Paper and Web Questionnaires Seen from the Business Respondent's Perspective

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Abstract

Both in Britain and Norway, quite a lot of data about the objective and perceived response burden in businesses have been collected. Yet, the data have not been analyzed within a conceptual framework that links response burden to its possible causes and effects. In this paper we will take a first step towards such an analysis.

Keywords: Questionnaires, Web, Respondent Burden, Perceived Respondent Burden.

1. A Quality driven Approach to Response Burdens

The costs and burdens that public authorities put on companies and enterprises in order to collect statistics and other kinds of steering information are of great concern in every modern society. Survey organizations should of course be sensitive to this concern. In addition to this, we believe that there is another and even more important reason why survey organizations should be engaged in reducing response burden. That is because high response burden is likely to reduce response quality. High response burden indicates that the questions are difficult to answer, and consequently that many of the respondents may not be able to give correct answers (Couper and Groves 1996). 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 (Krosnick 1991). While response burden is the perspective of the respondent, response quality should be the perspective of the survey methodologist. That is why we argue that we should have a quality driven approach to response burden.

This quality driven concern has several, important implications. First, it is not the well being of the business, but the well being of the respondent that is in focus. The owners or shareholders of a business may complain that answering survey questions is a non profitable activity that places burden on the business accounts. This economic business burden may then relate to the priorities given to surveys. But our focus is still not at the owners' or managers' worries, but on the respondents. This standpoint clearly distinguishes our perspective from the Standard Cost Model approach, which is the most popular response burden model in Europe right now (SCM Network 2005).

Secondly, even if it is correct that time consuming questionnaires generally are burdensome to complete, it is probably not the time itself but the *perception* of time and effort that is likely to affect the response quality. Time passes quickly if the topic is interesting and the respondent feels that he/she is competent to answer the questions posed, while it feels longer if the respondent does not understand the point of the questions or feels incompetent. This is why we argue that it is the business respondents' perceived response burden that should be in focus.

1.2 The Total Business Survey Burden Model

In the project 'Developing methods for assessing perceived response burden', (partly funded by the Commission of the European Communities) three national statistical institutions (Statistics Sweden, Statistics Norway and the U.K. Office for National Statistics) undertook research with business respondents to understand what constitutes perceived response burden and produce an evidence-based set of guidelines for assessing and reducing perceived response burden (Hedlin et al 2005).

Traditionally, the literature has focused on the respondent and response burden has been equated with the time taken to complete the survey (Hedlin et al 2005, chapter 1). But neither the businesses nor business survey respondents are homogeneous. Businesses vary by industry, size and single site or multi site. Business survey respondents vary in the level they are within the business, their financial involvement in the business that they work in, and their experience of completing business survey questionnaires. Both the characteristics of the business and the business survey respondents have an influence on the priority given and perception to responding to business surveys.

When responding to business surveys the respondent or respondents undertake eight key processes. These processes are now internationally recognised as the

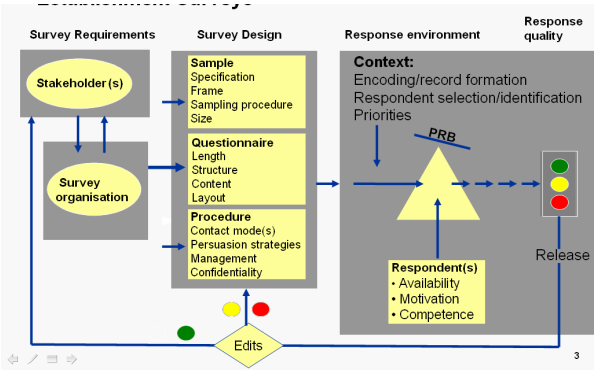
business survey response process (Willimack & Nichols, 2002). The processes in the model are:

1. Encoding in memory/record formation
2. Selection and identification of the respondent or respondents
3. Assessment of priorities
4. Comprehension of the data request
5. Retrieval of relevant information from memory and/or existing business records
6. Judgement of the adequacy of the response
7. Communication of the response
8. Release of the data.

The first three and the last point of this list are clearly business characteristics, while point 4 – 7 are individual response processes.

The Total Business Survey Burden Model (TBSB) created during the aforementioned project, identifies the creation and flow of burden between all the actors (stakeholder(s), the survey organization, business(es), gatekeeper(s) and respondent(s)) in the survey process. The model provides a holistic approach to burden, in which the respondent is only a part. In doing this, burden is conceptualized as a cyclical process which is transferred between actors in the survey process (Jones, et al. 2005). The present version of the model look likes this:

Figure 1: The Total Business Survey Burden Model



In this paper we will concentrate on the right-hand side of the model. At first glance this part of 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 box, is described as an intermediate variable that are influenced by the survey design, the characteristics of the respondent and by external factors that may affect the task he/she is set to perform. Next, we are interested in the impact that the perceived response burden has on the response quality, - here indicated by a traffic light that could be red, yellow or green. This is a classical socio-psychological model with three independent variables, one intermediate variable and one dependent variable.

