

Experimenting with Pre-Contact Strategies for Reducing Nonresponse in an Economic Survey

Alfred D. Tuttle¹, Kenneth Pick², Richard S. Hough³, and Jeri M. Mulrow⁴,

¹U.S. Census Bureau⁵, 4600 Silver Hill Rd. 7K132B, Washington, DC 20233

²U.S. Census Bureau⁵, 4600 Silver Hill Rd. 7K132E, Washington, DC 20233

³U.S. Census Bureau⁵, 4600 Silver Hill Rd. 7K149, Washington, DC 20233

⁴National Science Foundation⁵, Division of Science Resources Statistics, 4201 Wilson Boulevard, suite 965 Arlington, Virginia 22230

Abstract

Non-response in economic surveys poses at least as great a challenge as it does in demographic surveys, but the reasons for it are less well understood. Finding the right person within an organization with the necessary authority and access to requested information to facilitate completion of a survey can be very challenging, especially when the survey requires responses from multiple people throughout the company. However, the assignment of responsibility for the survey is outside of the control of the survey organization (Sudman et al. 2000).

The Business R&D and Innovation Survey (BRDIS) is a new survey sponsored jointly by the National Science Foundation and the U.S. Census Bureau that measures research and development (R&D) activities of U.S.-based companies. The sample is comprised of approximately 40,000 companies. Of these, approximately 4,000 companies with total R&D costs of at least three million dollars are sent the “long” form (BRDI-1) and the remainder, with total R&D not known or known to be under three million dollars, receive a “short” form (BRDI-1A). The new survey is organized into several topical sections and explicitly instructs the “survey coordinator” to seek the assistance of various types of specialized personnel within the companies. Therefore the selection of a coordinator capable of obtaining assistance from likely respondents throughout the company is critical to accurate and complete response.

To maximize the success of the new survey we investigated an alternative strategy for getting the survey to the appropriate respondents, and thus, reducing nonresponse. We conducted a split-sample experiment with historically problematic respondents and non-responders to the SIRD who would be receiving the BRDI-1. In the control treatment, we sent the new survey to the last company contact for the SIRD or to an updated contact from the Census Bureau’s Business Register. In the experimental treatment, we sent a pre-survey letter to a company executive (CEO, president, VP of research, etc.) with a request that s/he provide contact information for an employee capable of coordinating the company’s response to the survey. We will present the overall results of this experiment and compare response rates to the pre-survey contact update request as well as to the survey itself.

Key Words: Establishment survey, contact strategies, pre-survey letter, experiment

⁵ This report is released to inform interested parties of research and to encourage discussion. The views expressed on methodological, technical, or operational issues are those of the authors and not necessarily those of the U.S. Census Bureau or the National Science Foundation.

1. Background

The new 2008 Business R&D and Innovation Survey (BRDIS) replaced the long running Survey of Industrial Research and Development (SIRD). The SIRD had been collected annually by the Census Bureau under a joint partnership agreement with the National Science Foundation (NSF) since 1957 and mainly focused on collecting data on R&D expenditures broken out by various categories. The new BRDIS underwent intensive development and testing over the course of three years and was designed to collect more detailed data on R&D expenditures, expanded data on R&D personnel, and new data on patenting and other innovation activities at businesses operating in the United States.

During the period 2005 through 2008, NSF and Census Bureau staff engaged in a number of activities to inform the development of BRDIS. These activities included data user workshops, consultation with industry experts, record-keeping interviews with companies, cognitive testing of questionnaire drafts, and consultation with survey design experts. A key finding in the development process was that data accuracy appeared to be directly linked to the survey respondent's role within the business. For example, while an accountant would be the best person to provide data on R&D expenses, a human resources specialist would be the best person to provide summary data on R&D personnel. The content of the new expanded survey was divided into four different areas requiring four different types of respondents: R&D financing requiring accountants; R&D management and business strategy requiring R&D experts; R&D human resources requiring HR personnel; and R&D results and income requiring business legal experts. The expansion into new topics would now mean that the BRDIS contacts, that is the primary respondents, would need to collaborate with several departments within their companies. This presented a number of questionnaire design and collection challenges (Mulrow 2008, Tuttle 2009).

