

Expert review followed by interviews with editing staff – effective first steps in the testing process for business surveys

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Abstract

A new and cost-effective approach to business questionnaire evaluation was investigated at ONS. Instead of carrying out expert reviews followed by cognitive interviews with potential respondents, expert reviews were followed by interviews with data editors. These interviews not only confirmed some of the findings of the expert review but also identified other problems with questionnaires that expert reviews had not highlighted.

1 Background

In Britain the Office for National Statistics, as well as carrying out major household surveys, is also responsible for carrying out some 100 self-completion business surveys. These business surveys provide the main inputs to key economic statistics but until fairly recently very few had been subjected to systematic testing or evaluation. Failure to evaluate resulted from four main factors:

- lack of a tradition of evaluating and testing business questionnaires;
- the large number of questionnaires to be tested;
- a lack of resources to carry out widespread cognitive testing; and
- lack of staff with the skills to carry out evaluations.

In an earlier paper (Eldridge, Martin and White, 2000) we described how awareness of the benefits of cognitive methods of questionnaire pre-testing was stimulated in the part of the Office responsible for business surveys. In part this was done by challenging the assumption that data contributors who completed business survey questionnaires were in some way

different from respondents who completed household survey questionnaires. This assumption had meant that less attention was paid to the design of questionnaires and the drafting of instructions on how to complete them than was paid to data processing and statistical estimation.

The questions on business survey questionnaires at ONS are largely designed by data end-users (usually statisticians) and use terms that would be familiar to accountants but may not be common currency among owners of small businesses. At the time work described in this paper was being carried out, few attempts were made to see whether or not respondents to business surveys understood the questions they were asked or paid any attention to the instructions they were given about how to complete questionnaires. Some attention was paid to the overall design of survey questionnaires, but more from the perspective of the requirements of data scanning than the needs of respondents. At the same time a large amount of clerical effort was spent by data editors in chasing non-responders, answering queries from contributors and dealing with data that had for one reason or another failed a validation check.

2. Methodology

In 2000, when the project described here was carried out, enthusiasm for evaluating surveys questionnaires was growing among staff responsible for business surveys. However, the large number of survey questionnaires coupled with a lack of resources meant that evaluation based on cognitive interviews with potential respondents was not an option. Staff from ONS's Question Testing Unit decided therefore to carry out expert reviews of a selection of business questionnaires followed by semi-structured interviews with staff responsible for editing the questionnaires that fail data validation checks, contacting businesses to clarify queries and identify the source of contributors' difficulties, and for chasing businesses that have not returned a form. Our approach took account of the work of Sudman, Willimack, Nichols and Mesenbourg (2000), in particular their creation of a hybrid response model for establishment surveys based on the work of Tourangeau (1984) and Edwards and Cantor (1991).

What we wanted to find out was whether or not carrying out interviews with editors added value to the process of expert review. We also wanted to know whether or not linking two relatively inexpensive processes that could be completed within a short period of time

provided a cost effective means of getting valuable information about business surveys and a means of making worthwhile changes to business survey questionnaires.

Interviews were carried out with editors working on three different surveys, but in order to demonstrate the value of our approach the remainder of this paper will consist of a case study of one of ONS's shorter business questionnaires, the Quarterly Capital Expenditure (CAPEX) questionnaire. First we describe the main features of the questionnaire and the instructions on how to complete it. Then we present the findings and recommendations of our expert review. Before describing the results of our interviews with editing staff we outline the main features of the editing process that a completed CAPEX questionnaire would go through. We end with a discussion of the implications of this method of pre-testing business questionnaires.

2 A case-study: the CAPEX survey

The CAPEX questionnaire which is designed to measure firms' quarterly capital expenditure has changed in some respects since the pre-testing work being described here was carried out. Then as now it contained no more than six questions or items. An example of the questionnaire as it was in 2000, together with its notes and instructions can be found at the end of this paper.

