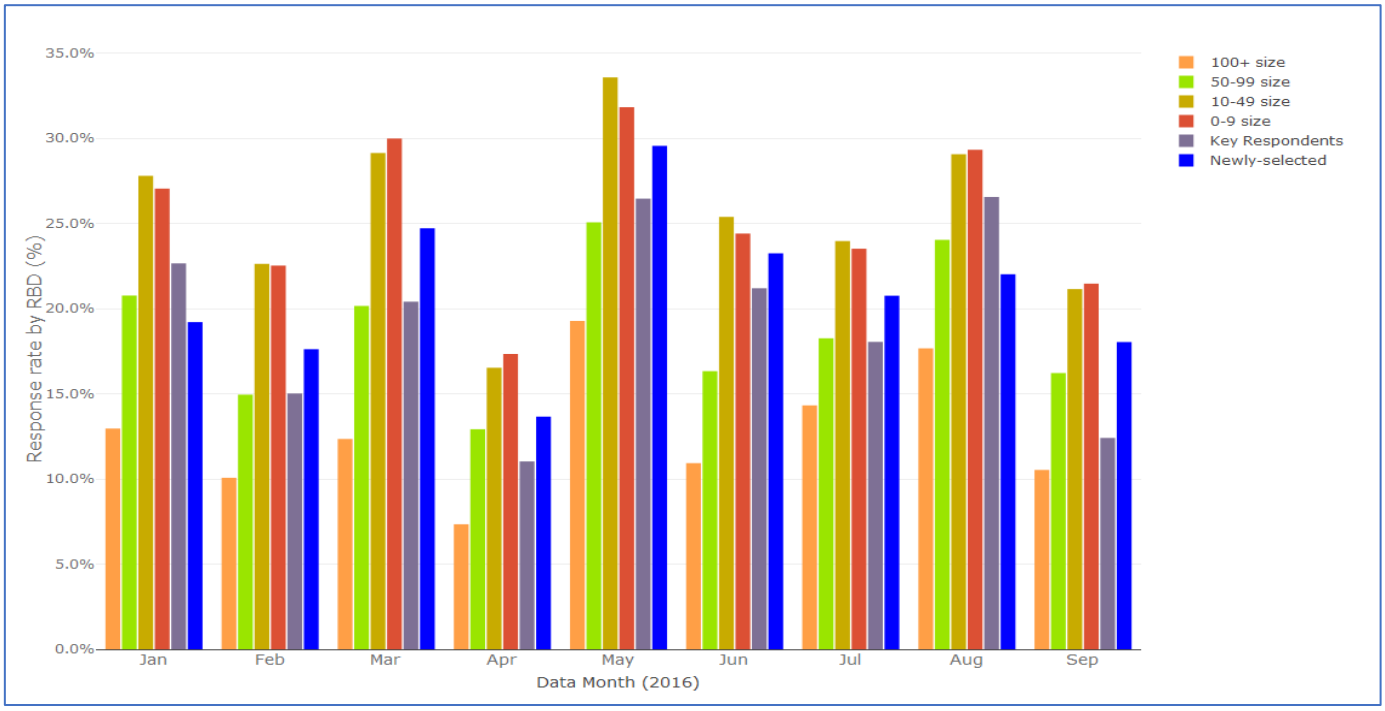


***Figure 1*** *Response rates by RBD for the months January-September 2016 for different groups of respondents. "Newly-selected" respondents refer to businesses that newly joined the survey sample in that month. "Size" refers to the number of business employees. The historical trend highlights the variability in response rate across respondent groups and survey months.*

## Project Aims

We set up a project to explore the use of insights drawn from behavioural science literature to design an intervention that could address the psychological and behavioural barriers to the Construction Survey compliance.

There were two aims to the project:

1) Leveraging behavioural science principles to increase the number of businesses that return the survey questionnaire by the specified deadline, thereby reducing resources spent response chasing.
2) To assess the feasibility of behavioural insights trials across business surveys, and gauge the benefits of behavioural insights interventions weighted against the operational and reputational risks.

To this purpose, we designed and ran a two-arm stratified randomized control trial (RCT) while conducting the Construction Survey in the months of April and May 2018. For the businesses in the experimental group, we redesigned the material to include several behavioural 'nudges' to help them understand the purpose and expectation of the letters, build their trust that the ONS values their input and respects their effort, and

[2] A qualitative investigation (that is, focus groups with the businesses and/or BDD staff handling queries, complaints and feedback) would have been required.

create a positive engagement loop. Businesses in the control group received the business-as-usual survey material.

## Challenges

### Challenge 1: Can we apply behavioural insights to businesses rather than individuals?

While the ONS has experience in testing the application of behavioural science principles to improve participation in surveys of household, this was the first time it had attempted to trial an intervention with businesses. Business surveys have very different features to social surveys that may affect the use of behavioural insights to change participation patterns:

1. We are **targeting organisations not individuals**:
    - Respondent must answer for the business, not for themselves
    - Questionnaire is usually mailed to the business (not a specific person)
    - Responding may require consulting records, and several people
    - Questions come with detailed instructions
2. Participation is **mandatory** not voluntary:
    - Less relevant to convince respondents about the importance to respond
3. The Construction survey is a multi-wave survey. **Long-standing respondents** may:
    - be 'biased' by prior survey experience
    - have developed reporting routines that may be hard to switch
    - be aware that the RBD is not a hard deadline and that ONS will prompt them in due time

### Challenge 2: operational constraints and risk perception

We faced a series of practical challenges when designing the trial and the behavioural science intervention.

4. **Risk aversion** from the statistical outputs' side due to concerns that the intervention may adversely affect the data, especially from key respondents, and consequently the derived estimates.
5. We **could not change** the format, content or structure of the survey questionnaire, nor the mode of the survey (paper-based).
6. No Randomised Control Trial or other experimental interventions had been tried within business operations before and so we had **little pre-knowledge of the operational and processing obstacles** that we might be facing at the difference stages of the survey cycle.

# FROM EXPERIMENTATION TO IMPLEMENTATION: PUTTING THE PIECES TOGETHER TO FORM A COHESIVE CONTACT STRATEGY FOR THE U.S. ECONOMIC CENSUS

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***NOTE**: Any views expressed are those of the authors and not necessarily those of the U.S. Census Bureau.*

## Backgrounder

The Economic Census, conducted by the U.S. Census Bureau every 5 years for reference years ending in '2' or '7', is a mandatory, self-administered survey collecting detailed financial data from approximately 4 million business establishments. Data are used by businesses, policymakers, local communities, and researchers for economic development, business decisions, and strategic planning, and provide key source data for the Gross Domestic Product (GDP) and other indicators of economic performance. In addition, economic census data form the foundation of the Census Bureau's Business Register, which supports numerous annual, quarterly, and monthly surveys that measure the U.S. economy.

Although response to the Economic Census is required by law, the Census Bureau employs an intensive contact strategy in order to maintain high response rates. This has traditionally included offering multiple self-administered data collection modes, in the form of paper or electronic questionnaires, tailored by industry, resulting in several hundred different questionnaire versions. Electronic modes consisted of a downloadable software facilitating spreadsheet reporting amongst the United States' largest companies with multiple, potentially thousands of, individual establishment locations. An internet-based instrument was also available, designed for and marketed to single unit establishments.

For the 2017 Economic Census, the Census Bureau undertook a major re-engineering and modernization effort. This includes implementation of 100% Web data collection, with limited options for alternative reporting arrangements offered incidentally only in U.S. territories affected by 2017 natural disasters. Although respondents' uptake of electronic reporting has generally been quite favorable among the Census Bureau's economic surveys, providing only online reporting for the 2017 Economic Census contributes an additional layer of risk to ensuring adequate response rates. Therefore, we conducted a multi-faceted research program, which included obtaining feedback from respondents via focus groups and cognitive testing, as well as randomized experiments testing different contact strategies. Results from these studies were combined with lessons learned from an assessment of historic economic survey response patterns, to aid development of an effective communication plan.