To address some of the collection challenges, the NSF and Census Bureau implemented a pro-active communication strategy to assist the survey respondents in understanding their new role and responsibilities. Significant resources were devoted to communicating with survey respondents about the new types of questions on the survey and the need to coordinate with others in their organizations to obtain the appropriate data to answer the survey, including help in identifying the appropriate respondent for each section. The communications also highlighted the mandatory nature of the new survey (the SIRD only had five mandatory items), encouraged timely reporting, and addressed respondent questions and concerns. To accomplish all of this, the communication strategy for the 2008 BRDIS involved three distinct processes: 1) pre-survey contacts, 2) telephone assistance provided by survey analysts, and 3) nonresponse follow-ups. This paper will focus on the results of the pre-survey contact strategy that was implemented prior to the initial mailing of the 2008 BRDIS.

2. 2008 BRDIS Pre-Survey Contact Strategy

Several months before the survey was mailed, we sent a pre-survey notice informing companies of the new survey and asking that they confirm or update the contact information we had on record, either by returning the paper form by mail or fax or via the Census Bureau's website. The pre-survey contact strategy was developed with two objectives. The first, aimed especially at companies that had responded well to the SIRD

in the past, was to let respondents know that the survey had changed and to provide them with a draft of the new questionnaire for their reference prior to the official survey mailing in January 2009. The second, aimed at companies that had poor response to the SIRD in the past, was to secure new respondents.

Our advisory panel of industry experts suggested that due to the specialized nature of the new survey, it would be important to raise awareness of the survey to the company executive level and to gain their support in responding to the survey. The NSF and Census Bureau agreed that this was reasonable and decided to conduct an experiment to determine if either a generic letter to a company executive or one to the current respondent would have a greater effect on obtaining new respondents and improving response rates and data quality. Of equal concern was the possibility that once a company executive was aware of the survey, s/he might decide that responding to the BRDIS was not an appropriate use of company resources and institute a policy of nonresponse, with consequences for BRDIS as well as other government surveys. In light of this risk, conducting the experiment with historically problematic respondents was reasonable, since there was little to lose anyway.

In the overall design of the pre-survey contacts for the 2008 BRDIS (BRDI-1 form recipients), respondents were divided into six groups based on company size (in terms of 2007 R&D costs) and the response designation (good vs. poor⁶). The contact strategies varied by group and consisted of letters sent either to company executives or previous respondents, and also included an endorsement letter from Norman R. Augustine, former CEO of Lockheed Martin Corporation. The groups and pre-contact strategies are summarized in Table 1.

The experiment involved groups 5 and 6. Companies in these groups had R&D costs greater than \$3 million in 2007, but were not in the Top 500 R&D performing companies⁷ from 2007, and had a historic response pattern designation of poor. Companies meeting these criteria were randomly assigned to either of these two groups. Group 5 companies were mailed a form letter addressed generically to a “Company President or CEO.” It informed them of the new survey and requested the name of a person who would be responsible for coordinating their company’s response. Companies in group 6 were sent a similar non-personalized form letter addressed to the current respondent from the SIRD with a request to validate that they would be the contact for the new survey or to provide a new contact if they would no longer be responsible for

⁶ A response designation of good or poor was determined by analyzing how a company responded to four of the five mandatory data items from 2005-2007. When a company was a unit nonresponder during any survey cycle or did not respond to one or more of the four mandatory items during the three-year time frame, it was assigned a poor response designation. Otherwise, it received a designation of good. The four mandatory data items used to define poor response were domestic sales, domestic employment, total domestic R&D costs and federally funded R&D. The fifth mandatory item, R&D costs by state, was not used in this definition.

⁷ The “Top 500” R&D companies represented approximately 80% of the total R&D estimate published in 2007. Given the significance of these companies to the overall estimates, additional resources were dedicated to encourage response and high quality data from them. Each Top 500 company was treated with a customer relations management approach, and was assigned to a survey analyst or “account manager” at the Census Bureau’s headquarters. These account managers were available to answer any questions or concerns from the respondents within these important companies. The account managers were responsible for establishing a solid working relationship with each respondent and the communications were structured and documented.