In carrying out our expert review of this questionnaire we drew heavily on the work of Jenkins and Dillman (1997) who have used theories and techniques from cognitive and motivational psychology to establish a set of principles for the design of self-completion questionnaires, and also on the work of Lessler and Forsyth (1996).

2.1 A description of the CAPEX questionnaire

The front page and the questions of the CAPEX questionnaire are printed on two sides of one sheet of paper. Instructions on how to complete the questionnaire are printed on two further sides of paper. In 2000 the whole document was printed in a mixture of black and blue type on a predominately white background.

2.1.1 Front page

In the top right hand corner of the cover sheet, underneath the title of the questionnaire, is a statement which informs respondents that ‘Notice is given under section 1 of the Statistics of Trade Act 1947’. Beneath this statement is a box in which respondents are invited to provide details of changes to the names or addresses of the firms they own or work for. Further down on the left hand side are the name and contact details of a person who can provide help and answer queries. These are followed by a long serial number to be quoted by respondents seeking such help. Brief instructions about how to complete the questionnaire are provided in a paragraph on a blue wash background, with a blue upper case heading followed by text in black bold and regular text.

Beneath the information paragraph are two bullet points headed ‘**IMPORTANT**’. The first of these informs respondents that ‘Failure to make a return can incur penalties under section 4 of the Act’. The second bullet point says ‘It is **illegal** for us to reveal your data or identify your business to unauthorised persons.’

The last but one item on the page is headed ‘**FOR YOUR INFORMATION**’ and consists of five bullet points dealing in brief with a variety of issues from minimising respondent burden to providing financial details in Euros.

The last item is a sentence thanking respondents for their co-operation.

2.2 Second page

The second page of the questionnaire starts with another two bullet points headed ‘**IMPORTANT**’. These are followed by 12 items listed under five headings - Period, Land and buildings, Vehicles, Other Capital expenditure, Total Capital Expenditures and a box in which respondents are invited to print comments about unusual fluctuations in capital expenditure.

3 The findings of the expert review of the CAPEX questionnaire

At ONS, our approach when pre-testing a questionnaire is to start with an expert review. Our view, though not one that has itself been tested, is that a detailed critique of all aspects of a questionnaire can save time at the cognitive testing stage. An expert review was therefore

where we started our work on the CAPEX questionnaire. The following summarises the main judgements resulting from this expert review.

3.1 The front page

There is clearly too much information on the front page of the CAPEX questionnaire. Moreover, all of it looks of equal value which means that respondents may not know what they should read first. Some headings stand out because they are in blue and in upper case, but blue is used for other important information. We recommended that colour and typeface should be used more consistently in order to help respondents navigate the front page of the questionnaire.

3.1.1 Changes-to-address box

We asked a number of questions about the box provided for respondents who wished to give details of a change of name or address. Did respondents use it? Were the changes they detailed acted on by ONS staff? We suggested that if the answer to either question was ‘No’ there might be no reason for having the box.

3.1.2 The respondent identification number

As we have seen, respondents needing help are instructed to quote a respondent identification number consisting of 14 digits and one letter. We pointed out that quoting long identification numbers can be difficult for respondents and they are liable to quote them inaccurately. Our recommendation was that these numbers should be shortened if possible.

3.2 Instructions on completing the questionnaire

Instructions for respondents about how to complete the quarterly CAPEX questionnaire (apart from those on the front page) are provided in three different places – on the questionnaire proper, and on two separate sheets. The first of these sheets deals exclusively with CAPEX and the instructions thereon are referred to as ‘notes’. The second sheet of instructions is used with a large number of ONS business surveys and describes the format respondents should use when entering numerical data.

The questionnaire proper begins with some information for respondents in the form of two bullet points headed ‘**IMPORTANT**’. The first piece of information is an instruction, which includes a reference to a ‘flier’, about what to do if the capital expenditure of the business is

nil or less than £500 or the Euro equivalent. The second bullet point asks respondents to ‘read the notes before completing this questionnaire’. It does not tell respondents that the notes are on the flier. Nowhere are respondents told what the data they provide is used for.