Since the Economic Census is an infrequent collection with heavy response burden, it was infeasible to conduct one or more census-like pilot tests to investigate alternatives, nor even to test a complete communication strategy from beginning to end. Instead, we tested one or more components by incorporating randomized experiments into the production collection of several annual or sub-annual surveys. These experiments tested options and approaches briefly described below, along with the surveys within which they were embedded.

***Variations in the type, timing, and/or sequence of contacts***

| Strategy | Survey | Target population / industry |
|---|---|---|
| Advance notice, mailed 30-90 days prior to delivery of questionnaires | 2012 Economic Census | Employer establishments in all industries except Agriculture and Public Sector. |
| Certified vs. non-certified mail during 2nd nonresponse follow-up | | |
| Certified mail during 2nd vs. 3rd nonresponse follow-up | | |
| Due date reminder (DDR) mailed 2-3 weeks before the due date | 2014 Quarterly Business Professional & Classification Survey – 2nd Qtr (aka SQ-Class) | Quarterly survey of businesses in the service sector industries with new or reactivated tax ID numbers (e.g., business "births"). |
| DDR mailed 2 weeks before due date | 2014 Annual Retail Trade Survey | Enterprises engaged in retail and accommodations (food service, hotels, etc.) industries. |
| Accelerated 1st nonresponse follow-up letter, mailed 2 weeks earlier than "normal" mailing schedule | | |
| Combination of DDR and Accelerated Follow-up | | |

***Optimal targeting of escalation techniques under adaptive design scenarios***

| Strategy | Survey | Target population / industry |
|---|---|---|
| Adaptive design strategies tested:<br>1) Targeted Allocation: Targeted selection of cases to receive certified follow-up with remainder receiving standard follow-up vs. 100% certified follow-up | 2015 Annual Survey of Manufactures (ASM) | SUs with employees, in manufacturing industries |
| 2) Subsampling: Probability subsampling to receive certified follow-up (with remainder receiving no further follow-up) vs. 100% certified follow-up | | |

***Envelope appearance and labeling***

| Strategy | Survey | Target population / industry |
|---|---|---|
| Using red ink vs. standard black ink in an imprinted due date/past due notice on the envelope. | 2014 Annual Wholesale Trade Survey | Enterprises in the wholesale trade sector. |
| Alternate envelope sizes: half-page-sized envelopes (9.5"x6") vs. standard letter-sized envelopes (9.5"x4"). | 2015 Annual Retail Trade Survey | Enterprises engaged in retail and accommodations (food service, hotels, etc.) industries. |
| Use of pressure-sealed envelopes vs. standard envelopes in:<br>1) DDR | 2016 SQ-Class 3rd Qtr | Quarterly survey of businesses in the service sector industries with new or reactivated tax ID numbers (e.g., business "births"). |
| 2) 1st NR follow-up reminder vs. 1st and 2nd NR follow-up reminders | 2016 Industry Classification Report | Businesses with poor classification data on the Business Register |
| 3) DDR vs. DDR and 1st NR follow-up reminder | 2016 Company Organization Survey / Annual Survey of Manufactures (COS/ASM) | • COS: Single-unit (SU) and multi-unit (MU) companies with employees, all industrial sectors (except Agriculture or Public Sector).<br>• ASM: SU and MU companies with employees, manufacturing industries.<br>• Establishment level reporting.<br>• Units may be in COS only or in both COS and ASM |

***Alternative motivational messages***

| Strategy | Survey | Target population / industry |
|---|---|---|
| Flyers inserted into initial and follow-up mailings that contained motivational messages providing information about:<br>1) Key uses and users of Services Annual Survey data products, including charts and summary statistics.<br>2) An "app" available on the Census Bureau's website to aid business decisions, demonstrating the broader mission of the Census Bureau to provide data products that rely on "the participation of businesses like yours in our surveys."<br>3) Electronic reporting, with illustrations showing the steps for accessing the online reporting system, and describing benefits to respondents of electronic reporting. | 2015 Services Annual Survey | Enterprises in the services sector. |

Experimental results indicated individual components to use or avoid, along with associated circumstances. Although tested separately, it was impractical to consider any of these techniques to stand alone. While this presentation will briefly describe the experimental results, its primary focus will demonstrate how these results, along with other empirical evidence of survey response patterns, were woven together – and subsequently adjusted due to practical constraints of time, resources, and scope – to form an evidence-based comprehensive, integrated, and cost-effective data collection strategy for the 2017 U.S. Economic Census.

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FIFTH INTERNATIONAL WORKSHOP ON
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# Background paper to
# A CONTINUOUS SEARCH TO IMPROVE TARGETED COMMUNICATION IN BUSINESS SURVEYS

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Targeted communication to different groups of stakeholders seems a promising technique for improving data collection and strengthening the image of Statistics Netherlands. In survey methodology this is also referred to as tailoring (Snijkers et al., 2013). By supplying the businesses with the right information, and by removing potential hurdles, we expect the businesses to provide us with better data, and, if possible, at a faster response pace. This may hold particularly for The Netherlands, were citizens are less law-abiding than in neighbouring countries.

If some progress can be made, what is the best way to act proactively to the needs of the businesses? What timing is the best? What technique is more effective, and what are the limits with respect to cost-efficiency? To gain a better understanding of the possibilities of targeted/tailored communication in business surveys, Statistics Netherlands conducted several pilots. For each pilot, a communication plan was made, and, according to the plan, communication products were prepared. To determine whether it is worth putting the products into production or not, the results of the pilots were monitored and evaluated. Important elements of these evaluations were: businesses' use and appreciation of the newly developed communication materials, the timing of the communication, whether the survey is mandatory, the effects on response rates, and, of course, the consideration of extra costs. Although data quality is an important element of a survey pilot evaluation as well, in these evaluations we only looked at the above-mentioned effects on perception, response rates and costs.

In the presentation the applied communication approaches for several surveys will be discussed in detail, showing the developed communication materials. These surveys and corresponding communication approaches are:

1. The recently become mandatory agricultural surveys (removing potential barriers)
2. The mandatory 2017 Survey on Research & Development (a reminder with additional information about the approaching enforcement procedure)
3. The non-mandatory Survey on Arts and Culture Education (a pre-due data reminder card)
4. The non-mandatory 2017 ICT-survey 2017 (several changes)
5. The non-mandatory 2018 ICT Survey (an incentive experiment and an experiment with a pre-due reminder card)

The main results will be discussed below.

*Key words: Communication, corporate image, response, design, timing, mandatory and non- mandatory surveys, pre-due date reminder, incentive, instruction video, reminder letters*

**1. Removing potential barriers for the recently become mandatory agricultural surveys**

In 2016, most of our agricultural surveys became mandatory, namely the Surveys on apple & pear Yields, Vegetables (outdoor crops), Pig Population, and Arable Farming. To meet the needs of the farmers and their representatives, the Dutch Agricultural and Horticultural Organisation (DAHO), we agreed that (1) we wouldn't enforce the new measures until 2018, and (2) to maintain a good customer relationship, we made several attractive communication products like instruction video's, factsheets, and pre-due reminder cards, to send along with the letters.

In 2018, we have postponed the enforcement of non-respondents for another year. In 2016, we designed the above-mentioned communication products, we applied them since that year. These additional communication actions were aimed at improving the image of Statistics Netherlands, and positively influencing the perception of the farmers. The obligation didn't result in much commotion on Facebook and Twitter. The number of calls to the Statistics Netherlands info desk was also relatively low, as was the number of emails.

In 2014 and 2015, response levels were about 50 percent; after implementing the obligation of the survey in the communication materials to farmers in 2016, response rates increased to around 75 percent: an increase of about 25%-points. To examine whether these communication products have affected the response rate levels positively, we did an additional experiment in 2017: for one non-mandatory survey (Consumption of Pastureland), we developed the same communication products as mentioned above. The results were disappointing: The response decreased from about 50 percent (in 2014-2016) to 39 percent in 2017.

From these results we may conclude that the higher response rate levels of our agricultural surveys are entirely affected by the obligation. Enquiries with the DAHO revealed that the farmers are focussed on the mandatory surveys. Because of the obligation of the four other surveys, the non-mandatory Survey on Consumption of Pastureland has a lower priority now. This implies that we should reconsider the obligation of this non-mandatory survey.