Table 1: Pre-survey contact groups and strategies; experimental groups are 5 and 6.

<i>Group</i>	<i>Size of company</i>	<i>Response designation</i>	<i>n</i>	<i>Pre-contact strategy</i>
1	Top 500	Good	352	<ul style="list-style-type: none"> - Personalized letter to CEO/other executive - Information about new survey, request for assistance for the named respondent , notification that survey is mandatory; respondent CC'd - Endorsement letter from Norman R. Augustine - Letter to SIRD respondent with information about the survey and request to update contact information or provide new contact
2	Top 500	Poor	96	<ul style="list-style-type: none"> - Personalized letter to CEO/other executive – Information about new survey, request for new respondent to be assigned who is appropriate to the new survey, notification that survey is mandatory - Endorsement letter from Norman R. Augustine
3	Top 500 and non-Top 500	N/A; cognitive interview participant	44	<ul style="list-style-type: none"> - Personalized letter to CEO/other executive thanking the company for assistance with the survey and naming the respondent who participated in pre-testing; respondent CC'd - Letter to SIRD respondent with request to update contact information or provide new contact
4	Non-Top 500	Good	1,145	<ul style="list-style-type: none"> - Letter to SIRD respondent with information about survey and request to update contact information or provide new contact - Endorsement letter from Norman R. Augustine
5 – experimental treatment	Non-Top 500	Poor	1,063	<ul style="list-style-type: none"> - Generic letter to “CEO/President” with information about the new survey, notification that survey is mandatory, and request to provide contact information for survey recipient - Endorsement letter from Norman R. Augustine
6 – control	Non-Top 500	Poor	1,060	<ul style="list-style-type: none"> - Letter to SIRD respondent with information about survey, notification that survey is mandatory and request to update contact information or provide new contact - Endorsement letter from Norman R. Augustine

their company's response. Both letters emphasized the mandatory nature of the entire survey and referenced the endorsement letter from Norm Augustine. Group 5 contained 1,063 companies. Group 6 contained 1,060 companies.

The survey literature suggests that targeting a company executive who can delegate a survey to someone else for completion is a reasonable approach. It may seem like common sense, but it has been found that the single biggest determinant of response is getting a form to an appropriate person in an organization (Mesenbourg et al. 1990). However, selection of the respondent is not under the control of the surveyor, but of the sampled organization (Sudman et al. 2000). Tomaskovic-Devey et al. (1994) found that respondents' lack of access to records containing requested information and their lack of the authority to compel the survey task and release the data are both contributors to nonresponse, and these are often not vested in the same person (Edwards and Cantor 1991). In an experiment comparing survey mailings targeting named, pre-selected respondents (identified via pre-survey telephone contacts) versus generic titles, Ramirez (1997) found that the larger the company, the more likely the survey was to be completed by someone other than the pre-selected respondent. Debriefings with the interviewers making the pre-selection calls indicated that in some cases those who agreed to take responsibility for the survey did not fully understand the nature of the survey request until they received the actual questionnaire. In other cases, the self-selected respondents intended only to coordinate the completion of the survey by others and provide only some or none of the requested information themselves. Such conditions led to other people identifying themselves as the respondents on the returned forms. These scenarios were more common in larger organizations.

These findings motivated our strategy for bringing the survey to the attention of those in the company with the authority to delegate the task of completing it to the right persons. The question arises of how can we ensure that the high-level decision-makers will think participation in the survey is an appropriate use of company resources? In an experiment with advance letters to known contacts for the Current Employment Statistics Survey, Groves et al. (1997) varied the amount of information about survey program, the sponsoring agency, and the information requested on the survey. They found some indication that the treatment with the most information about the survey and the agency achieved higher survey response rates as size of firm increased, suggesting that providing more background about the nature of the survey may have appealed to respondents, perhaps by providing evidence that the survey is worth the effort and expense of responding, and exerted a positive effect on response.

