



EUROPEAN COMMISSION
EUROSTAT



Handbook for Monitoring and Evaluating Business Survey Response Burdens



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Preface

This handbook is the result of a joint project between Statistics Norway, Statistics Sweden and the UK Office for National Statistics. It is a follow up of a previous project cooperation entitled 'Developing methods for assessing perceived response burden' (Hedling et. al, 2005), which was part of the Leadership Group (LEG) on Quality Implementation. The project has been partly funded by Eurostat.

In recent years increasing attention has been paid to response burden in statistical business surveys. There is increasing political concern about the costs of response burden to businesses in many different countries and methodologists are also concerned with response burden as a survey quality issue.

The aim of this handbook is to provide a tool for measuring perceived and actual response burden in business surveys that will help statistical organisations and other parties carry out their own response burden (PRB) surveys.

The handbook consists of six short chapters plus three appendixes, dealing with the measurement instrument, sampling, data collection modes, analysis and dissemination of results. It is our hope that other survey organisations will find it a helpful guide and tool to carry out their own PRB-surveys.

We would like to thank Anne-Kathrine Jernberg for drawing the PRB-questionnaire and Siri Boquist for designing the cover of the handbook. As this handbook would not have been possible without the previous mentioned LEG-project, we would also like to acknowledge the many people that were involved in that project: Yngve Bergstrøm, Elisabeth Gulløy, Nils Håvard Lund, Kristian Lønø, and Mari Sandelien of Statistics Norway; Dan Hedlin, Helena Bäckström, Ing-Mari Boynton, Leopold Granquist, Sara Hoff, and Helen Wahlström of Statistics Sweden; Sian Bourne, Catherine Davies, Geoff Hutchings, Steven Marsh, James Rushbrooke, and Amanda Wilmot of the UK Office for National Statistics; and Martin Karlberg, Statistics Sweden up to September 2003, now Eurostat.

Photo: Crestock

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1 Introduction

This publication is a handbook written for statistical organisations and other institutions that carry out business surveys. Its main topic is how to monitor and evaluate perceived response burden (PRB) among business survey respondents. In short, the handbook outlines how to organise, conduct and analysis a response burden survey. Hence, the chapters that follow this introduction are typically about the survey instrument, sampling and the survey procedure of a PRB study.

The procedure recommended builds on the set of questions developed during the LEG-project “Methods for Assessing perceived response burden” (Hedlin et. al, 2005). The questions developed during this project consist of a few core questions that are embedded in a small survey that also cover other response burden aspects and which collect information that can be used to explain why burden is high or low. In this publication we will:

Monitoring
vs
evaluating

1. Describe a procedure built on the core questions that can be followed in order to monitor how response burden changes over time.
2. Present a more analytical approach that aims to explain what causes response burdens, what effect these burdens have on the response quality and what could be done to reduce response burden.

What separates the monitoring and analytical approaches are the number of questions that need to be asked and the way the results are treated. The monitoring questionnaire is presented in chapter 2, along with examples of design for paper and web questionnaires. A model suited for analysis is presented in chapter 3.

1.1 Why and When to Conduct Response Burden Surveys

Increasing attention is paid to business burdens that follow from the information needs of central authorities, and hence also from statistical surveys and other data collection methods. Because the majority of the statistical surveys are sample surveys, the total burden that statistical organisations put on the country’s industry and commerce is marginal. For the businesses that are selected, however, statistical reporting obligations may still be felt as burdensome. The fact that other businesses escape the same obligations is hardly any consolation for those sampled.

There are three key reasons why statistical organisations would want to carry out response burden surveys:

1. To monitor perceived response burden over time.
2. To evaluate changes that have been made to the questions and/or questionnaire
3. To evaluate changes that have been planned or made in the mode of data collection

Monitor
changes
over time

In order to monitor perceived response burden over time, if there are no other changes to the survey, the core version of the PRB question set is recommended (see chapter 2). Statistical organisations normally conduct different types of business surveys. Some are panels which are recruited once and then followed for example, over a twelve month period to produce monthly statistics. Others are quarterly, and then there are surveys that are conducted annually or even with less duration and also ad hoc surveys. For monthly or quarterly surveys, an annual or every second year monitoring PRB survey, run at the same time each year, is recommended. If you wish to look at

seasonal comparisons you could either change the seasons over some years or carry out surveys that cover all seasons in one particular year. As long as no major changes are made, it is probably not necessary to monitor the perceived response burden of annual surveys each year. Every fifth year is most probably sufficient.

To
evaluate
changes

If considerable changes to a questionnaire have taken place, the longer, analytical version of the PRB question set is recommended (see chapter 3). A considerable change could be a mode switch, adding or removing several questions, changing several questions or redesigning the whole questionnaire. If the motivation to change the questionnaire is to improve it then you should conduct a PRB survey before, as well as after, the changes. This will enable you to measure the effect on perceived response burden.

1.2 A Quality Driven Approach

Quality
effects

Survey organisations should be sensitive to the burdens they put on businesses, and their concerns for how costly and time consuming this is for the businesses. From a statistical point of view, however, the most important reason why survey organisations should be concerned with the response burden is the fact that high response burden is likely to reduce response quality. A high response burden indicates that questions are difficult to answer, and consequently that many of the respondents may not be able to give correct answers. Difficult and burdensome questions may also de-motivate the respondent so that he or she is less willing to make a serious effort to correctly answer the questions. To quote the survey methodologist Mick Couper: "If you obviously did not put much time and effort into designing your survey, why should the respondent do so in answering your survey?"

of the
response
burden
perceived by
business re-
spondent(s)

This quality driven concern about response burden has at least three important implications for a response burden survey. First, it is not the perception of the business, but the perception of the respondent that is the most important. The owners or shareholders of a business may complain that answering survey questions is a non-profitable activity that burdens the business account. But as long as this does not affect the conditions and motivation of the respondent, it is not part of the quality concern that rules the response burden survey described in this publication. The burden felt by those who bear the economic responsibility is not irrelevant but is considered to be an explaining factor rather than what should be monitored and explained. The response burden survey described in this publication focuses on the business respondent.

and
explained
by survey
design
factors

It also becomes clear that, in this quality driven perspective, the traditional response burden indicator "time spent" may not be the best response burden indicator. Even if it is correct that time consuming questionnaires are generally burdensome to complete, it is not the time use itself but the *perception* of time and effort that is likely to affect response quality. Time passes quickly if the topic is interesting and the respondent feels that he or she is competent to answer the questions posed. In contrast, time passes slowly for the respondent if he or she does not understand the point of the questions or feels incompetent.

Thirdly, in a statistical organisation the most immediate factor we can manipulate in order to reduce response burden is the data collection instrument and data collection procedure. If a questionnaire is burdensome, it is seldom an option to drop the statistics produced from this questionnaire. Instead we try to improve the instrument or change the data collection procedure. To be able to use the response burden questions for this purpose, it is important that they identify the most burdensome part of the questionnaire. The very best would perhaps be to identify which questions caused problems. Our question set is not that specific. It does not identify individual questions, but rather what kind of activities including general question issues, that caused the problems.

1.3 The PRB Approach compared with the Standard Cost Model

The focus on how the survey instrument and procedure first affect the perceived response burden and next the response quality, is clearly a different approach from the currently popular Standard Cost Model. The Standard Cost Model starts and ends with regulations that generate information requirements and focus on the time, converted to money, the businesses have to spend in order to establish and run the information systems needed to fulfil these requirements. If the price is high, that is an argument for simplifying or abolishing the original regulation. How the information is collected, what the business respondent(s) feel about his or her reporting obligations and the quality the information reported, is not what the Standard Cost Model is about (for a more thorough description of the SCM, see appendix 1).

STC vs
PRB
studies

There are also other differences between a perceived response burden (PRB) study and the Standard Cost Model (SCM). Both approaches are concerned with generalisation of the results. The PRB approach recommends a statistical sample in order to ensure this, while the SCM is generally based on strategic and not a statistical sample. The sampling procedure for PRB studies is described in chapter 4 and appendix 3. To what extent results from a SCM approach also hold for the population the samples are drawn from cannot be justified by statistical calculations. The main reason for this choice is probably that SCM investigations are very time consuming and costly, and consequently cannot be carried out in a sample big enough for a statistical survey. While SCM studies collect detailed information that cannot easily be generalised, PRB studies collect less, but more representative information. It would probably be easier to claim that SCM studies are representative if they were drawn from PRB samples.

A PRB study is also less costly to run. The design we recommend in this publication is to attach PRB-questions to the original survey. If this is done, the extra cost is minimal. An alternative procedure is to follow up the original survey with telephone interviews. This is a more expensive design, but still much cheaper than running a SCM investigation.

As far as the results from PRB and SCM studies can and have been compared, they come up with very similar estimates on questions like the time it takes to fill in the questionnaires. Hence, for this purpose at least, the PRB design seems to give best value for money.

1.4 What a PRB Survey cannot tell

Qualitative
follow up
studies

This is not to say that PRB studies do not have weaknesses. One of the weakest points, that we have found, is that PRB studies do not catch the relationships between the business respondent and other actors in the business that are involved in reporting activities. The PRB question set does include questions about the reporting activities that the respondent to the PRB questions took part in, if he or she cooperated with others and how much time was spent on reporting in addition to the time spent by the respondent. But these questions only indicate that other activities have taken place, and do not give insight into the activities carried out by others. To understand better what actually takes place in the businesses we recommend that PRB studies are followed up by selective qualitative studies that use observations and personal interviews. Therefore, we recommend qualitative studies that are similar to the Standard Cost Model as follow up studies in a smaller subsample drawn from the PRB studies. Qualitative studies would also be a way to identify problematic questions and find the actions that improve questionnaires and reduce the perceived response burden, as mentioned above.

The second drawback of the PRB approach is that it focuses on one survey at a time. It will measure the perceived burden of an individual survey. But the perceived response burden may also be greatly influenced by the total amount of surveys directed at a

business, or more correctly a respondent. If surveys directed at the same business have different respondents, no additional burden may be perceived. But if the same respondent is receiving many surveys, and especially if they are received at the same time, he or she may very well feel an additional response burden by the accumulation of surveys. One should also bear in mind that the combined effect of receiving many surveys may lead to pressure from owners or shareholders to devote less time to filling in questionnaires. This will influence the situation of the respondent and raise the perceived burden, since there is now also additional pressure from management. This factor is very difficult to monitor in a PRB survey, especially since the response process looks very different for different kinds of businesses, and also varies between businesses that are similar in other aspects. Trying to measure perceived burden from a “top-down” approach would jeopardise the information collected about individual surveys, since questions in such a survey would have to be much more general. What the PRB survey can do is identify surveys that are perceived as more burdensome than others. Qualitative follow-ups can then help in identifying the reasons in more detail, including “accumulation effects”.

2 The PRB Questionnaire

In this chapter the core PRB questions are presented. These questions are primarily meant to be used to monitor perceived response burden over time. The questions identify surveys that cause problems for respondents and describe the response burdens and rewards in business surveys. The chapter also provides examples of visual design for paper and web questionnaires. In the next chapter some additional questions are presented, that might be added to investigate more closely why some respondents find business surveys burdensome while others do not, as well as what aspects they perceive as burdensome in different surveys. We recommend using these additional questions to evaluate changes that have been made to the questions and/or questionnaire; and planned or made changes in the mode of data collection.

2.1 Basis for the Questions

The PRB questions in this chapter are based on results from focus groups with respondents to business surveys in Norway and the UK and in-depth interviews with businesses in Sweden. The results from these qualitative approaches were surprisingly similar across the countries and across the different surveys that were used as a starting point for the discussions (Hedlin et al., 2005). The first version of the questionnaire was tested in qualitative interviews with businesses and adjusted according to problems identified in these tests. As the questionnaire has been included in more surveys, other problems have occurred that have prompted adjustments to the questions and questionnaire. The question set presented in appendix 2 is the latest version, but it still covers what our qualitative research indicated to be the most important sources for response burden for respondents to business surveys. Broadly speaking the key aspects of burden identified were:

Key variables of burden

- How complicated it is to collect or memorize the information that is asked for in the surveys (the mode of data collection and the response process)
- How easy or difficult it is to read and understand the questions and how user friendly the layout of the questionnaires is (questionnaire and question design).
- How time consuming it is to collate information and fill in the questionnaire and the perception of this time
- Perceptions of what causes different burdens

In addition, motivational factors were identified as important and should be included in a monitoring survey as additional information, even if motivation is not directly an aspect of burden but rather a moderating factor that contributes to the perception of burden:

- How motivated the business respondents are to contribute to the statistical production in question (perceptions of the NSI)

The mode of data collection and how the response process is organised will influence the perception of burden in several ways. Layout and design of questions and questionnaire are also variables that are believed to be of great influence on the perception of burden in surveys. Research has shown (Dillman, 2007) that improved layout and design contributes to more favourable attitudes among business respondents and makes the response process smoother.