The additional annual costs coming with the extra communication materials are € 8.500,--, excluding hourly wages. Statistics Netherlands should reconsider whether the advantages outweigh the costs of this approach.

**2. A reminder with additional information about the approaching enforcement procedure**

In order to determine whether a prior warning about a planned enforcement process would increase response rates, we developed an information card about the upcoming enforcement procedure for the mandatory 2017 Survey on Research & Development. This warning card was enclosed with the reminder letter. Normally we sent this information to the businesses after the enforcement process is initiated.

Results were promising. Compared with earlier years, the response rate level was high in 2017. Before we started the enforcement procedure, we had an additional response rate of 6 percent. We presume the additional card is effective, but we need to repeat the pilot, because we used a new questionnaire as well, which may have interfered with the pilot. To obtain confirmation of the results, we will repeat this pilot with another questionnaire in the autumn of 2018.

### 3. A pre-due data reminder card for the non-mandatory Survey on Arts and Culture Education

The non-mandatory Survey on Arts and Culture Education has a very low response rate (34%, while the minimum targeted response rate is 50 percent). Therefore, we tried to improve our communication materials, particularly the pre-due date reminder. We designed an attractive pre-due date reminder card, tailored to the target group. To half of the group of educational institutes (randomly chosen) we sent the card, instead of the standard letter. The results were unexpected: the response rate of the experimental group was significantly lower than predicted. In total, 7,7 percent of the card-receiving group responded before the due date, while the response rate of the letter-receiving group was 10,7 %. At the end of the survey period the difference wasn't significant anymore, because of non-response follow-up interventions like a reminder letter, and expensive telephone reminding: The response rate of the pre-due date reminder-receiving businesses was 25,3 percent for the card-receiving group, and 27,0 percent for the letter-receiving group, respectively.
From these results we may conclude that for this low response-rate non-mandatory survey, a formal pre-due date reminder letter works significantly better than an attractive pre-due date reminder card. At this moment we do not have any information to explain this conclusion.

### 4. Several changes in the non-mandatory 2017 ICT-survey

The ICT Survey is the largest non-mandatory survey conducted by Statistics Netherlands. In 2017 some major changes were made, both regarding the questionnaire and in the communication strategy. The questionnaire was modernized, put on a new electronic platform, and the paper version was terminated. Due to complains in earlier years, the pre-due date reminder letter was written more friendly. Finally, because of the school holidays and the Easter holidays we changed the time line schedule of contacting businesses. The due date was curtailed (from more than eight weeks to six weeks), the pre-due date reminder was brought forward one week, and the two non-response follow-up reminder letters were sent two weeks earlier.

Because of all these changes, which were implemented at the same time, it is impossible to determine the effects of individual measures. But a closer examination of the cumulative response rate graph did provide some indications.

It seems that an earlier pre-due date reminder caused a faster response rate increase. Thirty days after sending the pre-due reminder letter, the response rates were around 28 percent, both in 2016 and in 2017. The earlier timing of the 2017 pre-due date reminder led to a faster increase of the response. Six weeks after the advance letter, and after the pre-due date reminder in 2017, we reached a response rate level of 43,9 percent in 2017, which is 12,7 %-points higher than in 2016 (31,2 percent). This result is also interesting when taking into account that the pre-due date reminder was sent to an equal percentage of businesses in both 2016 and 2017: costs were equal in both years. A more friendly pre-due date reminder has, in any case, no negative effect on the response-rate.

In 2017 the first and second reminders were sent too early. As a result, the differences in response rates faded away slowly. Eleven weeks after the advance letter (the day the second reminder letter was sent in 2017) the response-levels in both 2016 and 2017 were about equal: 60 percent. After 15 weeks, the response rate was 68 percent in 2016 and 65 percent in 2017. Making it necessary to spend extra money on a third reminder. Sending of the third due date reminder in 2017, increased the response-level to 68 percent, resulting in an equal response rate level in both years. From this we may, yet again, conclude

that any additional reminder will increase response rates. A clear disadvantage of the 2017-design are the extra costs, 11 percent extra letters plus 4000 letters for the third reminder letter.

**5. An incentive experiment and an experiment with a pre-due reminder card in the non-mandatory 2018 ICT Survey**

A Year later, in 2018, we examined whether response rates would increase if we would add a small incentive-folder with the main results of the 2017 Survey to the initial letter. Furthermore, we repeated the pre-due data reminder card experiment of the non-mandatory Survey on Arts and Culture Education, to ascertain the effect of the card on a non-mandatory survey with a much higher response rate.

First, we split up the group in large and small businesses. Then both groups were divided into six randomly chosen equal portions, namely: 1. folder & pre-due date reminder card, 2. folder & pre-due date reminder letter, 3. folder& no pre-due date reminder, 4. no folder & pre-due date reminder card, 5. no folder & pre-due date reminder letter, and 6. no folder & no pre-due date reminder letter.

This survey is still running, and analysis is in progress, but already it's possible to draw some conclusions. Adding an incentive folder with the main results to the advance letter, didn't increase response rates, neither for the small businesses, nor for the large businesses. Combination number 5 (no folder & pre-due date reminder letter) has the highest response rates. A pre-due date reminder letter did not result in significant higher response rates than a pre-due date reminder card. Sending a pre-due date reminder letter results in significant higher response rates than no pre-due date reminder at all.

**Discussion**

To achieve the required response rates for surveys conducted by Statistics Netherlands, several different communication measures and strategies were tested. Because of these pilots, more clarity is obtained about their effects, and the considerations of putting these individual products into production or not.

The results of the agricultural surveys show that as a survey gets a mandatory status, response rates will increase. With that in mind, a reminder with additional information about an up-coming enforcement procedure seems most promising regarding increasing response rates. We did not investigate the effect of a mandatory status on data quality. But one must bear in mind that businesses will focus on mandatory surveys, at the expense of the non-mandatory surveys: when we communicate a lot about the mandatory status of survey A, the response rates for a comparable non-mandatory survey B (to be completed by the same businesses) will decrease. Using tailored communication to improve a survey's image is valuable, provided that the benefits outweigh the costs as there are no effects on response rates.

Regarding a pre-due date reminder, we may conclude that this measure enhances response rates. But when a pre-due date reminder card is compared with a pre-due date reminder letter, a formal letter seems to be more effective in increasing the response rate than a specially designed card, although the differences are not always statistically significant. When designing the pre-due date letter for a non-mandatory survey, it is best not to be too strict; a more relaxed toned pre-due date reminder is

preferred, preventing people from getting annoyed, i.e. getting a feeling of being chased and pushed. Businesses still have time to respond.

The use of a non-tailored unconditional incentive does not work. In-depth personal interviews show that businesses prefer more detailed personalized information (Dillman et al., 2009, Snijkers and Jones, 2013).

A general conclusion from these pilot studies is that direct communication measures (like advance, pre-due date, and reminder letters) work best to get response; except for an information card about the upcoming enforcement procedure, additional and indirect communication materials (like folders, video clips, etc.) do not seem to have an effect. This means that it is important to have a well-designed and tailored communication strategy. This includes the timing of all measures: What's the best time to send an advance letter? How do you schedule the reminders? How many? What time intervals will ensure an optimum outcome? What else do you need to take into account? The ICT Survey study shows that for this survey an earlier pre-due date reminder letter (sent 5 ½ weeks after the initial letter) works quite well, but it's better to wait a bit longer with the non-response follow-up reminders (it's best to send them respectively 9 and 13 weeks after the initial letter). To determine the optimal timing for several mandatory and non-mandatory surveys on a yearly, quarterly and monthly base, more research is necessary.

**Discussion questions**

- What are your experiences with additional communication materials, like folders, video clips, etc? Do they have a (positive) effect on response rates? Do you use them to maintain a good customer relationship?
- What are your experiences regarding the effect of cards as compared to letters.