Commensurate with these findings, the survey designers at NSF and the Census Bureau hypothesized that several key pieces of information would be salient to company executives and/or the gatekeepers who open their mail. First, we hypothesized that, as one of the government's primary scientific organizations, the National Science Foundation would enjoy caché among executives whose companies engage in research and development activities. We also hoped that the endorsement letter from Norman Augustine, well known as the former CEO of one of the U.S.'s largest technology companies, would be compelling. These strategies were also suggested by our panel of industry experts, who are themselves executives of large U.S. companies. We emphasized that the survey data would be used to help ensure the competitiveness of American companies in the global marketplace by providing government and other decision-makers with timely and accurate data on private-sector research and development. Subordinated to these inducements, the advance letter also notified

recipients that participation in the survey was mandatory and cited the relevant section of the U.S. Code. Finally, we provided URLs by which more information about the survey could be found, as well as reference versions of the questionnaire. As suggested by Ramirez' (1997) research and findings from our own pre-testing of the BRDI-1 questionnaire, we thought the actual survey questions would be necessary for company personnel to identify appropriate respondents, and we thought the questions would be of interest to them as well.

It should be noted that the companies in mail groups 5 and 6 were subject, along with the rest of the survey sample, to the third communication strategy noted above, nonresponse follow-up. Follow-up activities undoubtedly raised the response rates for all groups, including 5 and 6, but we cannot say definitively that both groups received similar attention. However, there is no evidence to suggest any differences in follow-up contacts were systematic, and thus the effects may be considered random.

3. Results

A total of 2,123 companies were identified as having a poor historic response pattern over the prior three years. Companies were randomly assigned to either receive a pre-survey letter addressed to the current contact (group 6, n=1060) or a generic pre-survey letter addressed to a company executive (group 5, n=1063). Based on the results of the pre-survey contact and the survey processing, group 6 ended the processing with 943 active cases and group 5 had 932 active cases. Companies were deemed inactive based on the following criteria: if a company went out of business, merged with other sampled company, or was determined to be out of scope⁸. The results of our experiment are summarized in tables 2 and 3.

Responses to the survey by the due date were found to be similar for both the control and experimental groups. Control group cases receiving pre-survey letters addressed to the current contact had a response rate of 30.1% (n=284) while companies receiving letters addressed generically to a company executive had a response rate of 28.5% (n=266). The difference in response rates at the time of the due date was not statistically significant ($\chi^2_{df=1}=0.5616, p=0.4536$).

The pre-survey letters to both groups asked them to provide contact information for the person who should receive the survey. Overall response to this request was higher for those companies receiving letters addressed to the current contact (49.1%, n=463) than for companies receiving letters addressed to an executive (45.2%, n=421). These differences were found to be statistically significant at the 90% confidence level ($\chi^2_{df=1}=2.9008, p=0.0885$). 31.1% (n=293) of the control group provided a new survey contact while 27.7% (n=258) of the experimental group did so, although the difference was not statistically significant at the 90% confidence level ($\chi^2_{df=1}=2.5938, p=0.1073$). Among companies which responded to the contact update request (i.e., a subset of each group), 63.3% (n=293) of the control group provided a new contact, which was not statistically different from the 61.3% (n=258) of companies in the experimental group which provided a new contact ($\chi^2_{df=1}=0.3758, p=0.5399$). Similarly, no differences were found in final survey response rates between the control and treatment groups among

⁸ Most companies deemed out of scope conducted solely agriculture-related R&D or were non-profit organizations.

those that responded to the contact update request (control group – 79.5%, n=368; experimental group – 78.4%, n=330; $\chi^2_{df=1}=0.1597$, p=0.6895).