Also the contents of the model is nothing new, but taken from other scientists. The seesaw refers to the social exchange theory used by Don Dillman to point out that a questionnaire both can be perceived in a positive and negative way (Dillman 2007). The terms indicating different external conditions present in businesses have been taken from the work of Diane Willimack and Nichols (2002). And the four arrows linking perceived response burden with response quality refer to the four cognitive steps described by Roger Torangeau (Torangeau 1984). What we have done is simply to put these different contributions together in a socio-psychological model.

Two very important points should, however, been drawn from this model:

1) First, it is important to recognize that the perceived response burden may stem from other sources than the survey design. If what makes responding burdensome are contextual conditions or the respondent's personal characteristics, we can try to adjust our instruments to these conditions, but they are difficult to change.
2) Secondly it important to recognise that a survey design, (as well as the other causal factors), consists of a number of components. Thus, what we need to know is not only that a certain survey design affects the perceived response burden, but what parts of the design have that effect.

To summarize the quality driven approach to the response burdens in businesses, these are the important points:

- response burden is mainly a problem if it affects response quality
- it is the respondents' response burdens that matter
- perceived response burden is a more relevant variable than completion time
- response burden may be affected by contextual conditions and personal characteristics of the respondent as well as by the survey design
- perceived response burden questions should identify why questionnaires are burdensome.

In the following empirical study we try to identify how the three types of variables contribute to the perceived response burden.

2. Response Burdens studied empirically

2.1 Questions and data

We have made a first effort to link these factors together in an empirical study. One of the outputs from the aforementioned LEG-project, was a fairly simple perceived response burden (PRB) question set that could be linked to specific questionnaires without itself adding too much to the response burden. The two core questions in this question set are:

Do you think it was quick or time consuming to *collect* the necessary information to complete the questionnaire?

+1	Very quick
+0.5	Quite quick
0	Neither quick nor time consuming
-0.5	Quite time consuming
-1	Very time consuming

These were asked to pick the main reason(s) from a list or specify other reason(s)

Did you find it easy or burdensome to *complete* the questionnaire?

+1	Very easy
+0.5	Quite easy
0	Neither easy nor burdensome
-0.5	Quite burdensome
-1	Very burdensome

These were asked to pick the main reason(s) from a list or specify other reason(s)

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The values listed on the left side of the response boxes were not presented in the questionnaire, but are weights that we used to construct two indexes ranging from -1 to +1. You will meet these indexes in the presentation of results.

In addition to these two core questions and their follow up questions, other questions that can be used in an analysis are also asked. In the following, some of these are used to distinguish between different sources of perceived response burden.

- **Survey Design Factors**
  - Characteristics of 6 web questionnaires directed to different industries
  - (The time it took to fill in the questionnaire)
- **Contextual factors**
  - Size: The number of employees
  - Information sources: Documentation problems that made the information collection time consuming
  - Division of labour: The number of persons who took part in the response process
- **Personal Characteristics**
  - Availability: How easy or difficult it was to set aside time for the questionnaire
  - Motivation: How useful for the business and society the respondent felt that statistics produced from the data were
  - Competence: If he/she was a first time or experienced respondent

The PRB-questions have been posed in several Norwegian business surveys and also in a few studies in Sweden and UK. The results presented here are from six annual business surveys that were run in 2006. All these surveys have both a paper and web questionnaire, but unfortunately we were only able to link the PRB-questions to the web questionnaire.

As can be seen from table 1 below, even if the web proportion of the responses were relatively high, less than 50 % of the respondents were confronted with the PRB-questions.

Business surveys in Norway are mandatory, but the PRB-questions were not. This led to an additional reduction of the net sample due to nonresponse. Even if we have not detected any serious bias in the net sample, we do not claim that the results presented here can be generalised. Hence, the conclusions we draw are suggestions rather than conclusions.

Table 1: Web and PRB response rates, by Industry. 2006

	Web response	PRB response
Hotels and restaurants	31 %	43 %
Transport & communication	31 %	40 %
Sea transport	41 %	30 %
Service industries	33 %	45 %
Domestic trade	33 %	44 %
Construction	31 %	43 %

2.2 Burdensome Survey Features

In the analysis each source of potential response burden has been looked at separately and then put together into a regression model to distinguish the most important.