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FIFTH INTERNATIONAL WORKSHOP ON
BUSINESS DATA COLLECTION METHODOLOGY
19-21 SEPTEMBER 2018 – STATISTICS PORTUGAL, LISBON

# MOTIVATING RESPONDENTS IN BUSINESS SURVEYS

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**Organization: Statistics Portugal**

## Introduction

The quality and relevance of official statistics depends crucially on the accuracy and timeliness of data reported by the Providers of Statistical Information (companies, families, public and private institutions). One way to improve the quality of official statistics is to motivate respondents by enhancing the relevance of the data provided.

Regarding this concern Statistics Portugal started in 2017 a regular initiative based on a voluntary ad hoc survey, , to the companies that usually participate in business surveys. This initiative provided a picture of how the reporting obligation is seen by respondents. The survey was divided into four sets of issues: I - Characterization of the respondent; II - Level of effort and difficulties in data reporting III - Number of reporting obligations, and IV - Perception of the quality and usefulness of statistical information produced by Statistics Portugal (for society and for the company itself). The questionnaire has mainly qualitative questions with an ordinal scale reflecting greater or lesser severity of judgment.

This short questionnaire is appended to current online business surveys. Being logged into the data collection secure portal (WebInq) and after completing an online mandatory business survey, respondents are directed to a second voluntary block with these questions. Some 64,000 voluntary responses involving 68 surveys were received in 2017. It allows Statistics Portugal to start the measurement of Perceived Response Burden and the quality of the data reported, and obtained critical suggestions for the improvement of procedures in data collection.

In consequence and in order to enlarge the perceived utility of statistical information for the respondents, Statistics Portugal started a regular production of Personalized Feedback Reports. These reports are produced as a mix of individual statistical information and aggregate data, and the respondent see it as a payback for the data reply and is an important way of communication in order to have better and more collaborative data providers.

Likewise other countries, Portuguese business structure is composed by more than 95% of micro and small companies. This has a particular impact on sampling and consequently, around 85% of the surveyed companies have also micro or small size.

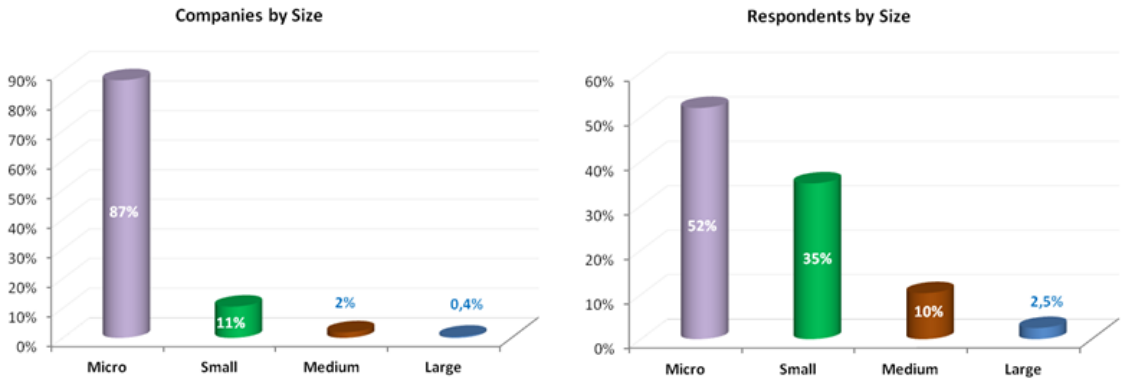


Figure 1

Contrary to what we expected the level of difficulty of reporting statistics information, is independent of the companies size, with almost of 50% of the companies considers that reporting statistical information is an “Easy” or a “Very easy” task.

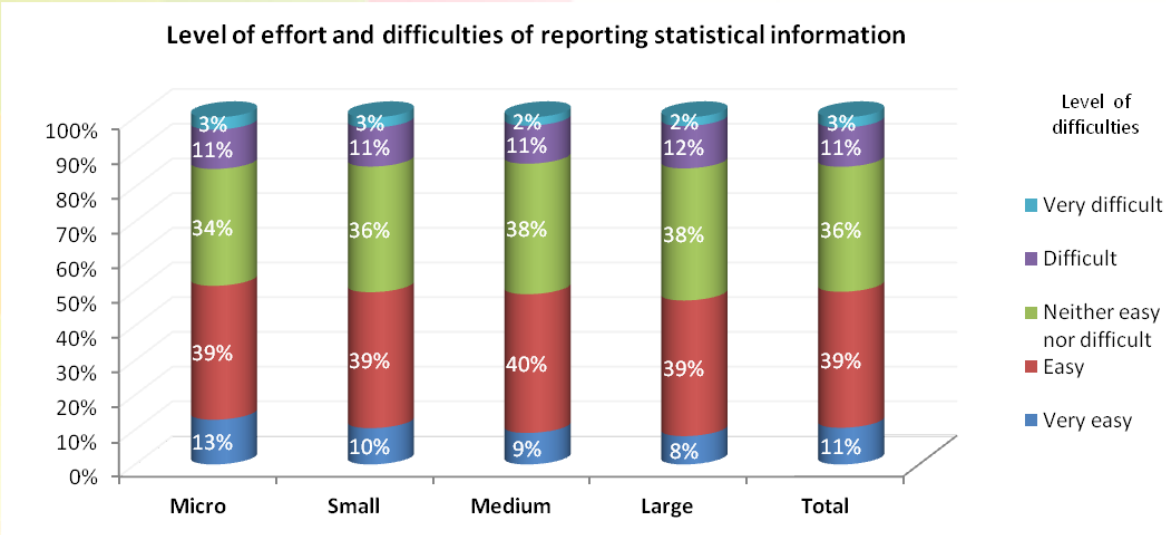


Figure 2

These figures could be explained by the Number of Surveys that each company has to report. As we can see in the next chart, 90% of the micro companies don’t have any statistical obligation and 8% have only one survey to report by year. On the other hand, all large

companies are involved in surveys, and 37% have the obligation to report more than 10 different surveys by year.

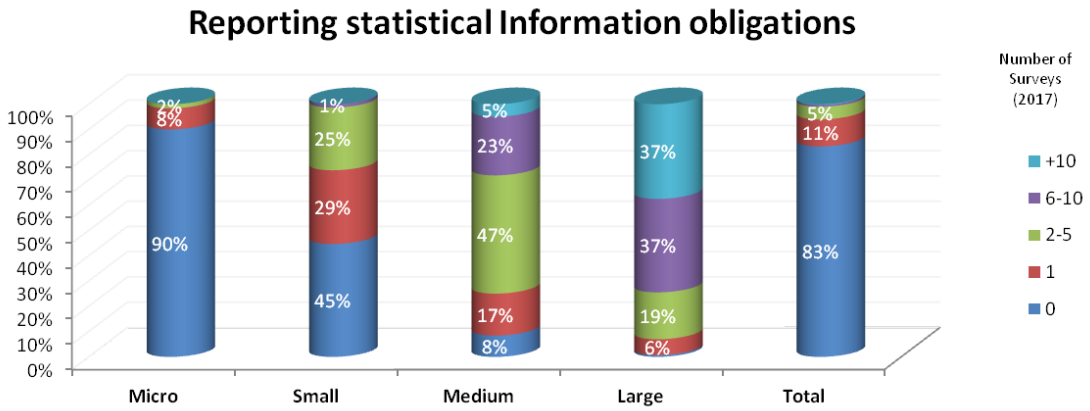


Figure 3

This ad hoc survey also allowed Statistics Portugal to obtain a picture of how the obligation to reporting statistics is viewed by the respondents. With the results was possible to have further information about the Perceived Response Burden. After the survey, one of the major results was the following: "Companies consider that the statistical information disseminated by Statistics Portugal has significant utility to the society, but they are more reluctant to admit their own interest on it." These results are presented in the figure indicated as followed.