Objective and subjective time measures

The traditional way of measuring the actual burden is by the time it takes to respond to the survey. In our experience, however, more detailed insight into the reporting process is needed in order to take steps to reduce respondent burden. Aspects of time can be measured both objectively and subjectively, and our experience is that it is important to cover both. Based on the findings of the qualitative studies mentioned above, the

perception of time and whether or not the respondent perceives the information collection process as time consuming or not has been chosen. The main reason for this is that our research has shown that it is the respondents' perception of time rather than the actual time use that influences their actions and impacts on data quality, as mentioned in the introduction to this handbook. Another reason is that the focus on time issues has been very intense in the public debates of response burden for businesses. It is also important to be able to distinguish between the tasks of collating information and filling in the questionnaire as well as between the time used on the host survey by the respondent to the PRB-questionnaire and by the entire business. In our research we found that collecting the information is more time demanding than filling in the questionnaire and that business surveys often have multiple respondents or information providers. Consequently, the time estimates are split into three separate measures along two dimensions: time for collecting information and time for filling in the questionnaires. By including both objective and subjective response burden measurements, it is further possible to study the correlation between the actual time use and the respondent's perception of the time they used to complete the questionnaire.

Motivation measures Research and also our experience in our previous work indicate that motivation is an important factor both for perception of burden and for data quality. This is a factor that it is possible to influence, and we therefore recommend that motivation measures are included in monitoring studies of response burden. Motivation is a personal attitude or state of mind, and can only be measured in a subjective way. In the PRB-survey motivation is measured by questions about the perceived usefulness of the statistics produced - to the business and to society.

Question order The questionnaire attempts to measure both perceived burdens or rewards and reasons why the respondent perceives a survey as burdensome. The questions can be asked in various order. One could start with questions that evaluate different aspects of the information collection process and the questionnaire, before summing up the information into a general evaluation of how easy or burdensome this exercise was. Alternatively one could start with an overall evaluation, before asking for specifications about the grounds for the evaluation. Generally it is not advisable to start with detailed questions, because this will affect what comes to the respondent's mind as well as what aspects he or she bases the overall evaluation on (Sudman, Bradburn & Schwarz 1996, Schwarz and Strack 2002). We therefore recommend starting with more general questions and going more into detail in follow up questions.

When developing the questions we focused on keeping them as simple, to the point and as self-explanatory as possible. At the same time we concentrated on covering the aspects identified in the qualitative research. We were also concerned about keeping the number of questions down, in order to avoid additional response burden.

Taking all these elements into consideration, we ended up with a set of nine core questions that should always be included in a PRB-survey. The questions are presented and explained in more detail below.

2.2 The PRB Core Question Set

This section outlines the questions that, in our experience, should be included in all PRB-surveys. These questions cover the main topics identified in the qualitative research mentioned earlier: whether or not the respondent found the host survey burdensome and the reasons if they did, time measures and finally questions about the usefulness of the statistics. We will present an overview of the questions and explain what they measure, as well as show examples of visual design for paper and web questionnaires and questions.

In figure 1, we show a schematic display of the core questions in a PRB survey, presenting what dimension the different questions cover, what PRB-indicator they belong to, the wording of the question as well as the response categories. The order of the questions in the questionnaire does not show in this display, but can be seen in the questionnaire included in appendix 2, even if this questionnaire contains more than the core questions. Some of the questions serve as filters to other questions, and there are skipping patterns that can be seen in the questionnaire itself. Skipping patterns are generally easier to deal within web-questionnaires than in paper questionnaires. However, our experience from using the PRB questions in paper questionnaires has been that the skipping instructions were obvious and easy to follow for respondents.

Question dimensions	The core questions cover four dimensions: Perceived response burden, actual response burden, perceived causes of response burden, and motivation, as has already been mentioned. These four dimensions cover the five key variables identified above.
Indicators	Generally, each question makes up one indicator of response burden, hence eight (or nine) indicators can be constructed from the responses to this questionnaire: Perception of time, perception of burden, time to collect information (respondent and business), time to complete questionnaire, reasons for time consuming, conditions for burden, usefulness to business and to society. One way of constructing an indicator based on the 5-point scale used in some of the questions is to give values to the response categories, letting -1 equal very burdensome/time consuming, -0,5 equal quite burdensome/time consuming, 0 equal a neither/nor option, +0,5 equal quite easy/quick and +1 equal very easy/quick. Hence the indicator will vary from -1 to +1.
Perception and causes of burden	<p>Burdensome or not burdensome</p> <p>We have designed two questions to measure whether the respondents perceived the main survey as burdensome or not (perceived burden dimension), as well as two follow up questions to measure the reasons why they found it burdensome (perceived causes of burden dimension). These questions will provide a minimum level of knowledge about perceived and actual burden that is necessary to understand what constitutes burden in the main survey and also give some ideas about what steps can be taken to eventually reduce burden for the respondents. Questions providing more insight and that should be included for more analytical purposes, will be presented in the next chapter.</p>
Problem indicators	The answers to these questions will give an indication on where the problems in the main survey are – is the problem in the content of the questions or in the design, layout or mode of the data collection instrument? Once we have found where the problem is, it is necessary to do a more thorough examination to explore the nature of the problem and how it can be solved, preferably by using qualitative methods.
Time measures	<p>Time is important</p> <p>Actual burden is traditionally measured by time use. As we have mentioned earlier, we have chosen more detailed time measures than what has been traditionally used. We have designed two questions to measure time to collate information and one to measure time to fill in the questionnaire, because in measuring the information collation we have distinguished between the time used by the respondent and the time used by the business. The reason for this is that many business surveys have multiple respondents or information providers to one survey. Measuring only the respondent's time use would therefore not give an accurate picture of the total amount of time required to respond to each survey. Also, our experience from our tests is that asking only for the total time use does not work very well, as some respondents reported only the time they themselves used, while others tried to estimate time use for the whole</p> <p>Figure 1: The PRB Core Question Set, for monitoring changes over time</p>

Core questions for a monitoring survey

Dimension	Indicator	Question	Response categories
Perceived burden	Perception of time	Did you think it was quick or time consuming to collect the information to complete the ... questionnaire?	Very quick, Quite quick, Neither quick nor time consuming, Quite time consuming, Very time consuming
	Perception of burden	Did you find it easy or burdensome to fill in the questionnaire?	Very easy, Quite easy, Neither easy nor burdensome, Quite burdensome, Very burdensome
Actual burden	Time to collect information	How much time did <u>you</u> spend collecting the information to complete the questionnaire?	Number of hours Number of minutes Did not spend any time on this at all:
		How much time do you think <u>the business</u> spent on collecting the information to complete the questionnaire?	Number of hours Number of minutes Did not spend any time on this at all:
	Time to complete questionnaire	How much time did you spend on actually filling in the questionnaire?	Number of hours Number of minutes
Perceived causes of burden	Reason for time-consuming	What were the main reasons that you found it time consuming?	Had to collect information from different sources Needed help from others in order to answer some of the questions Had to wait for information that was available at different times Other reasons, please specify
	Conditions for burden	What conditions contributed to making the questionnaire burdensome to fill in?	The high number of questions Messy presentations made the questionnaire hard to read Unclear terms and explanations of terms Questions that asked for complicated or lengthy calculations Available information did not match the information asked for Difficult to decide which response alternative was the correct answer Other reasons, please specify
Motivation	Usefulness for own business	Do you think that the statistics from this questionnaire are useful or useless to your business?	Very useful, Fairly useful, Neither useful nor useless, Fairly useless, Very useless, Don't know
	Usefulness for society	Do you think that the statistics from this questionnaire are useful or useless to society?	Very useful, Fairly useful, Neither useful nor useless, Fairly useless, Very useless, Don't know

business. By asking two different questions we help the respondent give a correct answer at least on their own time use, while most respondents will only be able to give a rough estimate of the businesses total time use.

Useful or not useful

Motivation is measured by the respondent's perception of usefulness of the statistics from the host survey to the business and to society. Our previous research found that respondents who perceive the statistics as useful for one of these actors, and probably more so the business than the society, will be more motivated to complete the survey and to provide accurate data. Research has shown that motivation is an important factor for data quality as well as for response rates. Motivated respondents do a better job. Also, it is possible for the survey organisation to influence the respondents' motivation to participate in a survey, by using for instance information, incentives, improving reporting conditions and the reporting process. In some countries with statutory surveys, punishment is also used to increase response rates, something which might be considered as a negative means to motivate respondents. To monitor the degree of motivation is therefore valuable for the survey organisation, and can be

used for planning and adjustment of the different means as well as to study effects of different means.

2.3 Question and Questionnaire design

In this section we will present examples of how a PRB-questionnaire can be designed both for a paper and pencil survey and for a web-survey. First we'll show you the recommended design of the paper questionnaire. We have tried to utilize Don Dillmans design principles in the questionnaire (Dillman, 2007). A mild pastel blue background color has been chosen and visual aids have been used to facilitate the response process for the respondents – space, text fonts, white answering boxes, arrows and noticeable numbering and skipping codes. These factors should help facilitate the navigation in the questionnaire which in turn will contribute to better response quality.

Figure 2: Example of Layout for Paper Questionnaire 1

Layout paper questionnaire

In this questionnaire we ask you to answer some questions on how easy or difficult it was to find the necessary information and to fill in the "name of survey" questionnaire. These questions are voluntary, but by answering them you will contribute to simplifying and improving our questionnaires. We therefore hope you will take some time to answer them.

1 Which task(s) did you carry out when responding to the "name of survey" questionnaire?
You may give more than one answer.

Distributed tasks to the people who contributed to the work of responding to the questionnaire → Go to **11**

Collected necessary information to answer the questions

Responded to the questions in the questionnaire

Did not respond to questions myself, but keyed the answers into the web-questionnaire } → Go to **6**

Had responsibilities connected to receiving the questionnaire and returning the answers → Go to **11**

It is important that you answer the following questions based on your own experience in the reporting process unless something else is asked for.

2 Did you think it was quick or time consuming to collect the information to complete the "name of survey" questionnaire?

Very quick

Quite quick

Neither quick nor time consuming } → Go to **4**

Quite time consuming

Very time consuming

3 What were the main reasons that you found it time consuming? You may give more than one answer.

Had to collect information from different sources

Needed help from others in order to answer some of the questions

Had to wait for information that was available at different times

Other reasons, please specify:

4 How much time did you spend collecting the information to complete the questionnaire?


Number of hours:

Number of minutes:

Did not spend any time on this at all

Figure 3: Example of More Simple Questionnaire Design

Layout paper questionnaire



Statistisk sentralbyrå
Statistics Norway

Division for Datacollection Methods.
Postboks 8131 Dep., 0033 Oslo
Telefon: 21 09 00 00 Telefaks: 21 09 49 73

Confidential

Questions about Response Burden and User Experiences

⌄

In this questionnaire we ask you to answer some questions about how easy or hard it was to report the necessary information for the Industrial Structural Statistics. We would prefer it if you could respond on behalf of the entire enterprise. These questions are voluntary. The questions are part of an international research project and we would very much appreciate it if you could find the time to answer them.

0 First we would like to know whether you have reported on behalf of the entire enterprise or for one single business only?

Have reported on behalf of entire enterprise → **1**

Have reported on behalf of one business → Stop. Thank you for your help!

1 Do you think it was quick or time consuming to collect the necessary information to complete the Industrial Structural Statistics questionnaire?