Table 2: Control and Experimental Group Response Rates for Characteristics Tested

<i>Characteristic Tested</i>	<i>Control Group:</i>	<i>Experimental Group:</i>
	<i>Letter to Current Contact</i> (n=943)	<i>Generic Executive Letter</i> (n=932)
A. Response to BRDI Survey at due date	30.10%	28.50%
Test statistic	$\chi^2(1)=0.5616$, p=0.4536	
B. Response to contact update	49.10%	45.20%
Test statistic	$\chi^2(1)=2.9008$, p=0.0885*	
C. Provided new contact to contact update request	31.10%	27.70%
Test statistic	$\chi^2(1)=2.5938$, p=0.1073	
D. Responded to contact update request and provided new contact ¹	63.30%	61.30%
Test statistic	$\chi^2(1)=0.3758$, p=0.5399	
E. Responded to contact update request and final response rate ¹	79.50%	78.40%
Test statistic	$\chi^2(1)=0.1597$, p=0.6895	
F. Final response to BRDIS	68.20%	71.70%
Test statistic	$\chi^2(1)=2.7102$, p=0.0997*	

* Statistically significant at the 90% level of confidence.

¹ Subsamples from the control and treatment groups: control group n=463; experimental group n=421.

However, when combining companies in the control and treatment groups who responded to the contact update request, the final survey response rate was 79.0% (n=698). Companies who did not respond to the contact update request had a final survey response rate of 61.9% (n=613). This difference was statistically significant at the 99.9% confidence level ($\chi^2_{df=1}=64.9782$, p=<0.0001).

Table 3: Survey Response Rates Compared to Contact Update Request Response Rates

	<i>Responded to contact update request</i>	<i>Did not respond to contact update request</i>
Responded to full survey, both treatments combined	79.0% (n=698)	61.9% (n=613)
Test statistic	$\chi^2(1)=64.9782$, p=<0.0001**	

** Statistically significant at the 99.9% level of confidence.

Overall, the final survey response rate for the group receiving the pre-survey letter addressed to the current contact (68.2%, n=643) was lower than the letter addressed to a company executive (71.7%, n=668). Statistical testing found this difference to be significant at the 90% confidence level ($\chi^2_{df=1}=2.7102$, $p=0.0997$).

4. Discussion

The direction of the differences between the two groups favored the control group in every variable except final response rates. Responses to survey by the due date, responses to contact update request, and submission of new survey contacts all were higher for the control group (though the difference was only statistically significant for update request responses), but why this was so is not clear. Only final survey response rates were higher for the experimental group than for the control group (table 2, row F). Although this is not strongly significant in statistical terms, in practical terms an increase in response of 3.5% is of substantive importance, particularly when one considers that the experiment was conducted with historically problematic responders. Moreover, the effect on survey participation of mailing a generic pre-survey letter to a company executive may have been small, but we can also point out that it did not produce a deleterious effect on response, which had been a concern.

Regardless of whether an executive was tapped to be part of the survey process, there was no difference between the two groups in responses by the survey due date (table 2, row A). This suggests that once the survey was assigned to coordinators, the companies' normal survey response processes were activated, and the survey was subject to the usual conditions and constraints that affect the timeliness of reporting. Even assuming that those who responded to the request were more motivated respondents, it does not mean that they were able to return their surveys any more quickly.

Of those who responded to the contact update there was no difference in the proportion who provided new contacts (table 2, row C). On the other hand, in both treatments a majority of update request responses resulted in new survey contacts (table 2, row D). Anecdotally, we know that respondent turnover occurs with some frequency as respondents leave their companies or are terminated, promoted, etc. We cannot say whether the new contacts were the result of turnover or thoughtful reassignment thanks to the contact update request. Either way, considering that getting the form to the appropriate respondent is critical to getting back completed responses (Mesenbourg et al. 1990), the practical significance of getting updated contact information for even a relatively small number of companies cannot be overlooked. Response to the contact update request (whether updated information was provided or not) across treatments was also clearly associated with completion of the survey (table 3).

We have to acknowledge some possible mediating effects on the responses we observed. The SIRD respondents may have been compelled to respond by several factors: the newness of the survey, the improved visual design of the questionnaire, the information in the cover letter, or the endorsement letter from Norm Augustine letter. Also, the entire BRDIS is mandatory, not just select items as in the SIRD. The explicit reference to the primary respondent as the "survey coordinator" may have helped to legitimize the role and the request to others in the company from whom assistance is required, as well as to the coordinator her/himself, inspiring greater confidence that her/his role in the process is legitimate and deserving of others' time and energy and raising her/his motivation. It is possible that these features of the survey and associated materials may have contributed

to higher response rates and served to reduce the differences between the control and experimental groups.