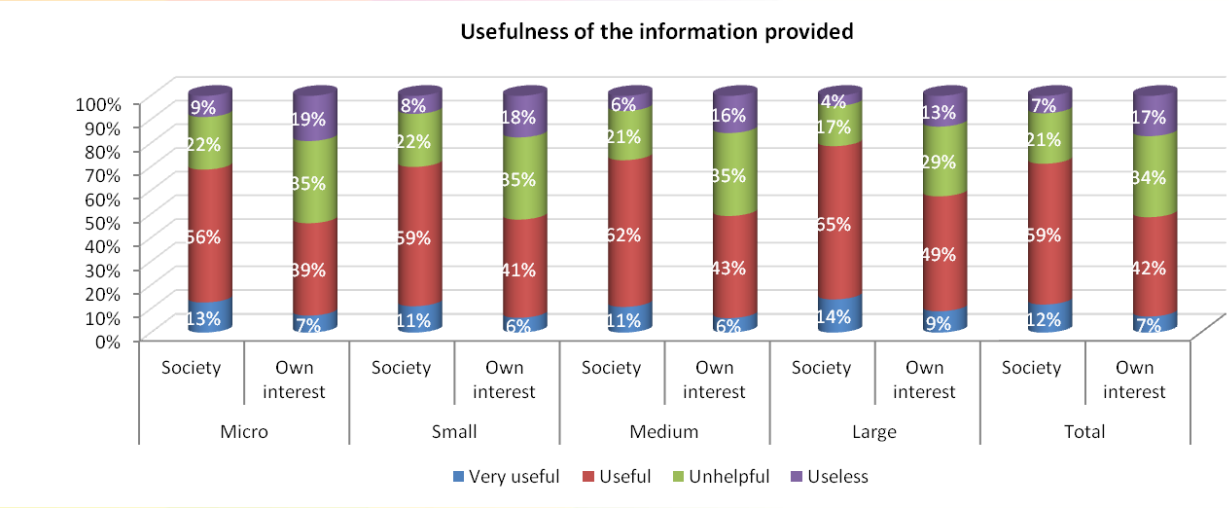


Figure 4

Another relevant aspect that comes from the ad hoc survey was obtained critical suggestions for the improvement of procedures in data collection, and also shows us the respondents' willingness to receive statistical personalized feedback reports.

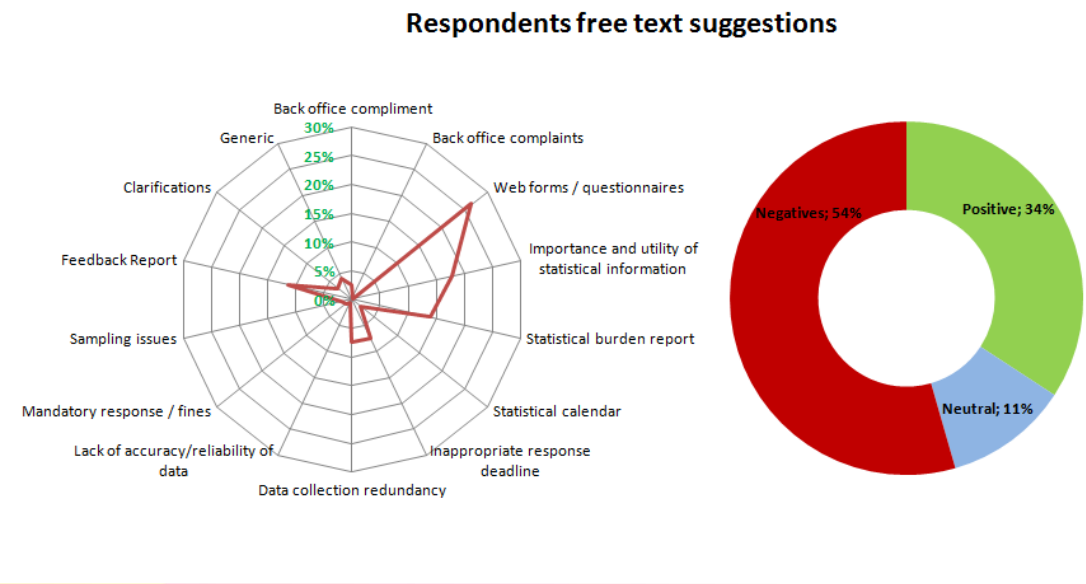


Figure 5

In order to deal with contradictory perceptions and also offering a sign of recognition for the effort of the information providers, Statistics Portugal reinforced the work begun in 2014 and developed more statistical personalized feedback reports, created the Annual Statistics Calendar, refreshed some Web forms and reviewed the Handbook of Principles and Practices for Business Surveys, simplifying reminders and letters and when possible adjusted the data collection schedule.

This feedback corresponds to the periodic provision of three types of reports:

- Customised Reports, which bring together, in a synthetic and targeted way by themes, the information collected - including indicators of the relative position of the company given the results of investigations in which it participates and other information of a specific nature, provided they do not compromise the principle of statistical confidentiality;
- National macroeconomic framework, quarterly updated;
- A link to the electronic brochure of economic activity more updated.

For confidentiality reasons, this feature is available to specific WebInq users with the proper authorization from the companies to access this kind of sensitive information.
After authentication by username and password, the respondent can access customized reports for all companies who have authorized his or her access to WebInq, as shown in the Figure 6.

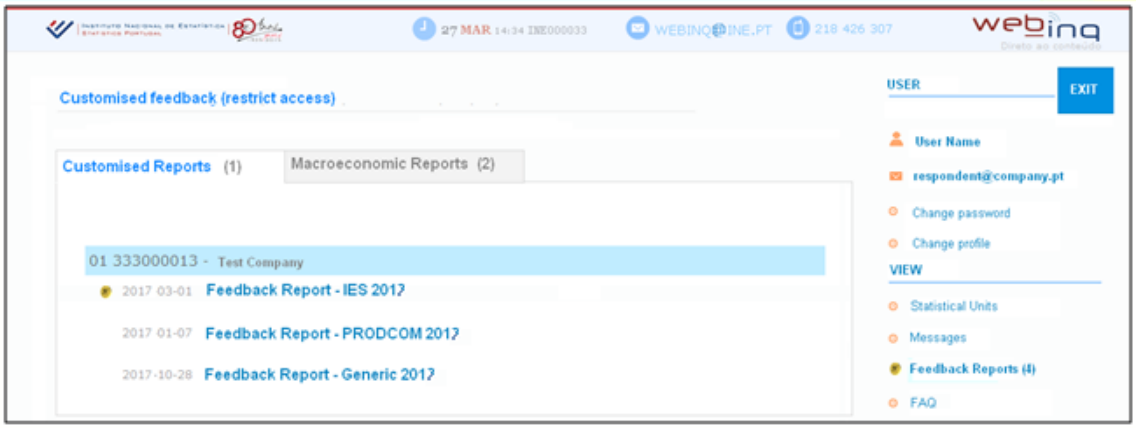


Figure 6: WebInq menu to access the customised feedback reports.

The reports have been designed in a very concise manner, using graphics and images, as in the example shown in Figure 7.