Very quick → **3**

Quite quick → **3**

Neither quick nor time consuming → **3**

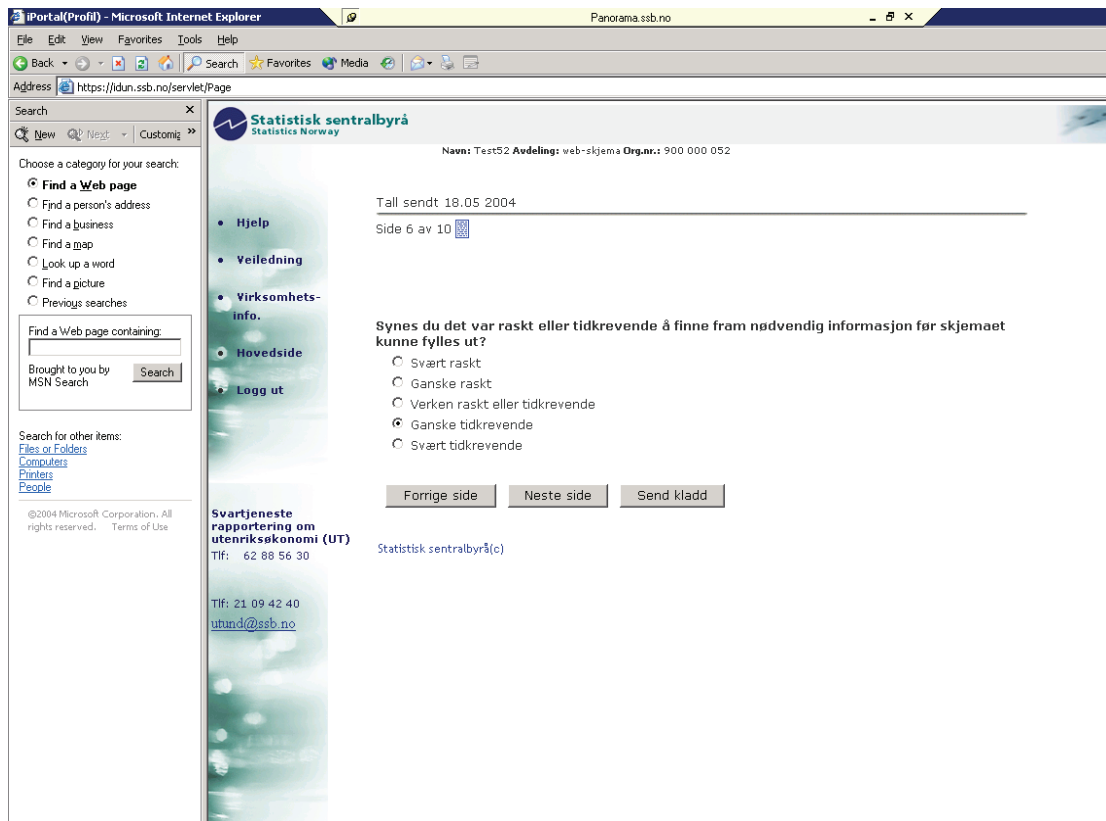
Quite time consuming → **2**

Very time consuming → **2**

⌄

Figure 4: Example of Design of Web Questionnaire

Layout web questionnaire



Questionnaire design

The background color is optional. Due to printing costs or other barriers, shades of gray can also be used, as shown in figure 3. This example shows part of an earlier version of the PRB-questionnaire, which was used in one of our initial tests on respondents on the Industrial Structural Statistics in Norway. The beginning of this questionnaire varies from the questionnaire included in this handbook (appendix 2) because it is designed for multi business enterprises – hence the question 0. Later this was adjusted to record the number of businesses they reported for. We have included this example both to show that a simpler design is possible and to show the importance of tailoring the questionnaire to meet different objectives and goals, but the core questions should remain about the same.

Figure 4 shows the design of the web-questionnaire used by statistics Norway in the first tests. This screen equals question 2 in the questionnaire presented in this publication. Since the skipping pattern is encoded in the program, the respondent is automatically moved to the next question he or she is supposed to answer. In that way, the web questionnaire is probably easier to respond to than the paper questionnaire.

Voluntary questions in statutory survey

The PRB-questions were included as a voluntary part of a statutory survey. A small amount of information about the PRB-questions and its voluntary nature is presented before the first question on whether the respondent is willing to answer these questions. If possible, however, we recommend that this question is not used and that the respondents may be able to see at least the introduction and the first questions before they are given an option to quit. Instead of a filter question there could be a box/response alternative placed below the first question, alternatively with the other action buttons that allows the respondent to end the session. The reason for this recommendation is that we have experienced that such a question contributes to higher nonresponse rates because many respondents are unwilling to participate in anything that is voluntary. When they are able to see the first question, however, more respondents are willing to answer – both because they find the topic interesting and because the questions are simple to respond to. More about motivations strategies in section 5.3

2.4 General Recommendations

In this chapter we have presented a set of core questions that should be used to monitor, over time, perceived response burden in business surveys. However, some adjustments to the questionnaire, the questions, the response categories or the instructions might be necessary to conduct a PRB-survey in another country or culture than the ones represented by the authors of this publication. As in all other surveys, cultural, social and legal rules and customs might influence what is possible to do and what is recommendable. For instance, the response categories in questions 3 and 7 might need adjustments to meet different requirements and interests in different organisations, as well as to different modes of data collection. In web-surveys for instance, it might be interesting to include more response categories about web usability and technical aspects that could influence perceptions of burden. Two extra response categories that have previously been used to cover these aspects are:

- Web functions that were difficult to use
- Technical problems with the web version of the questionnaire

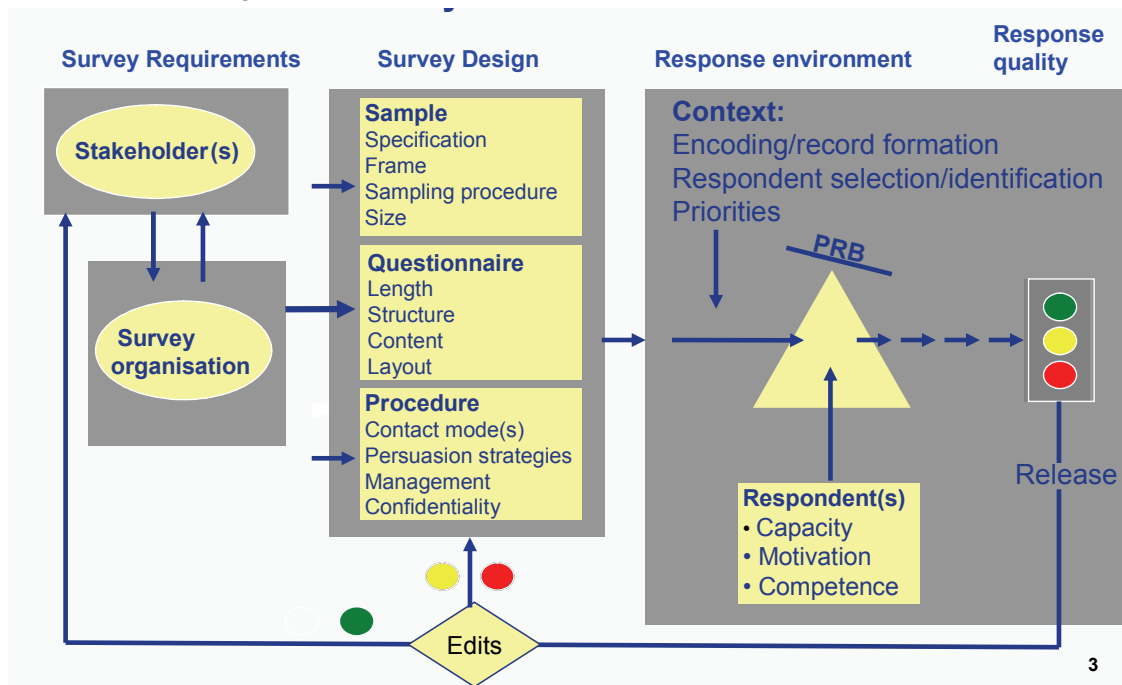
We do recommend, however, using the core questions as presented if possible, and that alterations should be tested before they are sent into the field.

3 Analytical perspectives

While monitoring is about measuring stability or change in a few indicators over time, the objectives of an analysis is to gain richer insight into the respondents' perceptions and to identify causes and effects of those perceptions. During the LEG-project "Developing methods for assessing perceived response burden" (Hedlin et al, 2005) a conceptual model that describes the origins and possible quality effects of the perceived burdens experienced by the business respondent, was developed. In this chapter we will use this model to identify a socio-psychological, causal model and to discuss how the different components of this model could be measured and analysed. It is recommended that this type of analyses is undertaken when evaluating changes that have been made to the questions and/or questionnaire; and changes planned or made in the mode of data collection.

The present version of the conceptual model that we often have referred to as the Total Business Survey Burden model (TBSB) (Jones et al, 2005), looks like this:

Figure 5: Origins and Effects of Perceived Response Burdens in Business Surveys



Factors that can and cannot be manipulated

Initially the model may seem confusing, but the logic of it is quite simple. The perceived response burden, indicated as a seesaw in the middle of the response environment box to the right, is described as an intermediate variable that is influenced by survey design components, the characteristics of the respondent and by contextual business factors. Hence, these three elements are recognized as independent variables. The characteristics of the respondents are the psychological factors that influence the perceived response burden, while the business context is the main social factor. The survey design is the main element that a survey organisation can tailor to the kind of businesses and respondents they address. This is done through a two step and threefold planning process. The two steps are usually called specification and operationalisation. What is specified and made operative is a sampling plan, one or more data collection instruments and a data collection procedure.

The response process

The three independent variables decide how easy or burdensome it is for the respondent to understand the questions, retrieve and judge the adequacy of available information and respond in the format asked for. This four-step cognitive process which was originally described by Tourangeau (1984), is indicated by the four arrows in the

model. It is the respondents overall evaluation of these tasks in a specific survey that we aim to measure by the simple question about how easy or burdensome it was to complete the questionnaire. The specifications in the follow-up question reflect the different cognitive tasks that the respondent is faced with. The possible quality effects of the perceived response burden are indicated by a traffic light that could be red for an erroneous answer, yellow for an item nonresponse or green for a correct answer. Thus, the perceived response burden is the intermediate variable which should explain why the three independent variables have an effect on the dependent variable, which is the response quality. In principle one should both be able to link the response quality to the perceived response burden and to specific response burden problems listed in the follow-up question.

When the data are received, an edit is supposed to identify which data is correct and which needs to be edited in house or queried with the respondent. The correct data goes back to the stakeholder that initiated the survey, while data that needs to be corrected by respondents goes into a new data collection process. The final quality of the statistics or data analysis is often dependent of even more refinements, such as weighting or imputation.

Socio-
psychological
model

In principle the response process here is described as a straight forward socio-psychological model with three independent variables, one intermediate variable and one dependent variable. In practice, however, it is more complicated than this. The reason for this is that all the elements in this seemingly simple model are made up of several ingredients that we need to keep apart in an analysis. This means for instance, that we do not only need to keep contextual and psychological factors apart from survey design factors, but that we also would like to know which design factors are the most important for determining perceived response burden.

3.1 The Composition of Causal factors

All survey designs consist of three main elements; a sample of the population under study, a questionnaire or other kind of data collection instrument and a plan for how the respondents should be contacted and persuaded to participate in the survey¹.

Experimental
design

Both the different elements of the survey instrument and the measures taken to find and motivate the respondents can be manipulated in an experimental design. When major changes in a questionnaire are introduced or new initiatives are taken to improve the response rate, we recommend that a controlled experiment is run before full scale changes are made. This can often be done by adding a small experimental sample to the original survey. The PRB questions should be asked both in the experimental group(s) and in a control sample drawn from the original survey. For an example of how such an experimental design could be set up, see chapter 5.4 in Hedlin et al (2005).

Observational
studies

An alternative approach is to compare the perceived response burden in surveys that are different or are promoted in different ways. If such an approach is chosen, it is important to ensure that the different designs are ideally evaluated by the same businesses, or at least by businesses in the same industry. If not, it is very hard to differentiate between the impact of survey design factors and industry specific factors on the perceived response burden and eventually on the response quality.

In addition to questionnaire features and data collection strategies, sampling can also affect the response burden because the same business is often drawn to participate in several surveys, and hence ends up on the desk of the same business respondent. However, this factor is usually impossible to manipulate in an experimental design. The number of questionnaires that one has to complete probably affects the perceived

The burden of
several
questionnaires

¹ In most publications the data collection instrument and the implementation of it is grouped together and named Measurement (see i.e. Biemer and Lyberg 2003)

burden of each individual questionnaire. Usually it is possible to identify from the sample management system how many questionnaires the statistical organisation sends to the same business, but not who is selected to answer the different questionnaires. That is commonly decided by the business itself. If this is an issue that you would like to focus on in the analysis, we recommend posing an extra question about how many questionnaires the respondent had to complete in the same time period. In one of the previous response burden surveys that we have carried out, "Many questionnaires to complete" was included as one reason why it was time consuming to collect information.

The result of internal processes

The contextual business conditions listed in the model (encoding/record formation, respondent selection/identification, priorities and release) are taken from the paper "Building an Alternative Response Process Model for Business Surveys", written by Willimack and Nichols (2001). The keywords listed here refer to work processes and decisions that set the conditions for the respondents. In an analysis of the factors that influence the perceived response burden, however, our first concern is not so much about the processes, but on the results. What we need to know is not how the relevant administrative systems were created, but if they contain the relevant information and if the respondent had easy access to this information. Likewise our first concern is not how it was decided who should fill in the questionnaire, but who they decided should do it and what authorities this or these employees were given. We recommend that the processes behind the decisions should be left to follow up studies, preferably with more qualitative methods.