Chart 1: Perceptions of the Information Collection and the Completion of the 2006 Questionnaires.

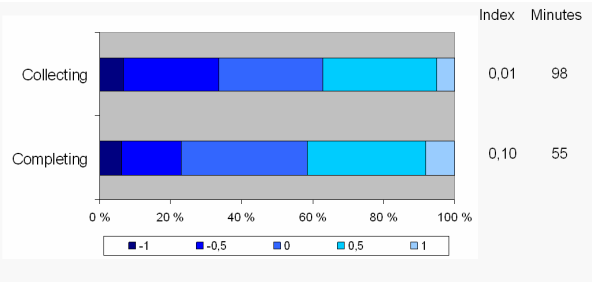


Chart 1 shows the distribution of answers to the two core questions. In addition we have calculated an index ranging from -1 to + 1, based on the values linked to each response category. Finally we have given the average time that the respondents estimated that they used to collect the necessary information and fill in the questionnaires.

Both indexes are positive, which indicates that the response burden experienced with these six questionnaires was generally not considered to be very high. The main message of the chart, however, is that it takes more time and is probably felt more burdensome to collect information than to fill in the questionnaires. This is also the result in all the other surveys where we have asked the response burden questions.

Chart 2: Sources of Time Consuming Preparations

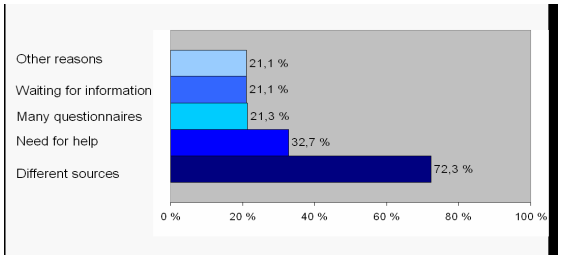


Chart 3: Sources of Response Burdens

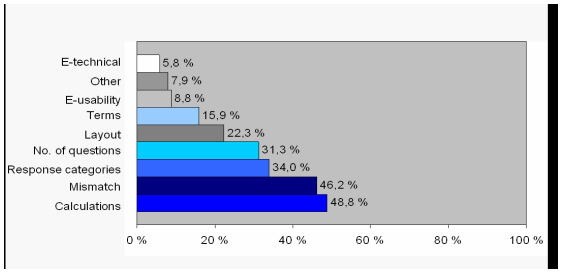


Chart 2 above shows the sources of time consuming tasks before the questionnaire was completed. Chart 3 shows which were the most burdensome aspects of the questionnaire. Documentation problems and problems with the questions are on the top of these lists. Poor layout that made the questionnaire difficult to read is listed further down the list. A logistic regression analysis reveals, however, that among those who felt that the questionnaire was very burdensome, questionnaire layout was the most often mentioned reason. Among these respondents, usability problems with the web version and other reasons where also quite often mentioned.

The correlation between how time consuming it was felt to collect information and how burdensome it was felt to fill in the questionnaire were high. Hence it is obvious that information spread in different sources goes together with problems like mismatch between available information and what is asked for, and together with the need for calculations and other kinds of adjustments before the questions can be answered. The reason for this could either be that the questions are poorly tailored to the information available or that the businesses' documentation systems are in a poor condition. When we compare results from the different surveys, there is evidence to support both explanations.

The PRB results from different industries in the annual business were quite similar. Respondents from all industries, had on the top of their list of burdensome tasks, (1) mismatches between the questions and available information, and (2) the need for calculations. We find it hard to believe that all documentation systems are poor. So this leads us to believe that the questionnaire could be better tailored to the available information. On the other hand, the number of respondents who complained about a mismatch was higher in the construction and sea transport industry than among other respondents. The construction industry also had the highest proportion of respondents who felt that calculations added to their response burden. This indicates there also are differences between the quality of documentation systems in different industries.

2.3 Different Sources of Response Burdens combined.

In the following three tables the effect of survey design factors, contextual factors and personal characteristics listed in paragraph 2.1 on perceived response burden are measured individually and combined. The Information Collection index (IC-index) and Perceived Response Burden index (PRB-index), which are based on the two core questions, have been calculated individually for each factor. In addition all factors have been tested in a regression model. The arrows indicate the reference value for each of the explanatory variables in the regression model. Values put in brackets had regression coefficients that were not significantly different from the reference value, while the other values were significant. The most noticeable index values have been written in bold.