If respondents turn to the flier, under the heading ‘Scope of the inquiry’ they will find information about the coverage of ‘this survey’. Will new respondents know that an inquiry is the same as a survey? Included in this section is a definition of a business unit.

The term ‘capital expenditure’ is defined in these notes in terms of ‘acquisitions and disposals charged to capital account’. However, the term ‘capital account’ is not defined – not a serious omission perhaps for respondents who are accountants in a large or medium size organisation, but possibly a mystifying term for the owner of a small business.

Then follows some information about what respondents should do if the capital expenditure of the business is nil or less than £500. They have two options: to ring a freephone number ‘as described on the enclosed flier’ – but of course they are looking at the flier as they take in this piece of information - or they can ‘complete the questionnaire to this effect’, namely that capital expenditure is less than £500. The latter option could be difficult since they are required to enter amounts of capital expenditure as £000s. Indeed on the CAPEX questionnaire, the number of boxes provided for each sort of capital expenditure or disposal would enable respondents to enter sums as large as £999 billion. We asked if it was necessary to provide for such large amounts and suggested that redundant boxes could be used to allow all respondents to enter amounts in £ actuals and make legitimate what, as we shall see, many of them do at present.

In the second column of this first page of notes are descriptions of 16 sorts of expenditure that should be included or excluded. It was our view that the language in which these inclusions and exclusions were couched would make them hard to understand for many contributors.

On the second page of notes respondents are instructed to enter the start and end dates of the period covered by their returns. They are asked to round their answers to the nearest thousand pounds sterling or thousand Euros and they are provided with information about the three main areas of expenditure covered by the survey – land and buildings, vehicles and other capital expenditure.

Apart from being worded in a way that makes them hard to understand, the instructions are in the wrong place. Ideally they should be placed exactly where they are needed, adjacent to the questions to which they refer. Printing them in a separate booklet or on a separate sheet increases the risk that they will not be read before respondents start answering questions or be read in a superficial way, or not passed on with the CAPEX questionnaire if the job of completing it is delegated by whoever received it first from ONS. We recognised however that it would be far more costly to scan a four-sided questionnaire that incorporated instructions on how to complete it than a two-page sheet. We recommended therefore that details of where to find the instructions should be provided at the relevant question and not the other way around. In other words, the questions should refer to the instructions not the instructions to the questions.

The third set of instructions addresses the problems caused if figures are not entered in boxes in a way which meets, precisely, the needs of the scanning technology. These instructions are clearly set out, but they too are not provided at the point at which respondents need them – that is, as they are about to enter figures in boxes. Again we recognised the implications for scanning costs of incorporating these instructions into the questionnaire and came up with a possible solution: we recommended that the three most frequently occurring mistakes made by contributors in entering figures be identified and detailed instructions relating to these errors be placed under the first set of boxes the contributors have to complete.

Our respondents now turn back to the questionnaire and start to fill it in.

3.3 The items on the questionnaire

None of the items on the questionnaire is formulated as a question. Instead contributors are presented simply with a list of headings and boxes in which to insert figures. This is unlikely to be a problem for large firms or ones that have completed the questionnaire for several years, but might it confuse newer respondents in small businesses.

Nowhere on the questionnaire proper is there an explanation of what respondents should be doing with it – all this information is in the ‘notes’. This is likely to increase the cost for respondents of completing the questionnaire for the first time, especially if the person completing it has not been sent the notes by whoever first received them from ONS.

3.3.1 Period covered by the return

The first item on the questionnaire is labelled 'Period'. Underneath it are two sets of boxes in which can be entered two dates. At first sight the implication of this layout is that respondents are being invited to say for what period of time they are providing data.