Among the reasons respondents can give for why it was time consuming to collect necessary information to a questionnaire, in the core PRB question set (figure 1, chapter 2), there are three response alternatives that indicate documentation problems:

- Had to collect information from different sources
- Had to get help from others in order to answer some of the questions
- Had to wait for information that was available at different times

In an analysis of the perceived response burden in six annual business surveys in Norway, these answers were used to distinguish between those who faced documentation problems and those who apparently did not. There was a significant difference in perceived response burden between those who had marked down at least one of these problems and those who had not (Haraldsen and Jones 2007). A weakness in this analysis, however, is that it is based on the assumption that those who did not find the initial information collection time consuming, neither had documentation problems. This also makes it difficult to distinguish between response burdens that had to do with documentation problems and response burdens that simply reflected that it took time to prepare for the completion of the questionnaire. Therefore we suggest that one could also ask those who did not find the preparations time consuming to evaluate the documentation systems accessible. This can be done by direct questions such as:

	Very easy	Quite easy	Neither easy nor difficult	Quite difficult	Very difficult
How easy or difficult was it to find the relevant information for this questionnaire in the business administrative records?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How easy or difficult was it for you to get access to these records?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In an earlier question set tested by ONS (Hedlin et al 2005) there is also at least one statement that casts some light over this type of problem:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The information was easily accessible from our business records	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Division of labour

Another contextual condition that may affect response burden is how the collection of information and questionnaire completion was organised. The additional PRB evaluation questions (see figure 7, page 24) contains one simple and one more differentiated question that can measure this:

Simple question:

How many people were involved in responding to this questionnaire? Please include yourself

Number of persons involved

Differentiated question:

Which task(s) did you carry out when responding to the questionnaire?

You may give more than one answer.

- Distributed tasks to the people who contributed to the work of responding to the questionnaire
- Collected necessary information to answer the questions
- Responded to the questions in the questionnaire
- Did not respond to questions myself, but filled the answers into the questionnaire
- Had responsibilities connected to receiving the questionnaire and returning the answers

Size of establishment

In addition to the work processes and decisions that set the conditions for the respondents there are reasons to believe that response burden will vary with the size of the business. Small businesses do not have so much to report and bigger businesses often have good documentation systems and professional respondents. Consequently we should expect that the response burden will be highest in middle sized businesses. If possible, information about the size of the business survey unit should therefore be included in the PRB-analysis.

Personal characteristics

The PRB model distinguishes between three kinds of personal characteristics that may have an effect on perceived response burden. Those are the personal capacity, motivation and competence of the respondent.

In earlier versions of this model we have used "availability" instead of capacity (Jones et al 2005). What we first of all think about here is the time and effort that the respondent can put into the task. The following question, which is already included in our recommended additional evaluation questions (see figure 7, page 24), attempts to measure how easy or difficult it was to set aside time for the questionnaire:

Was it easy or difficult for you to find sufficient time for the tasks you were responsible for in responding to this questionnaire before the given deadline?

- Very easy
- Quite easy
- Neither easy nor difficult
- Quite difficult
- Very difficult

The aforementioned PRB-analysis of six Norwegian annual business surveys showed that the answer to this question was the one that had the most pronounced effect on perceived response burden. The effect of this variable was stronger than the effect of completion time, and, even if there is a correlation between these two variables, it was not as strong as we expected (0,36). The ability to set aside time for the survey therefore seems to be a key variable in any PRB-analysis. From the existing question set, however, it is not possible to decide if this is a personal problem or a part of the contextual conditions set by the business management. It could possibly also be a result of a combination of management priorities and personal time allocation problems. In future PRB-surveys it may be a good idea to add a follow-up question about this. This question could be formulated this way:

To what extent to you feel that the reason for these time allocation problems was a result of....

	To a high extent	To a low extent
Priorities made by the management	<input type="checkbox"/>	<input type="checkbox"/>
Priorities made by yourself	<input type="checkbox"/>	<input type="checkbox"/>
Other reasons, please specify	<input type="checkbox"/>	<input type="checkbox"/>

Motivation is measured, in the core PRB question set (see figure 1, page 11) with the two questions posed about the usefulness, for the business and society, of the statistics produced from the questionnaire.

Competence has previously only been measured by a question about practical experience:

Is this the first time you have contributed to completing this questionnaire or have you contributed to completing the same questionnaire previously?

- This is the first time I have contributed to completing this questionnaire
- I have previously contributed to completing the same questionnaire

Experience and competence

Even if this may seem to be a rather vague indicator of practical experience, analyses have shown that previous experience measured by this question has a significant effect on perceived response burden (Haraldsen and Jones 2007). In future analyses,

however, we suggest that it is supplemented with a question about more formal competence. This question could be formulated like this:

What competence do you feel you had to answer the questions in this business survey?

- Very high competence
- Quite high competence
- Quite low competence
- Very low competence
- Unable to decide

3.2 Specifying Response Problems

Perceived burdens vs evaluating sources of errors

In the present version of the question set, only those who felt that the response burden was quite or very high are asked to specify the response problems that they had. As with the question of how time consuming the preparations was, the exclusion of those who did not feel that the questionnaire was burdensome causes an analytical problem because they will have to be treated as if they did not have any response problems. Even if the respondents did not find the questionnaire burdensome, they may however still have recognised problems. Consequently we feel a need for also measuring their evaluation of different error sources. One way of doing this is to confront those who felt the questionnaire was easy to fill in with statements like those in section 2 of the original questionnaire tested by ONS (Hedlin et al, 2005):

To what extent do you disagree or agree with the following statements about the questionnaire you have filled in?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
The length of the questionnaire was about right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The questionnaire was clearly laid out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There were too many notes and instructions to read	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The notes and instructions were useful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There were too many questions to answer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The questions were in a logical order	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not understand the terminology used in the questionnaire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

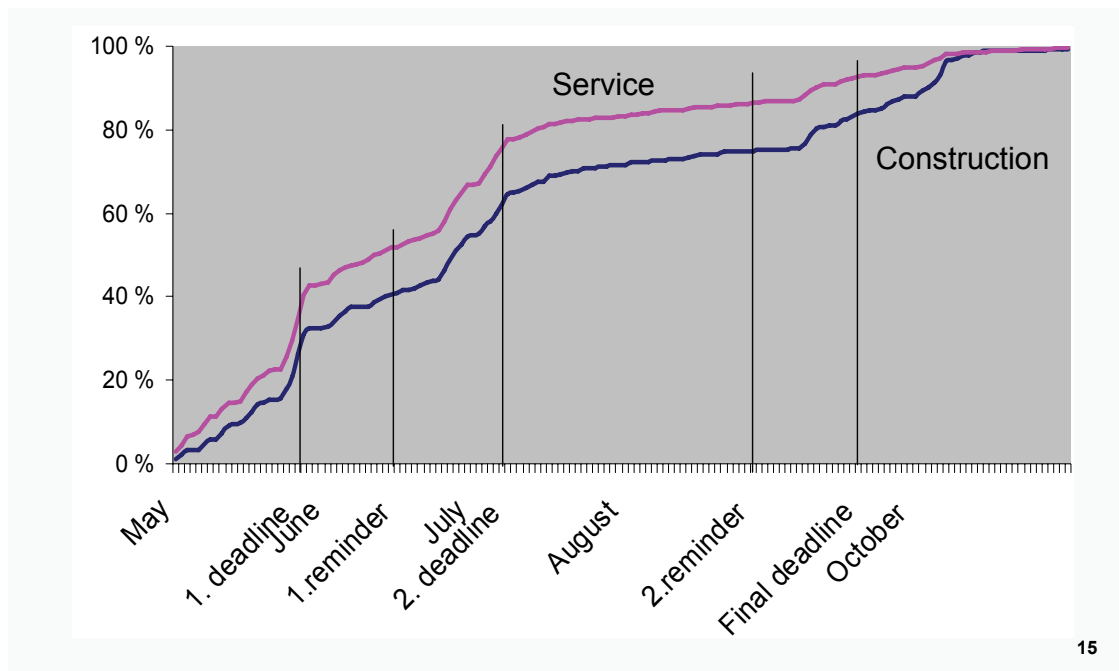
We do not argue that this list of statement coincides fully with the list of burdensome sources presented to those who felt the questionnaire burdensome or that the positions the respondents took to these statements are directly comparable with the sources of response burden reported. However, evaluation of these questions when used by ONS indicated that those who perceived the task as easy still recognised weaknesses in the questionnaire similar to those recognised by respondents who perceived it as burdensome.

3.3 Response Quality Indicators

Response pattern rather than unit nonresponse

The dependent variable in our analytical model can be measured in different ways. Traditional quality indicators in voluntary household surveys like nonresponse and net sample bias are often not so relevant in mandatory business surveys that typically achieve response rates above 90 percent. As a more relevant alternative, response rates at different milestones during the data collection period can be measured. One should imagine that it took a longer to collect the data from a survey with a high response burden compared to one with a low perceived response burden. Below is an example of how such an evaluation can be made. In this example the response pattern of a survey with a high perceived response burden (construction) is compared with a survey with low perceived response burden (service):

Figure 6: Web Response Patterns for Construction and Service Industry Questionnaires²



15

Quality = lack of detected errors

The other major source of response quality indicators is the error checks embedded in electronic versions of the questionnaires or run during editing of paper questionnaires. We may distinguish between four kinds of error checks:

1. Checks for item nonresponse.
2. Checks for valid values
3. Checks for logical inconsistencies (either within the questionnaire or between the answers given in the questionnaire and information gathered from other sources)
4. Checks for miscalculations

Note that if these error checks are embedded in electronic questionnaires, poor design may not be detected unless activated error messages are recorded during the data collection. If the response quality is obtained with the help of numerous error messages, one may also expect that the perceived response will rise and consequently that the electronic version of a questionnaire will be felt more burdensome than the paper version. If possible, the answers to the response burden questions should be linked to the number of errors made by the individual respondent, so that the correlation between the perceived burden and the response quality can be studied on

² From Haraldsen and Jones (2007)

an individual level. But it may also be interesting to compare this correlation analysis with what effect the perceived response burden have on the overall quality of a survey. For statistical purposes it is not the individual errors that counts, but their aggregated effect on the statistics produced.

3.4 Analytical Tools

Tips for
multivariate
analysis

As can be seen from the discussion in this chapter, when the core question set is extended with some additional questions, it opens up the possibility of a range of analytical studies. Studies can be limited to look at the correlations between specific design elements, business or personal characteristics and perceived response burden or they can be multivariate analyses that take all three independent variables and the significance of the intermediate variable into account. What analytical tools are used will vary accordingly. If you want to find the effect of each explanatory variable on perceived response burden, while still controlling for the other variables, you can perform a regression analysis with perceived response burden as the dependent variable and the explanatory variables as the independent variables. Then you interpret the effect of the independent variable A on perceived response burden, as the effect of A among respondents where all the other independent variables (B and C) are identical. If you add interaction terms into the regression analysis, this effect will be different for different values of B and C, whereas the effect will be an "average" effect if you omit interaction terms.

If the perceived response burden-variable is on a continuous scale, you can perform an ordinary linear regression, and if it is dichotomous you can e.g. perform a logistic regression. If the perceived response burden-variable is on ordinal scale, there are advanced methods, but you could also try a linear regression (where you pretend that the variable is on a continuous scale) or you can try a logistic regression after grouping the variable such that it becomes dichotomous (then you don't use all the available information that you have).

It is important to know that all regression analysis models rely on assumptions that should be checked. Sometimes mathematical transformations of the data may be a wise step to take before doing a regression analysis.

The full PRB-question set with the additional questions which have been suggested here, sum up to an evaluation questionnaire with 15 – 20 questions. This is a substantial increase of the original questionnaire which should only be added when major changes are planned or as a part of a general research project. In the table below we have listed the questions we suggest could be added to the monitor version of the PRB questionnaire (see Figure 1, chapter 2) in an analytical project.

Figure 7: Additional Questions in a PRB Evaluation Questionnaire

Dimension	Indicator	Question	Response categories
Business Context factors	Available documentation	How easy or difficult was it to find the relevant information for this questionnaire in the business administrative records?	Very easy, Quite easy, Neither Easy nor difficult, Quite difficult, Very difficult
		How easy or difficult was it for you to get access to these records?	Very easy, Quite easy, Neither Easy nor difficult, Quite difficult, Very difficult
Division of labour	Number of people involved	Or The information was easily accessible from our business records	Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree
		How many people were involved in responding to this questionnaire?	Number of people involved
	Roles	Which task(s) did you carry out when responding to the questionnaire?	-Distributed tasks to the people who contributed to the work of responding to the questionnaire -Collected necessary information to answer the questions -Responded to the questions in the questionnaire -Did not respond to questions myself, but keyed the answers into the web-questionnaire -Had responsibilities connected to receiving the questionnaire and returning the answers
		Number of questionnaires to complete during the same time period	Yes, No
		Did you have to complete the present questionnaire for more than one business?	Number of businesses
		IF YES, How many?	Number of other questionnaires
Personal characteristics	Available time	Was it easy or difficult for you to find sufficient time for the tasks you were responsible for in responding to this questionnaire before the given deadline?	Very easy, Quite easy, Neither Easy nor difficult, Quite difficult, Very difficult
		To what extent do you feel that the reason for these time allocation problems was a result of. -Priorities made by the management? -Priorities made by yourself? -Other reasons	To a high extent, To a low extent
		Is this the first time you have contributed to completing this questionnaire or have you contributed to completing the same questionnaire previously?	-This is the first time I have contributed to completing the questionnaire -I have previously contributed to completing the same questionnaire
	Competence	What competence do you feel you had to answer the questions in this business survey?	Very high competence, Quite high competence, Quite low competence, Very low competence, Unable to decide.
Response Problem		To what extent do you disagree or agree with the following statements about the questionnaire you have filled in?	Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree
Evaluation posed to those who found it easy to complete questionnaire		-The length of the questionnaire was about right -The questionnaire was clearly laid out -There were too many notes and instructions to read -The notes and instructions were useful -There were too many questions to answer -The questions were in a logical order -I did not understand the terminology used in the questionnaire	

4 Sampling

This chapter provides an overview of the sampling in a PRB-survey. First we will look at the population, before discussing whether the PRB-survey should be a census or a sample survey. Details on how to select the sample size for different designs of the PRB-survey, is provided in appendix 3.