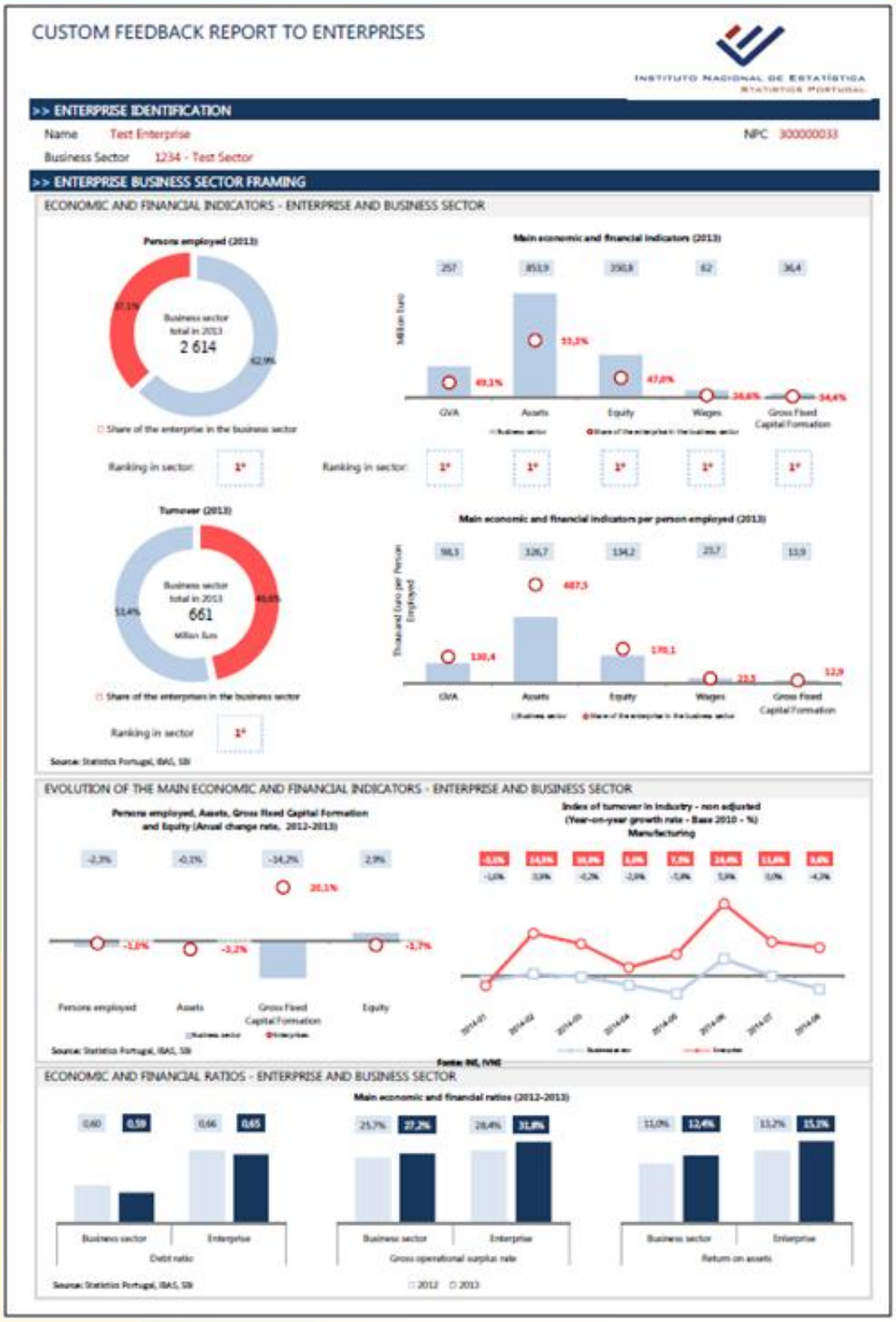


Figure 7: Example of a personalised report to a data provider (fictitious).

FIFTH INTERNATIONAL WORKSHOP ON
BUSINESS DATA COLLECTION METHODOLOGY
19-21 SEPTEMBER 2018 – STATISTICS PORTUGAL, LISBON

# CENTRALIZED INBOUND AND OUTBOUND CONTACT CENTER SERVICE AS NEW STRATEGY IN DATA COLLECTION[1]

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**Organization: Istat - Italian National Institute of Statistics**

## 1. Introduction

The Italian Statistical Institute (Istat) recently has re-designed its organisational structure characterized by the centralisation of all the support services, including - among others - the new Division for data collection implementation from direct surveys (DCI). One of the objectives of the new Division is the centralization and standardization of the communication strategy with respondents, by creating an only responsibility center in Data collection (DC), thus increasing the efficiency of the activities run, standardizing processes and functions activated, removing duplications and overlapping, restructuring DC processes, transferring specialist knowledge among sectors. In this context, an already existing service of INbound Contact Center (CC) has been enhanced and extended to all the types of units involved in the surveys (enterprises, institutions, individuals) and reorganized in the flows, whereas a new service of OUTbound has been settled, both working in an integrated process. Those services have been outsourced.

## 2. General technical aspects

The overall functioning of the infrastructure is based on the definition and implementation of the following technical aspects:

- information flow among the different actors involved (enterprises, CC operators, DCI personnel);
- functionality of the sharing tools for the INbound service called shared agenda,
- default contact card (procedure) for the OUTbound service,
- characteristics of the materials to be produced by thematic sector,
- FAQs to be provided to the CC operators aimed at ensuring the uniformity of the unit treatment by using a set of harmonised answers in both services,
- content of the training to be run each time a survey has to be launched,
- strategies for calendars implementation of the activities to be run.

[1] Contributors: G. Bellini paragraphs 1, 2 and 5; P. Bosso and S. Curatolo paragraph 3; F. Monetti and S. Binci paragraph 4.

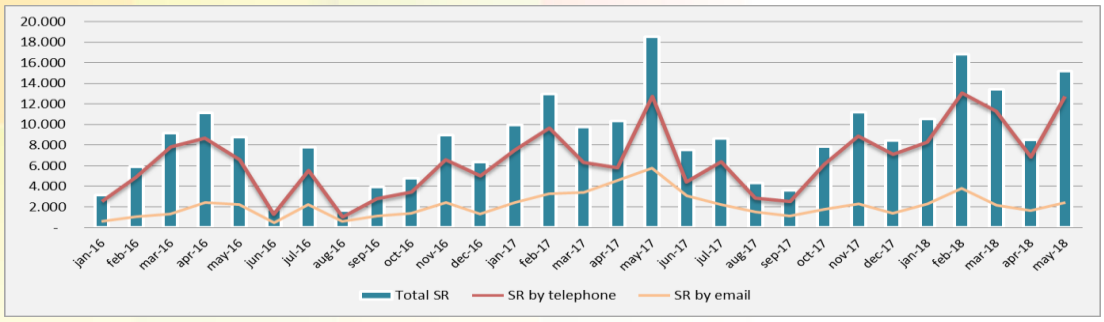
In order to start-up both services, a specific training to CC operators has been provided on main functions of acquisition systems available, that are the back office of Business statistical Portal for enterprises and single specific acquisition system for other kind of unit. In the following presented cases, CAWI is the acquisition technique adopted.

### 3. INbound Contact Center service

In more details, the INbound service provides assistance and support to responding units in the access and navigation of the acquisition systems (i.e. Business statistical Portal for enterprises), as well as on the general rules that define the statistical activity and on the legal obligations for respondents. Finally, it provides answers to the most recurring questions about major instances of the survey's content. The assistance is guaranteed by synchronous (toll free number) and asynchronous channels (dedicated email address). Three are the levels of assistance identified, with increasing levels of specialization and complexity: first and second-level of assistance are devoted to solve the most recurring problems generally managed by CC operators by FAQs, while the third one is for assistance on the cases with the highest degree of complexity that implies recurring both to DCI non-thematic and thematic experts. For requests that are not solvable directly by the CC a tool - the *shared agenda* - presenting features useful for managing and sharing the received instances is used.

From January 2016 to May 2018, the INbound assistance managed around 251,000 service requests for a total of 20,000 hours of activity (see trend by channel and month in Graph 1). Between the two possible contact channels, the telephone is by far the one preferred by users, representing 75 percent of the activated contacts, the remaining quota being done by email.

**Graph 1. Service request (SR) by channel and month – Period Jan2016-May2018**




Referring to level of assistance, 90 percent of contacts are solved by CC operators (first and second level assistance), whereas the remaining - more complex - are managed by Istat expert personnel (third level), either working in the DCI division or in the thematic sector.

Referring to service efficiency, the quota of telephone calls answered is 75 percent of the total income plus a further 3 percent of calls back, while the remaining are lost for abandonment by users, before assistance can be provided.

**4. OUTbound Contact Center service**

Two different levels of assistance can be provided by the OUTbound CC: i) the "core service", being the most widely adopted, and ii) the "additional service", so far only adopted in the Quarterly Business Survey on Job Vacancies and Hours Worked (VELA) in order to support transition from CATI to CAWI technique.

The "core service" is realized contacting by telephone the unit's referent that for enterprises is stored in the Business statistical Portal and indicated by the unit itself. This service also provides assistance on access to data acquisition systems.