However, underneath the boxes is an instruction that reads: 'Please complete the questionnaire for the period 1 October to 31st December YYYY. New respondents could very well be misled by this item, not least because at first sight it gives the impression that respondents may choose the period for which they provide data whereas in fact it is stipulated. We suggested that it might be better to ask respondents whether or not they could give figures for the stipulated reference period and only ask them to provide dates if the answer is 'No'.

3.3.2 Land and buildings, Vehicles and Other Capital Expenditure

Apart from wondering if the term 'dwellings', which occurs in item 2.1 on the questionnaire and which is nowhere defined, would be understood by respondents, we felt unable to comment on whether or not they would understand and correctly apply items 2 – 4 and the associated notes.

3.3.3 Total capital expenditure

We enquired if item 5 on total capital expenditure had been included so that respondents could see if the figures they had entered earlier summed to the correct amount. We pointed out that many respondents would be aware that these totals could be computed when the survey questionnaires were being processed, so that if the totals boxes had been put there for respondents' convenience it would make sense to say this, otherwise respondents might wonder why the totals could not be computed automatically.

We also pointed out that if respondents were expected to check their own totals it would reduce the burden on them if the layout of the boxes were to be amended so that all expenditure on acquisitions were in one column and all proceeds from disposals in another.

4 The editing process

Each survey questionnaire returned is automatically subjected to a set of validation checks that identifies any questionnaires containing inconsistent or otherwise odd data. No further checks are performed on consistent questionnaires.

The set of checks is extensive and can only be summarised briefly here. It compares the current return with previous returns in order to identify unexpected discontinuities in the data. It estimates whether the data in the return are what might be expected from businesses of a given size at a given period. Any interdependency within the questionnaire is also made use of in order to measure consistency. All questionnaires that contain completed comment boxes will fail the validation checks.

Paper images of any questionnaires that fail the validations checks are passed to editors via an electronic database which tells them the reference number of the failed questionnaire, the period for which data were returned and why the questionnaire has failed. Editors look at the page image and make use anything they can - comments, previous history, earlier conversations with contributors that are logged on a contributor database – to explain why a validation check failure has been triggered. Editors also contact respondents and invite them either to confirm or amend suspect figures.

Since the focus of the validation process is on data which appear atypical and which lead to critical errors, it is possible for returns containing inaccurate data to go to the so-called ‘clean data file’ as long as the inaccurate data are consistent or result in trivial errors. However, checks are also carried out on returns that indicate data that are too stable and could therefore be evidence of satisficing on the part of respondents. According to Krosnick (Krosnick, Narayan and Smith, 1996), respondents who satisfice shortcut the cognitive processes necessary for generating the best possible answer to a question and provide instead a plausible answer. In this context it is worth pointing out that businesses in which quarterly capital expenditure is nil or less than £500 may send a so-called ‘nil response’ by means of telephone data entry and avoid the effort of completing a questionnaire.

In addition to contacting contributors whose returns have failed a validation check, editors approach businesses that have not made a return to encourage them to do so, and deal also with queries from respondents about the survey and the survey questionnaire. Editors are

therefore likely to be a fruitful source of information about what causes difficulties for respondents and problems for them in providing accurate data.

5 Interviews with editors

The interviews we carried out with editors were qualitative and dealt with the front page of the questionnaire, the notes, the instructions about how to enter numerical data and the items on the questionnaire. For each item we found out about the queries raised by respondents and about the queries raised with respondents by editors.

5.1 The front page

As we have seen, there is a box in the top right hand corner of the front page of the CAPEX questionnaire in which contributors are invited to give details of changes to the name or address of their business. In order to make sure that these changes come to the attention of the editors, a return will fail the validation check if anything is written in this box. Our concern when we carried out the expert review was that these boxes were either not used by respondents or not acted on by editors. In fact they *are* used by respondents and acted on by editors but the picture is not as straightforward as this might suggest. Sometimes contributors use the box to make comments, which means that their returns fail the validation check, but at least the comment is brought to the attention of the editing staff. Other contributors provide details of changes of name and address but not in the box. If there are no reasons for their returns to fail the validation check the questionnaires will not be inspected by the editors and the amendments will not be picked up.