Population Alternatives

PRB-population For PRB surveys the *population* is the businesses for which response burden measurement is required. This population consists of the businesses included in the main survey sample, since these are the businesses being burdened by the survey. We will denote this population as the *net population*. Businesses that were not included in the survey are not burdened by it and are consequently outside the PRB population.

Total Business Population For analytical purposes we could also be interested in defining the population as the *total business population* consisting of all the businesses that constitute the population from which the main survey was drawn. When sampling from the PRB-population, you can get answers to questions such as "what is the average time spent completing this questionnaire" or "what proportion of the respondents perceived a heavy response burden completing this questionnaire". On the other hand, when sampling from the total business population for the PRB-survey, you can get answers to questions like "what is the average time spent on completing questionnaires among all businesses".

4.1 Census or Sampling

Cost The PRB-questions could either be posed to all the respondents to the host questionnaire or only to a sample of these. As we have pointed out earlier, while the first approach will increase the total burden of answering the PRB-questions, it will not have any effect on the individual respondent. Therefore the main argument for sampling will probably be cost reduction. For postal surveys money are saved on paper, printing and perhaps on mailing expenditures (given that one has to pay by weight). Especially if the responses are manually recorded, time and cost is also saved in this process. Nevertheless, it is primarily in telephone surveys that the cost reduction of drawing a sample may be substantial.

Estimation On the other hand, a sample makes the estimations a bit more complicated. If you send the PRB-questionnaire to the complete PRB-population you are in fact running a census, both in relation to the PRB-population and in relation to the total business population. The reason for this is that the response burden for those who do not receive the host questionnaire can be set to zero. Consequently, for this particular survey, you have also measured the response burden for the total business population.

Weighting the cost considerations against the methodological argument given above, we recommend a census approach when the PRB-questions are attached to a self-administered survey. Especially when dealing with a web survey or other electronic surveys the extra cost of additional questions is minimal. When the PRB-questions are posed in a follow-up survey, however, the cost argument for sampling has greater relevance. This is especially true if the follow up study is conducted by telephone interview.

If you choose to draw a sample from the host survey you should follow the procedure described in appendix 3 to generalise the results to the PRB-population, and subsequently also to the total business population. This generalisation is fairly simple as long as the PRB-sample is drawn by simple random sampling.

4.2 Gross Population and Nonresponse

Regardless of which data collection method you use, four outcomes are possible:

1. Both the host questionnaire and the PRB-questions are responded to
2. Only the host questionnaire is responded to
3. Only the PRB-questionnaire is responded to
4. Neither the host nor the PRB-questionnaire are responded to

We will advocate that only those who have responded to the host questionnaire should be regarded as part of the PRB-population. The logic behind this is the same as the logic we applied in the previous paragraph. Those who have not responded to the host questionnaire cannot be said to have a response burden. Consequently they should be considered as ineligible. Hence the nonresponse rate should be calculated as group 2 divided by group 1 + 2.

This is not to say that the respondents in group 3 who have only answered the PRB-questions are of no analytical interest, only that they do not belong to the PRB-population. If this group is big enough, it might be interesting to do a separate analysis of the results.

Since we know what the nonrespondents to the PRB-questions have responded to the host survey questions, this information can be used to estimate what effects nonresponse has on the response burden results. A qualified guess is that the nonrespondents' response burden is similar to the burden reported by respondents with a similar response pattern in the host survey.

5 The Data Collection Procedure

The basic structure of the data collection procedure of a PRB-survey is not different to any other data collection. But there are two considerations that should guide the detailed decisions taken. One is that the PRB questions are about a specific survey. It is important that the respondent to the PRB questions is the same person who answered the main survey and that the reference to the main survey stands clear in the mind of the respondent all the way through the PRB-survey. Secondly, while business surveys are generally mandatory, to answer the PRB-survey will typically be voluntary. Consequently there is a challenge to obtain a sufficiently high response rate. Generally the response rate is dependent on the mode of data collection, the contact strategy, how well the questions and questionnaire are designed and the data collection procedure.

The effect of nonresponse on survey estimation

Unit or item nonresponse implies that we lose control over the data selection mechanism. Selection probabilities become unknown; hence it is impossible to compute unbiased estimates. If the nonrespondents systematically differ from the respondents the estimators produced from the respondents will be biased. Non response is of practical concern for several reasons, it can produce biases in point estimators, it can inflate the variances of point estimators and it can produce biases in customary estimators of precision (Dillman et al. 2002:4). Sometimes, nonresponse harms the quality of survey statistics; sometimes, it does not. The principles that determine when it harms and when it does not are clear, but in practice, researchers cannot know which situation they are facing (Groves et al. 2004:178). A high response rate is in itself not a sufficient indicator of good data quality. The relationship between nonresponse bias and non response rate is very complex. The causes and effects of nonresponse vary from one survey to another. It is recommended to treat nonresponse as a process, and to try to monitor and control the process (Thomsen et al. 2006).

5.1 Basic Survey Design

Extended
or follow-up
survey

The perceived response burden (PRB) questions can be implemented either as an extension to the main survey questionnaire or as a new follow-up survey to an existing survey (see figure 8 below). Before agreeing the approach that you will adopt it is recommended that you think through the advantages and disadvantages of both approaches from a data quality perspective.

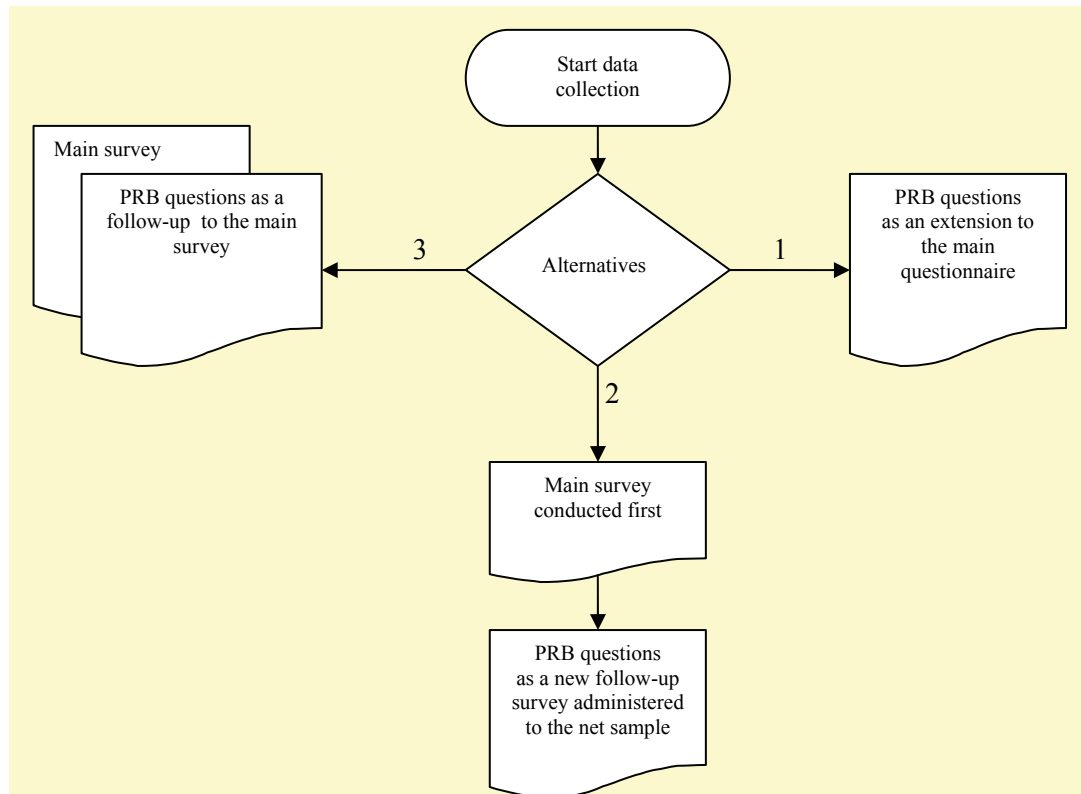
There are advantages and disadvantages to both of these strategies. For example, if the voluntary PRB questions are added to an existing mandatory business survey the contact strategy will have to be different compared with the one you would use in a separate survey. Alternatively, if the PRB questions are administered as a new follow-up survey then one of the decisions we have to make is whether the PRB-questions should be asked to the non-respondents of the main survey? One of the reasons why businesses did not respond could just be that the original survey was considered to be too burdensome. Another decision that you will have to make is which mode to use in administering the PRB follow-up survey e.g. paper, telephone or web.

Figure 9 outlines the main advantages and disadvantages of the two approaches in relation to some of the six European Statistical Service (ESS) Data Quality dimensions (Eurostat 2003) and the additional dimension of cost.

Both the general considerations that we pointed out in the beginning of this chapter and the quality evaluation above suggest that the preferred strategy is to pose the PRB-

questions as an extension of the main survey. The only weighty counter argument is if the original survey is so long that an extension will lead to considerably higher response burden. This can be a particularly valid argument if we want to use the longer analytical version of the PRB question set described in chapter 3. In these cases a separate PRB-survey may be the best solution.

Figure 8: Two designs for conducting a PRB survey



In addition to this response burden argument, there might be juridical or custom practice rules that hinder you in attaching the PRB-questions to the main survey.

5.2 Mode of data collection

Choices of DC mode

If you choose to use the PRB questions as an extension of the main questionnaire, the mode of the PRB will normally have to be the same as the main questionnaire. Business surveys typically use self-completion modes for surveys. Traditionally paper postal self-completion questionnaires have been used. Although in recent years, some National Statistical Institutes have also introduced web as an alternative self-completion mode for business surveys (e.g. Statistics Norway, Statistics Sweden and Statistics Netherlands). The UK Office for National Statistics also uses self-completion Telephone Data Entry for some of the business surveys that collect a small number of data items. The key reason for using self-completion modes in business surveys is dependent on the business survey responses process. For example, business survey respondents often have conflicting work priorities therefore a self-completion mode enables respondents to be able to complete the questionnaire when it suits them.

If the PRB questions will be administered as a separate follow-up survey there are more options to choose from. As a rule of thumbs, paper postal self-completion questionnaires are normally the cheapest and interviews are more expensive. But as a

Figure 9: Advantages and disadvantages of collecting perceived response burden data by extending an existing business survey or conducting a new follow-up survey

1. Extending an existing business survey		
	Advantages	Disadvantages
Relevance	Relevant as questions have been developed and tested to measure researched aspects of perceived response burden	
Accuracy	Main survey questionnaire and PRB questions should be answered simultaneously.	Addition of PRB questions to main survey may impact on comprehension of questions in main survey.
Timeliness	No time delay between response to main survey and to PRB questions.	May delay return of the main survey questionnaire as more questions to respond to.
Comparability	Comparable over time as long as the same PRB survey approach is maintained in relation to main survey e.g. PRB questions implemented as extension to main business survey questionnaire.	
Cost		<p>Paper questionnaires - PRB questions added to every existing questionnaire will increase the length of the questionnaire and add to paper, printing, postage and processing costs.</p> <p>Electronic questionnaires – additional set-up costs and data processing costs.</p>
2. New follow-up survey		
	Advantages	Disadvantages
Relevance	Relevant as questions have been developed and tested to measure researched aspects of perceived response burden	
Accuracy		<p>May have impact on accuracy - time delay between response to main survey and PRB follow-up. Longer recall time between collecting data and completing main survey</p> <p>PRB follow-up survey may only be sent to those who responded to main survey.</p> <p>There maybe lower response rates to the PRB follow-up survey</p>
Timeliness	Should not delay the 'normal' timetable for return of the main survey questionnaire.	Time between main survey and PRB follow-up will delay availability of PRB results.
Comparability	Comparable over time as long as the same PRB survey approach is maintained in relation to the main survey e.g. PRB questions implemented as a follow-up survey.	
Cost		<p>PRB follow-up survey using</p> <ul style="list-style-type: none"> - paper questionnaires – increased costs for paper, printing, postage and processing. - electronic questionnaires – increased costs for setting up an additional questionnaire and processing the returned data. - telephone - increased costs for telephone interviews and data capture.

second rule of thumb, interviews gain a higher response rate. This will probably also be true in a separate PRB-survey given that it is easy to trace the person who completed the main survey. One should bear in mind that business surveys often are just posted to the selected business and not to a specific respondent. If the name of the respondent is not noted with the completed main survey questionnaire, tracing the respondent in a follow-up interview survey may be costly and lead to many non contacts. In this case a better strategy might be to enclose the PRB-survey with the original main survey together with a letter that urges the respondent to complete this questionnaire after the main one is completed. A PRB follow-up survey could also be administered via a telephone follow-up interview. In the original LEG project (Hedlin et al. 2005) the UK Office for National Statistics successfully used this mode of data collection when testing their original question set. In this test the name and contact details of the person who had completed the main survey questionnaire was known. If this mode is used you need to consider possible data quality issues in terms of recency effects (ref?) in question responses.