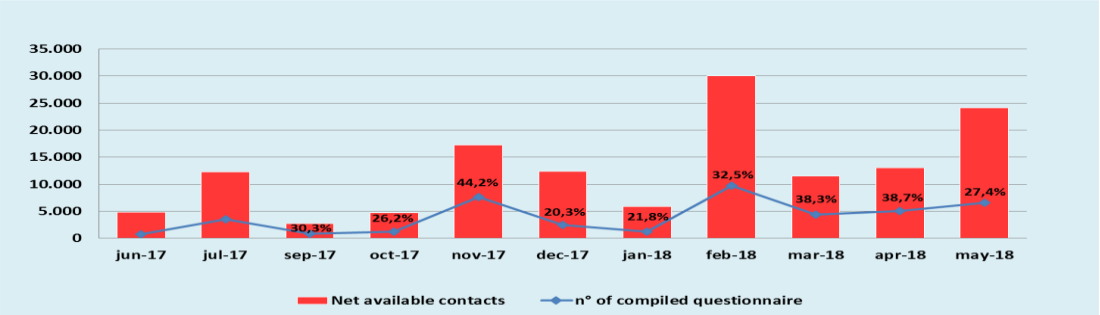
The "additional service" provided consist of: i) support in the compilation of the questionnaire and right interpretation of the questions; ii) realization of data entry in the on-line questionnaire, in case the contacted enterprise explicitly requests it; and iii) insertion of register changes, in the appropriate section of the Business statistical Portal.

In the case of the structural surveys, the contact is realized in a period of time before the closing of the survey only to the most relevant non-respondent units, while in the short-term surveys it is carried out for few days after the punctual deadline of the Data Collection and during the 'useful' period. The use of a customized contact form, based on the specificity of the survey, guarantees the uniformity of treatment of the units contacted. The amount of contacts attributed to each survey is related to two factors: sample number and response rates. The assignment takes place in a manner directly proportional to the first and inversely to the second. The list of contact units is provided by Istat, with daily updates. Where the information relating to referents is lacking or absent, it is supplemented by the CC company.

For the OUTbound service, from June 2017 till May 2018, the overall effectiveness (n. of compiled questionnaire over number of net available contacts) is calculated, and reaches 31 percent for the service as a whole; nevertheless splitting the values between structural (on enterprises or institutions) and short-term survey, it shows that is much higher in the first group (38) than in the second one (25).

In total, 43,580 contacts (of the 58,000 available per year by contract) have been invoiced, among these 59 percent was used for structural surveys recall, while the remaining for short-term surveys (see trend of OUTbound service and received questionnaires per month, Graph 2).

**Graph 2. OUTbound service and compiled questionnaire by month – Period Jun2017-May2018**




Data by survey are also analyzed referring to units subject to penalties or not and to the questionnaire arrival date.

Particularly, for VELA survey, significantly positive results emerged during the campaign moving from one quarter to the next one, as the activity run by the CC operators becomes more efficient (a relative higher number of contacts is established) and the percentage of returned questionnaires increases.

## 5. Preliminary conclusions and future developments

The centralization of CC services, jointly with other initiatives connected with Istat reorganization, allowed to maintain or increase both the response rate and data quality compared to the results obtained before the restructuring process, at the same time data collection length was maintained or reduced.

The challenges for the next future are: a) developing platforms for the acquisition of data from survey units belonging to different sectors; b) implementing the Integrated Survey management system; c) generalizing the service: increased integration between INbound and OUTbound services; d) rationalizing tendering procedures for the acquisition of the service: reduction of unit costs; e) correct dimensioning of the service in an evolving DC panorama**.**

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# Notifying and training procedure for respondents (enterprises, households) in Statistics Estonia

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**Statistics Estonia**

**Background paper**

The main task of Statistics Estonia is to provide reliable and objective information about Estonia. In order to do that, data are collected from enterprises, databases and individuals. If possible, data from state registers are used for statistics production. As the production of statistics requires also information which is not included in the registers, data need to be collected directly from enterprises and institutions as well.

In 2017, ~50% of questionnaires were submitted by the deadline and ~78 % were submitted by the end of the collection period.

A notifications and training procedure has been developed in Statistics Estonia to inform enterprises about what data to submit and when and how to do this.

Upon failure to submit data or submission of distorted data, the producer of official statistics has the right to issue a precept for elimination of the violation to the respondent. Upon failure to comply with the precept, the producer of official statistics may impose a penalty payment pursuant to the procedure provided for in the Substitutive Enforcement and Penalty Payment Act. A procedure for penalty payments has been developed for imposing penalty payments.

Since 2017, Statistics Estonia has imposed penalty payments on non-respondents of data of 7 statistical activities.

## Notifications – economic entities

For the submission of data, an electronic data submission environment eSTAT has been developed. eSTAT allows safe, quick and convenient submission of data collected for official statistical activities; in addition, the environment is used to notify data providers – to send various letters.

Data providers are notified of the obligation to submit data, about an approaching expired deadline. The letters are composed by the Data Processing and Registers Department in cooperation with the Marketing and Dissemination Department. The texts of the letters (in Estonian and English) are entered into the application's module for managing letters. In addition to e-mails, the application prepares paper letters files with the postal addresses of enterprises. For each letter sent to an economic entity, a contact record is created in eSTAT. Economic entities can view all their contact records as well as the content of each letter in eSTAT. Letters to data providers are sent either to the eSTAT main user, to executive manager of the enterprise / economic entity or, if their information is not available, to the general e-mail address of the enterprise.

Notifications about the data submission obligation are sent by eSTAT automatically.
The enterprises/households that do not have an e-mail address in eSTAT receive notifications by regular mail. All enterprises/households whose e-mail address has bounced back to

Statistics Estonia's e-mail (wrong or incorrect address) are automatically added to the list of those who receive paper notifications.

- 15 December – notification about obligations in the following calendar year

The notification letter includes the following information:

- The questionnaires which the enterprise must submit in the following year have been listed on Statistics Estonia's website under menu item "Obligation to submit data" and are visible to the enterprise after entering the registry code – questionnaires, periods, deadlines, important information about data submission
  (questionnaire pages have links to the information about the purpose of data collection, main users, information about where the data are used, published, etc.).
- For data submission, we recommend using the electronic data collection environment eSTAT. Links to information about joining and using eSTAT have been added.
- Information about Statistics Estonia's right to issue a precept to the respondent for elimination of the violation resulting from failure to submit data or submission of distorted data.
- A list of obligations has been added (questionnaires, periods).

A letter sent on the 12th of each month, which informs of being added to a survey sample during the year, includes the same information.

Other notifications are sent (until the upgrade of eSTAT) by Statistics Estonia's customer support (Data Processing and Registers Department).
After the application's upgrade, all dataset (data collection and processing) teams can start sending additional reminders and other notifications through the application.
We thank respondents for their cooperation:

- Upon ending data collection with a questionnaire, we inform respondents about the data sources which are going to be used for data collection in the future.
- When we send year-end greetings to enterprises who have submitted their data on time in the calendar year

We inform respondents before data collection:

- About the objective and importance of the statistical activity, reason for data collection, data users, etc. Letters are sent to all enterprises of a relevant questionnaire that have been added to the sample during the calendar year and/or have previously not submitted their data. We send inform-letters, for example, for questionnaires EKOMAR – Economic activity (year), Economic activity (quarter); Intrastat; Manufactured goods; Innovation Survey, etc.

In the notification letter, we also inform about the availability of more detailed information on Statistics Estonia's website: https://www.stat.ee/esms-metadata.

- eSTAT main users – notification at the beginning of the year about their data submission rights and obligations in the calendar year
- Information to new respondents about joining eSTAT – how to join, functions, their rights and obligations. We also inform about the availability of information on Statistics Estonia's website under menu item "Submit data" - https://www.stat.ee/en

- Economic entities submitting data outside eSTAT (paper, e-mail) – information letter referring to eSTAT, where we inform why it is safe, convenient and informative to submit data in the eSTAT application. We ask that in the future data be submitted in eSTAT.