The CAPEX questionnaire is sent to some 32,200 businesses about 5% of which contact ONS when they are sent a reminder to say that they have already returned the questionnaire, or they have lost it and need a replacement, or to explain that they do not understand it.

One of the items on the front page of the questionnaire that contributors who contact the Office ask about is the first bullet point after the heading **IMPORTANT** warning of the penalties they will incur if they do not make a return. They fail to notice the reference to the Statistics of Trade Act 1947 at the top right hand side of the front page. What, they would like to know, is the Act referred to lower down?

5.2 *The questionnaire proper*

5.2.1 Section 2: Land and buildings

The editors reported that this section causes problems for firms in the construction industry whose business is about acquisition of land, new construction work and the proceeds from the disposal of buildings. All returns from construction companies with figures entered next to 'New construction work' will fail apart from those where new building forms a very small proportion of turnover. It was not possible to say what proportion of construction industry returns failed in this way.

Firms can find it difficult to provide separate costs for acquisition of buildings and acquisition of land as the two assets are often acquired as a package. For the same reason firms are often unable to say which component is likely to be greater, or to act in accordance with the instruction which requires the total amount spent to be recorded under land, if it is estimated that the value of the land exceeds the value of existing buildings and under buildings, if the value of the buildings is estimated to exceed the value of the land.

The editors had no evidence to suggest that contributors might have difficulty understanding the undefined term 'dwellings' in item 2.1.

5.2.2 Section 5: Total capital expenditure

Our concerns about the layout of the totals boxes in this section were confirmed by the editors. They reported that totals were often not added up correctly and sometimes left blank. They attributed this to the fact that totals for acquisitions were interspersed with totals for proceeds.

5.2.3 Section 6: Comments

As we have seen, all questionnaires with completed comment boxes will fail the validation check. The editors reported that while comment boxes are frequently made use of, respondents rarely take notice of the request to print their comments which means that they can be difficult to read in an electronic format. Needless to say, not all the comments are useful.

5.3 *The instructions*

5.3.1 Instructions about data formats

As we have seen, all contributors are sent an instruction sheet, common to all business surveys, explaining how to enter numerical data in questionnaires. The experience of the editors suggests that these instructions are either not passed on to the people completing the returns or are not read and understood by them. Thus, figures are often entered as £ actuals rather than as £ thousands; they are frequently left rather than right justified and ‘NIL’ or ‘—’ are entered instead of a single ‘0’. None of these will necessarily cause a return to fail the validation check, but they do make the questionnaire hard for the scanning technology to deal with and result in poorer quality data than would have been the case had the instructions been applied accurately. According to the editors, smaller companies are more likely to enter data in the wrong format than larger ones, perhaps because they are less likely to employ accountants.

5.3.2 Queries concerning the CAPEX instructions

Few respondents have queries concerning the scope of the CAPEX survey. However, respondents from smaller companies often contact ONS editors to ask what the term ‘capital expenditure’ means. When this happens the editors we interviewed tell them that it refers to ‘anything you have bought or own that is an asset for your company’, in other words they offer these respondents an alternative definition of a key concept. Editors reported that firms did not have a problem including non-deductible value added tax (VAT) and excluding deductible VAT.

Instructions concerning the replacement of fixed assets confused some contributors.

Expenditure on replacing assets that were destroyed in circumstances that had resulted in an insurance claim should be included but the proceeds of a successful insurance claim for the loss of the asset should be excluded until they were spent on a replacement asset.

Finally, not all contributors understood the notes about ‘financial leasing’ and ‘operating leases’. The former applies to the acquisition of large plant that companies cannot afford to purchase outright and is in practice indistinguishable from hire purchase. The capital value of assets that are financially leased or bought on hire purchase should be included but not

interest or instalment payments. Assets acquired under an operating lease should not be included, as they remain the property of the lessor.