5.3 Motivation strategies

Cialdinis compliance principles

Given that you are able to trace the respondent, the general recommendations of how respondents should be convinced to participate are often based on the compliance principles developed by Robert Cialdini (1990) and adapted to surveys by Groves, Cialdini and Couper (1992). The compliance principles are

1. **Reciprocation**, which means that one should be more willing to comply with a request to the extent that the compliance constitutes the repayment of a perceived gift, favor or concession. Generally the most effective recruitment strategy in surveys has been to enclose cash, a ticket in a lottery or another kind of gift together with the invitation letter. While valuables only offered to those who answer the questionnaire leaves it up to the respondents to decide if it is worth while, an incentive given to all creates a feeling that one owes the surveyor to respond. For several reasons incentives are normally not used in business surveys. Substitute incentives such as information leaflets with results from previous studies have been used with some positive effects. A leaflet about response burdens in businesses may convey the feeling that one is already part of a common project.
2. **Commitment & consistency**, which means that after committing oneself to a position, one should be more willing to comply with requests for behaviors that are consistent with that position. All the previous studies we have carried out with the two questions about the usefulness of the data, to the business and society, that the respondent reports, have shown depressing results. In a PRB-survey, however, this rather negative attitude to business surveys can be turned to an argument for expressing one's perceptions of what makes business surveys burdensome.
3. **Social validation**, which means that one should be more willing to comply with a request to the degree that one believes that others would comply with it. The most powerful validation a business respondent can get is probably a recommendation from one of his/hers superiors. If possible, one could try to sell the response burden survey to the management before the questionnaire is given to the respondent.
4. **Authority**, which means that one should be more willing to yield to the requests of someone whom one perceives as a legitimate authority. Research undertaken by Statistics Netherlands (Snijkers, 2007) found that the dominant principle used in business surveys in Statistics Netherlands was that of 'authority'. In its mildest form statistical agencies argue that they are not commercial, but a social institution that produces welfare for its citizens. In its more persistent form, which is the most common in business surveys, the agencies refer to laws that make statistical

surveys mandatory. In a voluntary PRB-survey only the mild alternative can normally be applied.

5. **Scarcity**, which means that one should be more willing to comply with requests to secure opportunities that are scarce. In the previous sampling chapter it is recommended that, in order to reduce the response burden of the PRB-survey, it should only be carried out in a sample of those drawn from the main survey. When the survey is presented the fact that not all respondents, but a more exclusive group of respondents are selected to answer the PRB-questions should be highlighted. This could backfire, however, if respondents believe that they are being bothered more than others, and should be used with caution.
6. **Liking**, which means that one should be more willing to comply with the requests of liked others. The more personal we are able to make a request, the easier it may be to create a pleasant atmosphere. This is one of the techniques well trained interviewers use. We do not think that one can expect that the respondents have very warm feelings for the statistical agency. But a simple thing like including a photograph of the director general, showing that he apparently is a normal, likeable person, might work.

In addition to the six principles above, there is another important principle, the *helping tendency*. This refers to the extent that people are willing to help when asked. In most cultures there exists a helping norm that motivates individuals to help others who are in need and who are dependent upon them for aid. Hence even a simple request to participate in a survey can be more successful when it includes an appeal to the helping norm (Cialdini 1990).

To wrap up, many of the comments we have given to the compliance principles, points towards offering a leaflet about the response burden topic with the survey.

The question wording and visual design of the PRB-questionnaire have already been presented in chapter 2. When the questions and questionnaire were developed readability and user friendliness were important considerations. Here we only want to add one tip. As we pointed out in chapter 2, it may be of some importance that the respondents see the first questions before he/she decides to respond or not when the questionnaire is embedded in the main survey. If it is necessary to ask directly for confirmation of willingness to participate, the question could also be slightly loaded towards a positive answer; for instance like this:

Please confirm that you would like to answer these evaluation questions

Yes

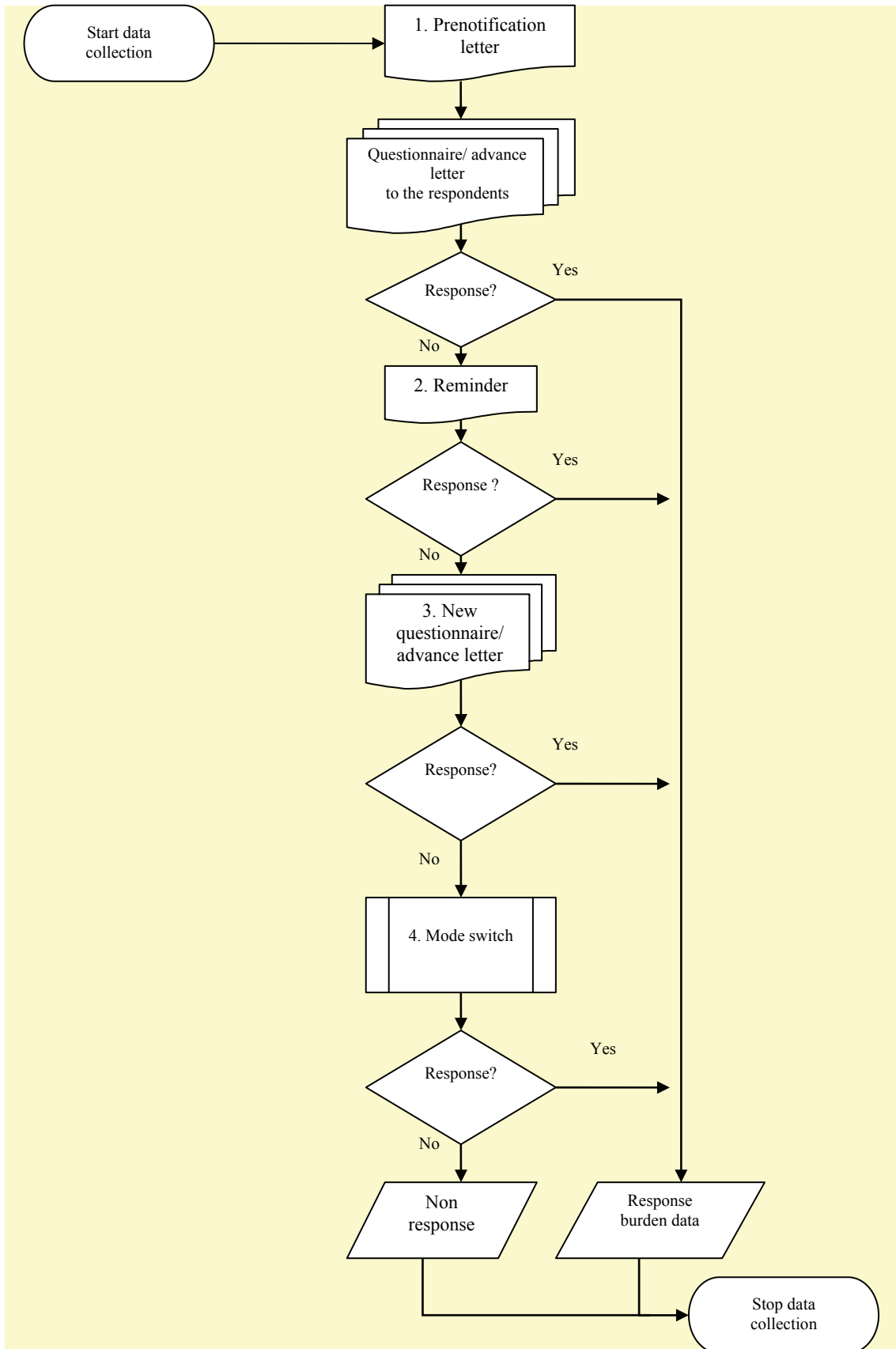
No

5.4 Data Collection Procedures

The final important issue that one has to avoid is nonresponse. This requires careful consideration to ensure that an agreed procedure is implemented during the data collection. In figure 10 we have visualized the data collection procedure in a flow chart. To minimize the risk of nonresponse Dillman (2007) recommends the initiation of four contacts in mail surveys:

1. A brief prenotice letter. We have already suggested that it would be a good idea to mail a prenotice letter to the management of the business and that a response burden leaflet should be sent together with the questionnaire.
2. A thank you card that is sent a few days after the questionnaire. This expresses appreciation for responding and indicates to those who have not yet responded that we hope they will soon do so.
3. A replacement questionnaire together with the first reminder. When the PRB-questions are enclosed in the main survey, a special reminder about these questions should be included in the reminder letter.
4. A second and final reminder made by a different mode than the original one. At this point telephone interviews are often the most effective. In mandatory business the second reminder is often a letter reminding those who have not yet responded that the survey is statutory and that nonrespondents may be prosecuted. We think a gentler, second reminder, preferably a telephone call, should precede this kind of warning letter.

Figure 10: Flow chart of data collection process



6 Writing-up and disseminating the PRB survey findings

When you have collected and analysed the PRB-data, you need to decide on a presentation or publishing strategy in order to make the results known to different target groups. This chapter outlines some of the considerations that should be made prior to writing up, during the writing up and prior to dissemination. These guidelines should be useful when considering these aspects of the project. When there are several stakeholders or more than one target group involved, different strategies should be made to meet the needs and interests of the different groups.

6.1 Areas to consider prior to writing-up the PRB survey findings

Before you start writing-up the findings of the survey several considerations should be made, for instance why the survey has been undertaken, who the audience is - different target groups or stakeholders, whether the results are to be published and if so in what medium or channel, and of course data confidentiality issues. Below are some questions that you should consider and answer prior to writing- up the PRB survey:

Why PRB-survey?

Why have you undertaken the PRB survey?

- Remind yourself of the original objectives of the study. This will act as a checking procedure when reviewing your analysis and findings prior to writing-up and dissemination. Remember, there are three key objectives for undertaking a PRB survey:
 - ⇒ because there is a requirement to monitor perceived response burden over time
 - ⇒ to evaluate changes that have been made to the questions and/or questionnaire
 - ⇒ to evaluate changes that have been planned or made in the mode of data collection

For whom?

Who is your audience?

- The presentation and writing up of results should be dependent on your likely audience. If you have different audiences with different areas or interest, you might want to consider tailoring the message to the different groups.
- Regardless of your audience you should aim to write clearly and avoid the use of jargon.

Secure confidentiality

Data confidentiality?

- Ensure that no individual or business can be identified from your analysis and results.
- Consider and agree how, where and for how long to keep the PRB survey data files.

6.2 Areas to consider when writing-up the PRB survey findings

Structure and tailor information

When the preparations have been made and you are ready to start writing-up the results in whatever form you have decided on, there are also some considerations that should be made. It is important to structure the information in a logical and intuitive way, and to present the results in formats that are accessible to the different target groups. You should ask yourself, and maybe also someone from your target group, how the information should be presented. Should you use tables or graphs, or perhaps a combination? Should the presentation be descriptive or analytic and how much details should be included? Below are some questions that you should consider and answer whilst writing-up the PRB survey:

- Report
- General principles for structuring a report:**
- Ensure that you have an appropriate title that reflects the contents of the report.
 - Include an executive summary at the start of the report so that people who do not have time to read the whole report can read this and receive the main messages.
 - Include an introduction that explains why the work was undertaken in the first place.
 - Include a methodology section. This section should include a description of the PRB studies sampling method, data collection instrument (including the questions), the data collection procedure, data capture, relevant study metadata e.g. response rates and how they were calculated and data analysis.
 - Include a results section & conclusions section.

- Tables
- General principles for tables:**
- It is easier to read down a column of numbers than across a row as numbers are closer together and therefore making it easier to make comparisons.
 - Where possible order rows by the row totals e.g. highest to lowest or lowest to highest.
 - Ensure even spacing of rows and columns and that they are not too wide.
 - Ensure labels are clear and self explanatory.
 - Include verbal summaries of data contained in the tables.

- Graphs
- General principles for graphs:**
- Graphs are good for presenting simple results e.g. a shape of a distribution but remember that the numbers are not explicit from the graph.
 - Numerical data for several variables is often better shown in a well designed table.
 - See examples in figure 11, next page.