Reminders are sent to enterprises that have not submitted their data to Statistics Estonia (partially completed questionnaires are regarded as questionnaires not submitted). The letters are sent automatically by eSTAT on specified dates – 5 days prior and 3, 7 and 20 days after the submission deadline. (Appendix 1)
In addition to the reminders sent from the eSTAT system, also separate reminders can be sent to economic entities:

- When necessary, to respondents of questionnaires with a longer collection period who have not submitted data by deadline
- In the case of INTRASTAT questionnaires not yet started – reminders are sent by client support on the 25th date each month about all the missing periods.

## Notifications – social surveys

All sample persons (households) of social surveys are sent a notification of being added to the survey:

- To an e-mail address if it is included in the sample information and if the survey methodology or client does not prescribe otherwise
- To a postal address if an e-mail address is not available

The lists of letters are prepared in the Survey Fieldwork Information System (VVIS). The records of sending letters are registered automatically in the system for each sample person / household. This is important information for both interviewers and customer support. Notification letters are also translated into Russian. The letters are e-mailed by Statistics Estonia's customer support. Notifications on paper are sent through the e-environment of Estonian Post Office.

The notification letters include:

- An overview of the survey, what is asked and who are surveyed
- An explanation about how the survey is conducted (methods)
- Time of participating in the survey (range of dates)
- An explanation about where to find additional information

In the case of the CAWI method, a website link is added which can be used to access the questionnaire. In addition, reminders are sent once a week during the fieldwork period. Letters of participating in the survey by using the CAWI method are sent only to persons whose e-mail address is available in the sample information.
In the case of the CATI method, information is added, that for better service and to ensure the quality of data, the phone call is recorded by Statistics Estonia.

In the case of the CAPI method, the interviewer's name and phone number are added so that the respondent could contact the interviewer to set up a suitable time for the interview.

## Training – economic entities

According to the Official Statistics Act, data submission is mandatory for economic activities and Statistics Estonia has the right to impose a penalty payment upon failure to submit data. Therefore, Statistics Estonia strives to make sure that it is easy and convenient for data providers to submit data. We wish to introduce to the managers, accountants, etc. of enterprises / economic entities the objectives of specific statistical activities for which the enterprises must

submit data, and instruct and consult them on using eSTAT, completing questionnaires and on the sources which are used to pre-fill the questionnaires.
Various training is offered to respondents throughout the year:

- Training about questionnaires
- Training about changes or adjustments in questionnaires
- Training to new data providers in samples about using the electronic channel eSTAT and completing questionnaires in eSTAT

Training can be carried out in Tallinn (the location of Statistics Estonia) and, depending on the availability of training rooms in other cities. Local municipalities can be consulted about the availability of rooms.

Who is invited to training?
We send training invitations to enterprises / economic entities:

- That did not submit data in the previous period
- That have been added to a sample in the current calendar year

Information on organised training, the training programmes and materials are available on Statistics Estonia's website under menu item "Submit data". Registration for training also takes place here. Enterprises that have not received an invitation can register for training as well. On our website, information on training is only in Estonian, as we provide training only in Estonian.

Training about questionnaires
When selecting questionnaires for training, we consider the following:

- Whether new questionnaires have been added or changes have been made in current questionnaires
- Whether the completion of a particular questionnaire is difficult for respondents
- The percentage of questionnaires submitted by deadline

About the questionnaires

- The purpose is to introduce:
  - The aims of statistical activities
  - Why the data of each and every enterprise are important
  - Data sources and opportunities for pre-filling questionnaires
  - Changes in questionnaires/classifications compared to the previous year (if there have been any)
  - Completing and submitting questionnaires
  - Frequently made mistakes when completing questionnaires
  - Finding and using data on Statistics Estonia's website http://andmebaas.stat.ee/?lang=en
  -

About the data submission application eSTAT

- The aim is to introduce:
  - The functionalities of the application in general
  - Creating users in eSTAT
  - Data submission options in eSTAT
  - Functional requirements for questionnaire completion
  - Loading, checking and confirming questionnaires

Training providers are – heads of statistical activities, customer support supervisor and leading statistician of the source database (collection and processing) team.

For every training session organised, we send participants a feedback form. The link to the feedback form is sent to the e-mail address that the participant provided during registration for training.

The form includes the following questions (questions may vary depending on questionnaire):

- Did the training session meet your needs?
- What is your assessment of the clarity of the information provided about the objectives and content of the questionnaire and about the use of the data collected?
- What is your assessment of the clarity of the information provided about… The question is formulated based on the content of the training session.
- What is your assessment of the organisation of the training session (availability of material, providing information, etc.)?
- What did you like / did not like about the training session?
- What training subjects of Statistics Estonia would be you interested in in the future?
- What are your suggestions concerning Statistics Estonia's future training sessions?

In addition, we send each enterprise that received a training invitation (irrespective of whether they participated in the training session or not) a link to the training materials, so that there would be an option to review the materials when necessary.
The summaries of feedback forms will be available to all training providers and the training organiser, so that training sessions to data providers could be made more informative and accessible.
This year, we started developing video tutorials. The first one is a tutorial for the eSTAT application. For building the videos, three tutorials for the application were recorded, which will be used for making short video clips on various topics. These will be added to the training materials on the website.
We have planned to develop similar video tutorials also for various questionnaires.

## Training – social surveys

In the case of social surveys, training is provided only to interviewers.

Training organised for interviewers:

- Basic training for new interviewers
- Surveys and questionnaires
- Training on interviewers' electronic application
- Motivational training

**Appendix 1**

**Reminders**

| Title | Time | Purpose | Addressee |
|---|---|---|---|
| Data submission deadline approaching | 5 days before the deadline | Notification about the **approaching** data submission deadline. **Suggestion and instructions** about submitting data electronically. | Respondent<br>If respondent is missing, the main user<br>If main user is missing, the manager<br>If manager is missing, enterprise's general e-mail address |
| Data submission in eSTAT **in progress** | 1 day before the deadline | Notification about the data submission deadline **on the following day**, while questionnaire completion is still **in progress**. Please complete and confirm the questionnaire by deadline. | The last to save the questionnaire – external or internal user |
| | | Data submission deadline | |
| Data submission in eSTAT **in progress**, deadline expired | 1 day before the first reminder | Notification about **expired deadline** and **half-completed questionnaire**. Please complete and confirm the questionnaire. | The last to save the questionnaire – external or internal user |
| Data not submitted to Statistics Estonia | 3 days after the deadline | Hereby we inform you that you have not submitted your data by deadline. Please submit the data immediately. We would like to remind you that data submission is mandatory according to the Official Statistics Act. | Main user and data provider<br>In the absence of main user, the manager<br>In the absence of both, enterprise's general e-mail address |

| | | | |
|---|---|---|---|
| Data submission in eSTAT in progress | 1 day before the second reminder | Reminder to the last person to save the questionnaire that the data submission deadline has expired, but questionnaire completion is still in progress. Please complete and confirm the questionnaire. | The last to save the questionnaire – external or internal user |
| **Title** | **Time** | **Purpose** | **Addressee** |
| Data not submitted to Statistics Estonia | 7 days after the deadline | Hereby we inform you that you have not submitted your data by deadline. Please submit the data immediately. We would like to remind you that data submission is mandatory according to the Official Statistics Act, and Statistics Estonia has the right to issue a precept-warning and impose a penalty payment. | Main user and manager<br>If main user and manager are the same person, only one letter is sent<br>In the absence of main user + manager, enterprise's general e-mail address |
| Precept-warning | According to the penalty payment process | Statistics Estonia obliges enterprises to submit the data collected with questionnaires.<br>A new deadline has been set.<br>If the addressee does not comply with the precept by the imposed deadline, or does not voluntarily make the penalty payment, the precept is forwarded to a bailiff for enforcement proceedings.<br>Voluntary payment of penalty fee does not exempt from the data submission obligation | Registered e-mail and registered regular mail to the enterprise's legal address |
| Unfulfilled obligation | 20 days after the deadline | Hereby we inform you that you have not submitted your data by deadline. Please submit the data immediately | Main user and manager<br>If main user and manager are the same person, only one letter is sent<br>In the absence of main user + manager, enterprise's general e-mail address |