2.3.1 The Importance of Industry and Completion Time.

Even if the questionnaires were similar, the questionnaires used to collect information about the construction industry and sea transport had more questions than the next three questionnaires on the list, while the service industry questionnaire was the shortest one. This difference in questionnaires coincides with the results in table 2 showing that the construction industry questionnaire was felt most burdensome and the service industry questionnaire less burdensome.

Table 2: Information Collection and Perceived Response Burden Index measured in different Industries and for Questionnaires with different Completion Time

	IC-index	PRB - index
Construction	-0.22	**-0.17**
Sea transport	0.04	(0.02)
Transport and communication	0.03	0.09
Hotels & restaurants	-0.05	0.10
Domestic trade	0.01	0.10
Service industry	0.12	**0.32**

Completion time	0 – 25 minutes	0,32
	26 – 50 minutes	0,11
	51 minutes +	-0,16

One other result that can be read from the regression analysis is that completion time had a significant effect even when controlled for survey. This suggests that completion time is not a mere reflection of the length of the surveys, but probably also reflects differences between respondents.

2.3.2 The Importance of Contextual Factors

Table 3: The Importance of Contextual Factors to Perceived Response Burden

		PRB- index
Size of establishment	0 – 9 employees	0,11
	10 – 19 employees	(0,13)
	20 – 49 employees	**0,06**
	50 or more employees	0,10
Documentation problems	None	**0,15**
	1	(-0,14)
	2	((-0,23))
	3	-0,45
No of Respondents	1	0,15
	2 or more	((-0,01))

Focus groups we have previously carried out, led us to believe that the response burden will be highest in middle sized firms (Jones et al 2005). Small firms do not have so much to report and bigger firms often have good documentation systems and professional respondents. In the surveys reported here perceived response burden was highest in establishments with 20 to 49 employees and significantly higher for establishments of this size compared with the very small and those with 50 employees or more. But the difference was not very large.

The most important structural factor seems to be if the company had several or no documentation problems.

2.3.3 The Importance of Personal Characteristics to Perceived Response Burden

All the factors listed as personal characteristics had a significant impact on perceived response burden. The most important indicator of all those measured was if the respondent felt that it was easy or difficult to find time for completing the questionnaire. This effect is stronger than the effect of the completion time and, even if there is a correlation between these two variables, it was not as strong as we expected (Gamma = 0,36).

Table 4: The Importance of Personal Characteristics to the Perceived Response Burden

		PRB- index
Available time	Very easy to find	**0,68**
	Quite easy to find	0,41
	Neither easy nor difficult	0,06
	Quite difficult	-0,09
	Very difficult	-0,37
Perception of usefulness	Very useful	((0,22))
	Quite useful	0,30
	Neither useful nor useless	0,18
	Quite useless	0,09
	Very useless	**-0,11**
Experience	No	0,04
	Yes	0,11

Two questions were asked about how useful the respondent felt that the statistics produced from his/her data were; one about the social usefulness and one about the usefulness for the business. Here these two questions are combined.

Next to nobody believed that the statistics produced from the annual business questionnaires would be very useful. They were particularly sceptical to the usefulness for their business. Those who had the most negative attitude also reported higher response burden than those who had a less negative or even slightly positive answer to these questions. The correlation was particularly strong in the construction industry.

2.3.4 Concluding Comments to the Factors Combined

The overall picture from this analysis is summarised in the following six points:

- calculations and mismatch between questions and available information was a common problem in business surveys
- having sufficient time available for the questionnaire was essential in terms of perceived response burden
- the number of questions was probably the most important difference between questionnaires
- poor layout and usability problems were often mentioned by those who felt that the questionnaire was very burdensome.
- the quality of documentation systems was probably the most important difference between industries
- the perception of uselessness goes together with perceived response burden.

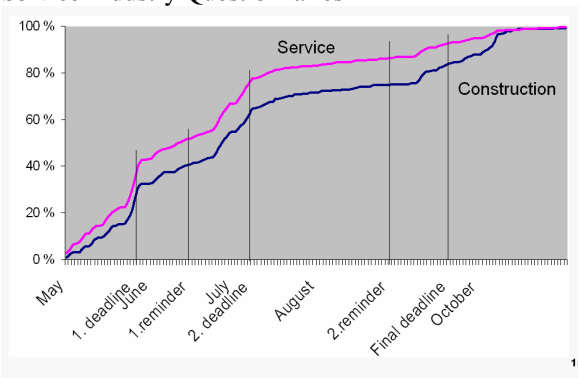
How easy or difficult it was to find time for the questionnaire together with completion time, documentation problems and the sense of usefulness explains more than 40 % of the variance in the perceived response burden variable (squared r).