6.3 Areas to consider prior to disseminating the PRB survey findings

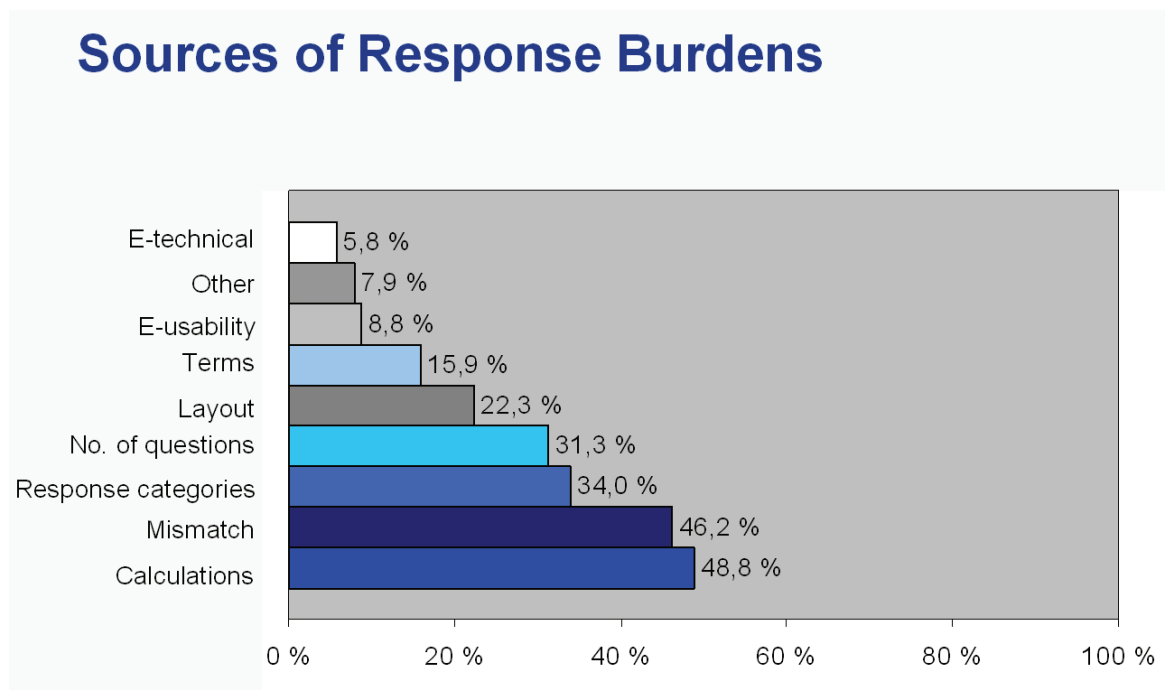
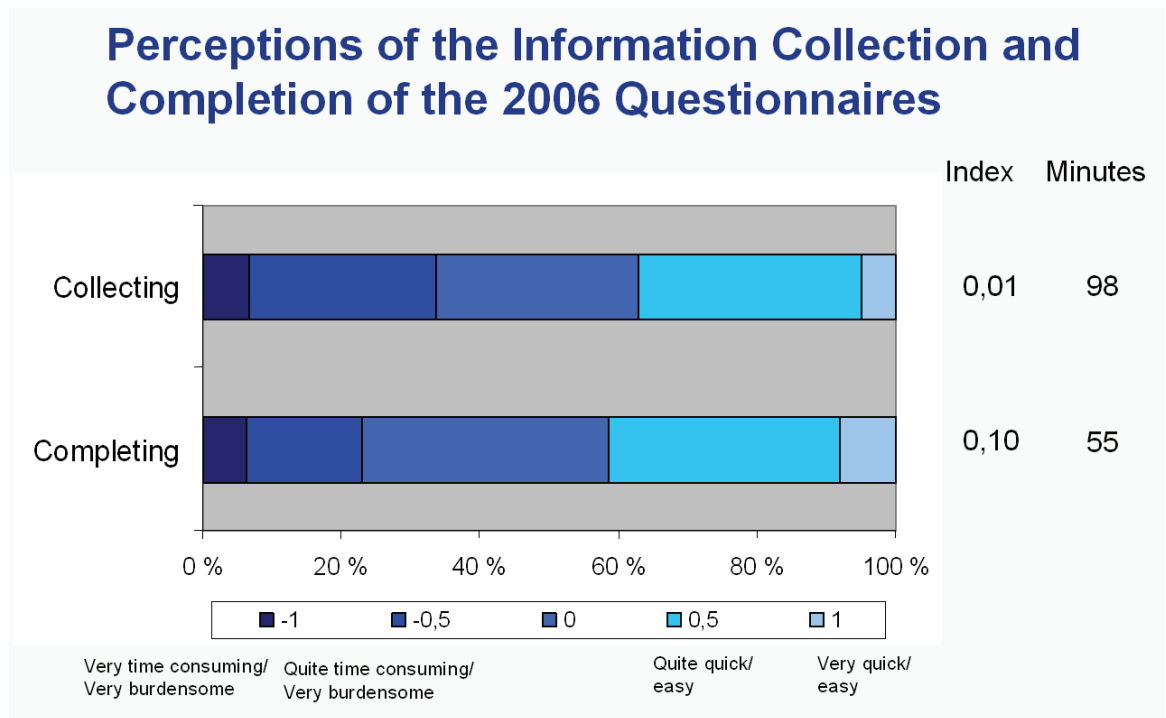
Dissemination considerations

There are also important considerations to be made regarding the dissemination itself, such as timing, mode(s)/channel(s), and other possible audiences than first intended. Are the findings interesting for the general public for instance, and should they be disseminated through the media? When the results should be presented is another question. Could the timing be influenced by other factors in the public sphere, or should they be, are other interesting questions. Below we have listed some further considerations that might be useful to take into account before disseminating the PRB-results regardless of audience:

- Timing of report dissemination.
- Mode of dissemination. One of the indicators in principle 15 (accessibility and clarity) of the European Statistics Code of Practice states that “dissemination services use modern information and communication technology and, if appropriate, traditional hard copy” (p. 8).
- If the findings report will be disseminated outside of the survey organisation ensure that you have briefed all relevant senior managers.
- How the report will be archived (electronic or paper) and if there is a need to disseminate the indicators separately as quality indicators?
- Is there is best practice that can be drawn from the studies findings. If there is, consider how, when, where and to who you will disseminate this best practice?
- Do the results of the PRB study indicate areas that need to be improved in the main survey? If there are, formally refer these to the relevant survey manager.

There are most certainly other considerations than the ones mentioned here, that will influence the strategies for writing-up and disseminating results of a PRB-survey. However, the points and reflections here should be helpful in assisting you in making choices in relation to writing up and disseminating the PRB survey findings.

Figure 11: Examples of how response burden results could be presented³



³ From Haralden and Jones (2007)

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Appendix 1: The Standard Cost Model

The Standard Cost Model (SCM) is today the most widely used method to measure administrative burdens on businesses. This method is not developed specifically to measure the statistical response burden, but to measure all kinds of administrative activities that face a business. It focuses on burden placed by central government through regulations or laws. The SCM methodology is activity-based, meaning that the costs and time taken to fulfil requirements is broken down by activity. This in turn means that one of the strengths of the model is that it points out the specific activities, or parts of a regulation, that are most burdensome. Detailed descriptions of the SCM and the methodology, as well as a manual on how to run a measurement using the SCM can be found on the SCM Network's website, www.administrativeburdens.com. Here, we will make a short description of the methodology and how it applies to statistics.

It should first be noted that the SCM model focuses only on administrative costs. These form part of the total costs of a business to fulfil a regulation. Other costs, such as direct financial costs (taxes, charges etc.) and long term structural costs of a regulation are not covered.

A core element of the SCM approach is using it in reducing the burden. The model therefore includes two parts, a baseline measurement and follow-ups to see how the costs develop over time.

Some key elements of the SCM approach are:

Information obligations: The obligations arising from regulation to provide information and data to the public sector or third parties.

Data requirements: Each information obligation consists of one or more data requirements.

Administrative activities: The activities that need to be undertaken to provide the information for each data requirement.

The cost parameters: The cost per administrative activity can be calculated as Price x Time x Quantity. The Price consists of a tariff (wage costs) plus overhead. The Time is the amount of time required. The Quantity includes the size of the population of business affected and the frequency that the activity must be completed.

To apply these elements to statistics, the Information obligation can be interpreted as a questionnaire. The data requirements are the different parts or questions within the questionnaire. The administrative activities being for example understanding the requirements, extracting the data from information systems, filling in the questionnaire, signing and sending. Calculating the costs may be done like this:

For a specific questionnaire and question, the average time taken to extract the data is 10 minutes (1/6 of an hour). The average hourly cost of staff doing this task is 60 euro, including overhead. Since this is a monthly survey, the task is done 12 times each year. The sample size is 10.000 enterprises. The cost of this administrative activity can be calculated as $1/6 \times 60 \times 12 \times 10.000 = 1.200.000$ euros.

The costs can be summed up per information obligation (questionnaire) and to a total for all information obligations. This means it is possible to calculate the total administrative costs of all statistical requirements, while retaining data at the activity

level means it is also possible to analyse which information obligations, data requirements and activities pose the highest administrative costs.

This is of course a simplified example. In practice, a number of difficulties in measurement are present, and can be studied in detail in the manual. We will here briefly describe the phases and steps in the measurement.

Step 0: Start-up. If large measurements of complicated regulations are to be made, a start-up analysis is necessary. In the measurements that have been carried out, at least in Sweden, the area of statistics proved to be relatively simple and clear.

Phase 1: Preparatory analysis

Step 1: Identification of information obligations, data requirements and administrative activities and classification by origin. For statistics, it is rather simple to identify information obligations. Each mandatory survey can be seen as an information obligation. Normally, for each survey there is one questionnaire, but in some cases several questionnaires are used. When it comes to data requirements, this is a breakdown of the questionnaire into pieces. A requirement can be a single question, but it can also be a set of questions, depending on which is deemed more practical. The identification of administrative activities is done by choosing from 16 standard administrative activities. The classification by origin is made to provide an overview of where the costs originate from. For example, surveys can be divided into national surveys and EU regulated surveys. Some surveys are a combination of EU requirements and additional national demands.

Step 2: Identification and demarcation of related regulations. This is done to avoid double counting of requirements. Again, for statistics this is quite simple. Requirements in questionnaires are attributed to statistics. When administrative data is used in statistics, this data is originally collected for other purposes, and the costs of providing this information should not be attributed to statistics.

Step 3: Classification of information obligations by type (optional step) – a division into compulsory and voluntary information obligations.

Step 4: Identification of relevant business segments. Businesses have to be segmented according to the criteria that affect the scope of resources used to comply with information obligations and data requirements. This can be a tricky part, but also important, since using segments may produce better estimates of costs. Some examples of segments that may be used for statistical surveys are different types of questionnaires, different use of information systems and whether the task is outsourced (to for example accountants) or not. Background information such as size class and activity code may also be used for segmenting, but it is not always necessary. The manual recommends not over-segmenting, since it will mean both more interviews (a more expensive process) and more difficult analysis. Segmenting should be made when different segments will produce significantly different estimates for time and costs.

Step 5: Identification of population, rate and frequency. The population indicates how many businesses are affected. For a statistical survey, it is equal to the sample size. Each data requirement may not be requested for the whole population, therefore rates may be used for different data requirements. The frequency is the number of times per year the survey is conducted.

Step 6: Business interviews versus expert assessment. The SCM approach states that not all information obligations must necessarily be evaluated by means of business interviews. However it recommends using interviews if possible.

Step 7: Identification of relevant cost parameters. Cost parameters may be internal and external, hourly pay or overhead, or necessary acquisitions to comply with the information obligations.

Step 8: Preparation of interview guide. For the interview method to work, it should provide uniform, consistent and accurate data. The interview guide is structured in order to measure the administrative costs in this manner, as detailed and precise as outlined in previous steps.

Step 9: Expert review of steps 1-8. Before actual measurement, it is recommended that experts review the decisions and propositions made.

Phase 2: Time and cost data capture and standardisation

Step 10: Selection of typical businesses for interview – normally it is recommended to conduct five interviews per segment, however it is said that three may be enough. The same business may be interviewed about several requirements (surveys). In recruiting business, it should be taken into account whether several people are involved in replying to the survey, and whether all these need to be interviewed.

Step 11: Businesses interviews – conduction of interviews with business selected in step 10 using the interview guide created in step 8. One strength of the interview method is that it is possible not only to measure the time taken, but also discuss possible ways to reduce the costs. Suggestions may be noted and compiled.

Step 12: Completion and standardisation of time and resource estimates for each segment by activity. Based on the interview, standard times should be set for all activities and data requirements. This may be considered the most tricky part of the SCM approach, since it includes assessment of whether the interviewed businesses are normally efficient or not. The standardisation of time is based on the assumption of normal efficiency, i.e. the time it takes for a normally efficient business to fulfil the requirements.

Step 13: Expert review of steps 10-12. Especially for step 12, experts may be used to assess whether the interviews yielded probable results.

Phase 3: Calculation, data submission and reports

Step 14: Extrapolation of validated data to national level. Based on phase 1 and 2, the data from phase 2 are extrapolated to the whole population with data from phase 1.