5. Future Research

The next step in our research is to put this in a multivariate context to understand the impact on survey response rate of the experimental variables in the context of other variables of interest. Specifically, we plan to conduct a logistic regression looking at independent variables such as geographical location, company size, intra-company collaboration, response burden, and industry type and how they impact a company's likelihood to respond to the survey, as well as the treatment and control groups' responses to the update request and assignment of new respondents.

Another important question that needs to be answered is, since the strategy of contacting executives of historically problematic companies produced measurable positive results in terms of response rates, has there been a comparable reduction of nonresponse bias? Although the strategy we studied was relatively inexpensive to implement, a major goal of any nonresponse reduction strategy is to improve the quality of a survey's estimates. A nonresponse bias study would provide a more effective evaluation of the benefit of this or any other attempt to reduce nonresponse.

Future researchers who want to test the validity of our findings could improve upon a limitation of this study: Our experiment only included a sample from the non-top 500 R&D companies. As a result, we cannot generalize our findings to the full set of companies under study. Although statistical tests conducted for this experiment suggest that pre-survey letters may improve survey response rates among poor responders, future researchers may want to apply the design of this experiment to the full set of company respondent types.

Other research might be aimed at shedding more light on the processes by which respondents are selected within companies. For example, collection and analysis of respondent job titles for each questionnaire section could help us to understand what types of respondents are involved, and assess whether the appropriate people appear to be completing the various sections of the questionnaire. Debriefings of respondents, as well as company CEOs, would give us a better understanding of how decisions regarding survey participation are made, and how other behaviors and processes relate to survey response, such as the selection of a primary respondent/survey coordinator and the strategies used for finding other people for assistance and the limitations thereof.

Acknowledgements

We would like to thank our reviewers, Diane Willimack and Paul Hsen, for their assistance and thoughtful suggestions.

References

Edwards, W. S., and D. Cantor (1991), "Toward a Response Model in Establishment Surveys," in P. P. Biemer, et al. (eds.) *Measurement Error in Surveys*, New York: John Wiley & Sons, pp. 211-233.

- Groves, Robert M., David Cantor, Mick Couper, Kerry Levin, Kate McGonagle, Eleanor Singer, and John Van Hoewyk (1997) “Research Investigations in Gaining Participation from Sample Firms in the Current Employment Statistics Program.” *Proceedings of the Section on Survey Research Methods*. Alexandria, VA: American Statistical Association.
- Mesenbourg, Thomas L., Paul T. Zeisset, and Robert A. Marske (1990) “1987 Economic Censuses Advertising and Response Behavior Study.” Paper Presented at the Census Bureau Annual Research Conference, Suitland, Maryland, USA.
- Mulrow, Jeri Metzger (2008) “Getting an Establishment Survey to the Right Person in the Organization.” *Proceedings of the Section on Survey Research Methods*. Alexandria, VA: American Statistical Association.
- Ramirez, Carl (1997) “Effects of Precontacting on Response and Cost in Self-administered Establishment Surveys.” *Proceedings of the Section on Survey Research Methods*, Alexandria, VA: American Statistical Association.
- Sudman, Seymour, Diane K. Willimack, Elizabeth Nichols, and Thomas L. Mesenbourg (2000) “Exploratory Research at the U.S. Census Bureau on the Survey Response Process in Large Companies.” *Proceedings of the Second International Conference on Establishment Surveys (ICES-II)*, Alexandria, VA: American Statistical Association.
- Tomaskovic-Devey, Donald, Jeffrey Leiter, and Shealy Thompson (1994) “Organizational Survey Nonresponse,” *Administrative Science Quarterly*, v. 39, n. 3.
- Tuttle, Alfred D. (2009) “Establishment Respondents as Survey Managers: Using Survey Design Features to Empower Respondents to Find and Recruit Knowledgeable Company Personnel for Assistance.” Paper presented at the Federal Committee on Statistical Methods Annual Conference, Alexandria, VA.