3. The Impact of Perceived Response Burden on Data Collection and Data Quality

We would have liked to link the perceived response burden to the response quality given on an individual level. That is yet not possible. Instead we have looked at the data quality of different questionnaires distributed to different industries. In particular we have looked at the difference between the questionnaire used in the construction industry with that used in the service industry; which were the questionnaires with the highest and lowest response burden.

First we have looked at the response pattern of different surveys. One should imagine that it took longer time to collect the data from a survey with a high response burden compared to one with a low perceived response burden.

Chart 4: Web Response Patterns for Construction and Service Industry Questionnaires



When we compare the response pattern for the Construction and Service Industry Questionnaires, this expectation seems to be backed up by the data. While more than 80 percent of the Service Industry questionnaires were received before the summer holiday, this did not happen before close to the final deadline in the Construction Industry. The patterns for the other questionnaires are, as we should expect, more inconclusive.

Finally we have also compared the number of questionnaires that were corrected for different industries. Again, we would liked to have a better quality indicator – the number of questions corrected or, even better, tables that show the results of different edit checks. But even this coarse quality indicator shows some interesting results.

Table 5: Questionnaires Corrected

Construction	**80,9 %**
Sea transport	53,3 %
Transport and communication	63,3 %
Hotels & restaurants	**79,7 %**
Domestic trade	70,1 %
Service industry	**33,4 %**

The first striking result in table 5 is the high percentage of questionnaires corrected. Reading these results, one should remember that we do not distinguish between small corrections and major changes.

It was the questionnaires used in the construction industry and in hotels and restaurants that were most often corrected, while the need for corrections were lowest in the Service Industry questionnaires. That the Construction Industry Survey is on the top of the list and the Service Industry Survey on the bottom is what we should expect. In addition you may remember that the Construction Industry Survey and the survey in Hotels and Restaurants were similar in that they were perceived as more time consuming to collect information to these questionnaires than to the others.

To summarise what these data tell us about the effect of the perceived response burden:

- generally in business surveys…
  - the data collection time is very long
  - the number of questionnaires that are corrected is very high
- When there is a pronounced difference in perceived response burden between questionnaires, there also seems to be a difference in…
  - how quickly the data are received
  - the number of questionnaires that need to be corrected.

4. Future Research

In this paper we have established a model that links survey design factors, contextual business factors and the personal characteristics of the respondents to perceived response burden, and which subsequently links perceived response burden to response quality. As stated in the beginning of this paper, even if the results are interesting, they should only be recognized as suggestive, not conclusive. This is not only because of the empirical data available for this analysis, but also because the response burden questions could be improved.

One of the interesting question raised in this paper we believe, is how the interplay between available information and questions asked affects perceived response burden. In the analysis carried out here, however, it was only those who found the information collection time consuming who were presented with the list of possible information collection problems. This implies that those who did not find the data collection time consuming, neither had documentation problems. It also make 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. In future studies we would prefer to ask all respondents to evaluate the accessibility of the documentation system.

Another contextual factor that could be measured in more detail is the how the data collection was organised. In the present analysis we only took into consideration if the respondent to the PRB-questions performed all task alone or together with others. In other analysis', however, we have looked more specifically on the division of labour (Dale et al 2006).

The PRB model in figure 1 distinguishes between three kinds of personal characteristics that may affect perceived response burden; availability, motivation and competence. Of these, we think that the question measuring competence, "Is this the first time you have contributed to completing this questionnaire?", is the weakest one. The personal factor that had the most pronounced effect on perceived response burden was the experience of how much time one had for the task. What we were not able to find out, however, was if the time allocation was made by the management or a result of the respondent's own priorities.

An obvious weakness in the causal analysis carried out here is that the quality indicators are rather general and not measured at an individual level. What we want to do in follow up studies is to distinguish between different kinds of errors detected in the incoming data and to compare these to edited data between respondents who felt the questionnaire burdensome and those who felt it easy to complete.

Finally we think that future regression analysis should take interaction effects into considerations.

The title of this paper states that the response burden of paper and web questionnaires should be compared. That was not done. We have described an analytical approach that could be used to study the reasons and effects of paper questionnaires as well as web questionnaires. As business surveys change from paper to web, it is also highly relevant to investigate if and how perceived response burden, and the effect it has on the response quality, change. Simple comparisons of perceived response burden of paper and web questionnaires have been done (Jones et al 2005). But until now the quality of the data we have from surveys that have changed modes or that offer different modes have not been good enough for comparisons. Thus, what we have offered in this paper is a conceptual tool for such comparisons. Using this tool for comparative research is yet to be done.

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