Step 15: Reporting and transfer to database, Normally the results are presented in a written report and data stored in a database for follow-ups.

These steps describe the baseline measurement. Over time, when changes are made, new measurements are made to update the calculations and measure the effects of different efforts to reduce burden.

Questions about Response Burden and User Experiences

In this questionnaire we ask you to answer some questions on how easy or difficult it was to find the necessary information and to fill in the “name of survey” questionnaire. These questions are voluntary, but by answering them you will contribute to simplifying and improving our questionnaires. We therefore hope you will take some time to answer them.

1 Which task(s) did you carry out when responding to the "name of survey" questionnaire?

You may give more than one answer.

- Distributed tasks to the people who contributed to the work of responding to the questionnaire → Go to 11
- Collected necessary information to answer the questions
- Responded to the questions in the questionnaire
- Did not respond to questions myself, but filled the answers into the questionnaire } → Go to 6
- Had responsibilities connected to receiving the questionnaire and returning the answers → Go to 11

It is important that you answer the following questions based on your own experience in the reporting process unless something else is asked for.

2 Did you think it was quick or time consuming to collect the information to complete the "name of survey" questionnaire?

- Very quick
- Quite quick
- Neither quick nor time consuming } → Go to 4
- Quite time consuming
- Very time consuming

3 What were the main reasons that you found it time consuming? You may give more than one answer.

- Had to collect information from different sources
- Needed help from others in order to answer some of the questions
- Had to wait for information that was available at different times
- Other reasons, please specify:

4 How much time did you spend collecting the information to complete the questionnaire?

Number of
hours:

Number of
minutes:

Did not spend any time on this at all

5 How much time do you think the business spent on collecting the information to complete the questionnaire? Please report as accurate as possible the total time for all persons involved in collecting information.

Number of hours Number of minutes Did not spend any time on this at all

6 Did you find it easy or burdensome to fill in the questionnaire?

- Very easy
 - Quite easy
 - Neither easy nor burdensome
 - Quite burdensome
 - Very burdensome
- } → Go to **8**

7 What conditions contributed to making the questionnaire burdensome to fill in? You may give more than one answer.

- The high number of questions
- Messy presentations that made the questionnaire hard to read
- Unclear terms and explanations of terms
- Questions that asked for complicated or lengthy calculations
- Available information did not match what was asked for
- Difficult to decide which response alternative was the correct answer
- Other reasons, please specify:

8 How much time did you spend on actually filling in the questionnaire?

Number of hours Number of minutes I did not fill in the questionnaire

9 Is this the first time you have contributed to completing the “name of survey” questionnaire or have you contributed to completing the same questionnaire previously?

- This is the first time I have contributed to completing this questionnaire
- I have contributed to completing the same questionnaire previously

10 Was it easy or difficult for you to find sufficient time for the tasks you were responsible for in responding to this questionnaire before the given deadline?

- Very easy
- Quite easy
- Neither easy nor burdensome
- Quite difficult
- Very difficult

11 How many people were involved in responding to this questionnaire? Please include yourself

Number of persons involved

12 Do you think that the statistics from this questionnaire are useful or useless to your business?

- Very useful
- Fairly useful
- Neither useful nor useless
- Fairly useless
- Very useless
- Don't know

13 Do you think that the statistics from this questionnaire are useful or useless to the society?

- Very useful
- Fairly useful
- Neither useful nor useless
- Fairly useless
- Very useless
- Don't know

Thank you for your help!

Appendix 3.

Step by step guide to selecting a sample size

In this step by step guide we will take you through the process of identifying your sample size. A straightforward simple random sampling approach will first be considered. We will then turn to a more sophisticated approach in the simple random sampling setting. This sophisticated approach can be improved further, and we will present a guide to *stratified simple random sampling*.

As an illustration, we will as measurement variable use *answering-time*, by which we mean the time it takes to understand the data request, locate the data, compile the data, complete the questionnaire and possibly have it signed off prior to return to the survey organisation. You can easily adapt the guides to analysing a proportion such as the proportion experiencing heavy response burden, c.f. the last part of this appendix.

Basic simple random sampling.

In simple random sampling, the sample is drawn just as in a lottery: each unit in the sample is drawn randomly *without replacement*¹ from the population.

Step 1: Make an estimate of the standard deviation s of the answering-time in the population.² This is difficult prior to collecting data, but there are solutions:

Selection
of size

- you can use an estimate based on experiences from similar surveys performed earlier.
- if you are uncertain, make a *conservative* estimate, i.e. let your estimate of s be somewhat larger than you would expect.
- if you are very uncertain you could consider a pilot survey of e.g. a sample size of 50 where you e.g. phone the respondents and get a rough measure of answering-time based on their collection of their participation in the main survey last time this survey took place.

Step 2: Choose the part of Table A.1 where the population size (i.e. main survey size) is closest to your population size. Think conservatively, if your survey size is 3,400 you might want to use 4000 in Table A.1.

Step 3: Choose the largest *error margin* that you find acceptable, i.e. the margin around the estimated average answering-time, that you consider should cover the population average answering-time with 95 percent certainty. The larger the error margin that you allow, the less sample size is required.

Step 4: Read from Table A.1 how large the PRB-sample size n should be in this group. For example, suppose that your population (main survey sample) is 2000, and that you have estimated $s = 10$ and chosen error margin equal 1. Then you have to have a PRB-sample size of 500.

The estimated average answering-time from the PRB-sample survey will be your estimate for the average population answering-time. If you have followed the steps above, and the true standard deviation of the population answering-time is not higher than the s that you choose above the uncertainty of your estimate is not

¹ a unit can not be drawn twice from the population.

² if you can identify an interval that in your opinion probably contains 95 percent of the answering-times in the population, then s is approximately a quarter of the length of this interval

larger than your chosen error margin: you can be 95 per cent certain that the population average doesn't deviate more from your estimated average than the error margin.

Simple random sampling controlling the size of the smallest group

Now assume that you want to find the response burden within each of a number of groups. Still using simple random sampling, you may want to decide on a sample size large enough to provide you with precise estimates for each of your groups. You can then do the following:

Selection of size

1. Identify the smallest group g of businesses where you want to estimate answering-time.
2. Carry out Steps 1 to 4 above, for group g , i.e. make an estimate of the standard deviation s_g of answering-time of this group in the population, and the error margin, and finally find the required sample size n'_g in this group from Table 1. Then reason for putting a mark on the symbol for sample size, is explained below.
3. Let the total PRB-sample size n be $n'_g \cdot N / N_g$ where N_g is the population size in group g .
4. The sample size n_g of the smallest group will be those of the total sample n that happen to belong to group g .

Please note, because of the randomness of simple random sampling, the actual sample size n_g from group g will only approximately be equal n'_g , and if n'_g is smaller than 30, this approximation will be poor.

The average answering-time is your estimate here just as in ordinary simple random sampling above, and also the considerations on precision is unchanged. However, in stratified simple random sampling below, your estimate will be more complicated.

Stratified simple random sampling

Stratification advantages

As in the previous example, assume that you want to obtain precise response burden results within each group. Stratified simple random sampling solves this challenge and also makes you decide on the *exact* sample size within each group. Stratification also gives you a more precise estimate for PRB in the total population.

Stratified sampling is effective when you think that different groups of businesses have different properties. In a PRB survey, a reason for stratification would be that you think that different groups within the population will answer differently to the PRB questions. This should not be confused with the fact that the original survey is often using a stratified sample. In some cases, there may be good reason to use the same strata as the original survey, but in other cases it may not. Since the PRB questions are optional, there will almost certainly be a lower response rate to these than the original survey. Using a detailed stratification might mean there will be groups with few answers, giving less precise results,. Stratification of the PRB sample could be made on a broader base than the original sample, for example using fewer size classes and industries. In some cases there might also be other indicators of interest in stratification for a PRB survey but not for the original survey (some examples could be the number of local units, or the number of values

reported in the original survey, the last one only possible to use in the PRB survey if it is run after the original survey).

Selection
of size

Stratified random sampling is somewhat more mathematically advanced than simple random sampling, but can be a substantial improvement.

1. Divide the population into *strata*, i.e. groups that you can identify from the previous business survey (e.g. by number of employees or turnover) if you have such information. Make this division with the following objectives in mind:
 - every small group where you want to estimate answering-time, should be a stratum
 - the division is more efficient³ if the strata are homogenous with respect to answering-time, i.e. if you group together enterprises with similar answering-time.
2. For each stratum or group g , follow steps 1 to 4 from "simple random sampling", i.e. make an estimate of the standard deviation s_g of answering-time of this group in the population, and the error margin, and finally find the required sample size n_g in this group from Table A.1.
3. From each stratum g in the population, draw n_g enterprises using simple random sampling.
4. \bar{X}_g , the average answering-time in the sample from stratum g , is the best suggestion or *estimate* of the average time used in stratum g in the population (or main survey sample)
5. $\sum_{\text{all } g} \bar{X}_g \cdot n_g / n$ is the best suggestion or *estimate* of the average answering-time in the population. Here the summing sign means that you add the terms $\bar{X}_g \cdot n_g / n$ for each stratum g .

Finding the error margin of the estimate for the average answering-time in the population, is beyond the scope of this text, but you can find this in textbooks on survey sampling, e.g. Lohr (1999).

Deciding on a sample size when investigating proportions

Proportions

When we instead of average answering-time want to measure a rate, e.g. proportion experiencing heavy response burden, the decision on sample size becomes simpler. The reason is that we don't need to estimate any standard deviation in the population. Instead it is sufficient that we estimate the average proportion in the population experiencing heavy response burden, and then we use Table A.2 instead of Table A.1. If you are very uncertain of the average proportion, you see in Table A.2 that you can use 50 per cent which is the most conservative choice.

³ in the sense that the variability (measured by variance) of the estimated average answering-time will be smaller with homogenous strata.

Table A.1. Error margin for the average answering-time (time used in answering the questionnaire) in the population. By sample size and standard deviation of answering-time in the population.

Size of main survey	Sample size	Standard deviation of average time used in the population				
		5	10	20	50	100
Infinite	50	1,4	2,8	5,5	13,9	27,7
	100	1,0	2,0	3,9	9,8	19,6
	200	0,7	1,4	2,8	6,9	13,9
	500	0,4	0,9	1,8	4,4	8,8
	1000	0,3	0,6	1,2	3,1	6,2
	2000	0,2	0,4	0,9	2,2	4,4
4000	50	1,4	2,8	5,5	13,8	27,5
	100	1,0	1,9	3,9	9,7	19,4
	200	0,7	1,4	2,7	6,8	13,5
	500	0,4	0,8	1,6	4,1	8,2
	1000	0,3	0,5	1,1	2,7	5,4
	2000	0,2	0,3	0,6	1,5	3,1
2000	50	1,4	2,7	5,5	13,7	27,4
	100	1,0	1,9	3,8	9,6	19,1
	200	0,7	1,3	2,6	6,6	13,1
	500	0,4	0,8	1,5	3,8	7,6
	1000	0,2	0,4	0,9	2,2	4,4
1000	50	1,4	2,7	5,4	13,5	27,0
	100	0,9	1,9	3,7	9,3	18,6
	200	0,6	1,2	2,5	6,2	12,4
	500	0,3	0,6	1,2	3,1	6,2

Table A.2. Error margin for the percentage in the population experiencing heavy response burden

Size of main survey size	Sample size	Percentage in the population experiencing heavy response burden					
		5% or 95%	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50 %
Infinite	50	8,3	8,3	11,1	12,7	13,6	13,9
	100	5,9	5,9	7,8	9,0	9,6	9,8
	200	4,2	4,2	5,5	6,4	6,8	6,9
	500	2,6	2,6	3,5	4,0	4,3	4,4
	1000	1,9	1,9	2,5	2,8	3,0	3,1
	2000	1,3	1,3	1,8	2,0	2,1	2,2
	4000						
4000	50	6,1	8,3	11,0	12,6	13,5	13,8
	100	4,3	5,8	7,7	8,9	9,5	9,7
	200	3,0	4,1	5,4	6,2	6,6	6,8
	500	1,8	2,5	3,3	3,8	4,0	4,1
	1000	1,2	1,6	2,1	2,5	2,6	2,7
	2000	0,7	0,9	1,2	1,4	1,5	1,5
	2000						
2000	50	6,0	8,2	10,9	12,5	13,4	13,7
	100	4,2	5,7	7,6	8,8	9,4	9,6
	200	2,9	3,9	5,3	6,0	6,4	6,6
	500	1,7	2,3	3,0	3,5	3,7	3,8
	1000	1,0	1,3	1,8	2,0	2,1	2,2
	2000						
1000	50	5,9	8,1	10,8	12,4	13,2	13,5
	100	4,1	5,6	7,4	8,5	9,1	9,3
	200	2,7	3,7	5,0	5,7	6,1	6,2
	500	1,4	1,9	2,5	2,8	3,0	3,1
	1000						