6.1 *How did the conclusions of the expert review compare with the findings of the editors' interviews?*

The expert review highlighted some concerns about the questionnaire that were confirmed by the interviews and some that were not. Some respondents found the front page confusing; they used the change of address box for comments and provided details of change of address somewhere else where it might not be picked up. In addition, they did not realise which Act was being referred to under the heading **IMPORTANT**. On the other hand, editors did not report respondents finding it difficult to quote identification codes correctly

Our concern about the item on the questionnaire proper dealing with the period for which data are being returned was not reflected in the experience of editors, but our concern about the definition of 'capital expenditure' in the instructions was. Similarly, our expectation that contributors would find it hard to provide totals for acquisitions and the proceeds of disposals was confirmed by editors but they did not report contributors asking why they were being asked to provide totals which could easily be computed electronically.

As we expected, there were aspects of the questionnaire that did not work well that we failed to identify because of our lack of knowledge of the sorts of businesses that are asked to contribute to CAPEX. Thus we did not predict that questions about acquisitions and disposals of land and buildings would cause problems for firms in the building trade. Similarly we did not predict that firms would have problems understanding the concept of financial leasing nor did we realise that the instructions did not deal clearly with the related concept of operational leasing.

Finally, our warnings about the dangers of providing instructions on separate sheets of paper rather than next to the questions to which they refer were clearly justified in the case of instructions about how to enter figures in a format that could be dealt with by optical character recognition.

7 Discussion

The main advantages of talking to data editors are that they have a good view of the questionnaires from the business perspective, not least because they have contact with large numbers of respondents, and that interviews with them are relatively inexpensive to administer. In effect editors can provide proxy cognitive interviews on behalf of a large number of business respondents. As well as confirming or not the existence of potential problems identified by expert review, they are also able, as we have seen from the example of questions about the acquisitions and disposals of land and buildings, to identify problems that may not be apparent to a researcher outside the business area. Clearly, interviewing editors is a valuable alternative when cognitive interviews with respondents are not a feasible.

However, it has to be borne in mind that the editors we interviewed had had contact only with respondents who had returned inconsistent data, had failed to make a return or who had contacted the ONS with queries of their own about the survey. There was nothing they could tell us about the many other respondents with whom they had no contact. It could be argued that the latter are of little interest since they did return data, the data they returned did not fail the validation checks and they did not raise queries of their own about the survey. However, we know from household surveys that the fact respondents can and do answer questions without asking for help or clarification from interviewers is no guarantee that the questions are working or being answered in the way the researcher who designed them intended. The same is likely to apply to business surveys.

Something else that needs to be borne in mind is that the quality of the information provided by editors depends on how well those editors understand the issues and rules that underpin a business survey. We were also aware that the editors we spoke to obtained the information they gave us by acting as untrained interviewers of respondents. The key word here is ‘untrained’. Compared with the information that would be obtained from trained survey interviewers reporting on how respondents in a household survey had handled a self-completion questionnaire, the information obtained from editors is likely to be partial and possibly biased.

8 Conclusions

At ONS we recognise the value of carrying out cognitive interviews with potential respondents to business surveys, but because of the cost of carrying out such interviews for a

very large number of surveys would have been high we decided to explore another method of getting worthwhile information about aspects of questionnaires that needed to be changed. In this context, cognitive interviews with respondents were viewed as our last option and something to be considered once we had done as much as we could by other, more cost effective means. For us these were expert reviews followed by interviews with business data editors.

We have concluded that interviews with editors of business questionnaires can add value to expert reviews. These interviews not only confirm some of the conclusions of expert reviews but also identify additional aspects of business questionnaires that do not work well and might need to be changed. If changing the questionnaires were to reduce the amount of time editors have to spend dealing with respondents' queries it could lead not only to an improvement in data quality but also to a reduction in the cost of editing business survey questionnaires.

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CAPEX questionnaire, notes and instructions



