

Best Practices for ICR Supporting Documentation for KnowledgePanel[®] Surveys

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Federal agencies develop Information Collection Requests (ICRs) that are submitted to the Office of Management and Budget (OMB) for new surveys that will impose a reporting burden on the U.S. public as defined under the Paperwork Reduction Act of 1974 and as further required under the so-called Data Quality Act.

This document is an attempt to provide textual support to Federal agencies proposing to use KnowledgePanel sample for studies about which an ICR will be submitted for OMB review.

Because OMB's stated objection to KnowledgePanel is the cumulative response rate (~10%), the information below emphasizes nonresponse bias measurement. KN has led the survey research industry in providing standards for response reporting for web-based surveys and has disclosed its response rates in *Public Opinion Quarterly*.¹

Best Practices for ICRs involve descriptions of these tasks:

- Sampling
- Data Collection Procedures
- Nonresponse Bias Measurement

Statistical weighting is not covered in this document as KN's standard procedures have been considered sufficient by OMB, in past ICR reviews.

Summary

Key Justification Points for using KnowledgePanel sample in Federal information collections:

- Uses probability-based sampling consistent with traditional sampling theory;
- Provides single mode of data collection (web based), obviating potential for data collection mode effects;

¹ See Callegaro, Mario & Disogra, Charles (2008). Computing Response Metrics for Online Panels. *Public Opinion Quarterly*. 72(5) pp. 1008-1031.

- Includes sample coverage of non-Internet households (via computer device and ISP provision) and Spanish-language households;
- Supports multimedia surveys/stated-preference methodology through the web mode of data collection;
- Supports targeted sampling for studies of subpopulations;
- Supports longitudinal information collections with high follow-up cooperation rates;
- Reduces reporting burden on the U.S. public by re-using previously consented sample and by eliminating the re-asking of previously asked survey questions;
- Benefits from informed consent having already been acquired from research subjects;
- Supports cost-effective measurement of nonresponse bias;
- Achieves within-panel survey cooperation rates of 70% and higher, minimizing the potential of nonresponse bias from self-selection into a specific study.

Best Practices for ICRs, to reduce it to the essentials, are as follows:

- **Survey-Specific Sampling**
 - Draw the KnowledgePanel sample exclusively from the 2008 and later cohorts sourced from Address-Based Sampling (ABS);
 - Include KnowledgePanel Latino;
 - Use modified stratified sampling with completion propensity adjustment, a sampling selection procedure that takes into account between-group differences in survey completion rates to KnowledgePanel online surveys.
- **Data Collection Procedures to Maximize Within-Panel Survey Cooperation Rate**
 - Send pre-notification email to sampled respondents 2-3 days before sending the actual survey invitation;
 - Field Survey for two to three weeks;
 - Include cash-equivalent incentives of \$5 to \$10 for longer surveys (25 minutes or longer);
 - Use cash-equivalent incentives selectively to target nonresponders late in the field period;
 - Use email reminders and telephone-based reminder calls with nonresponders.
- **Nonresponse Bias Measurement**
 - To identify possible self-selection effects at the panel recruitment and retention stages, statistically compare demographic and household characteristics of (i) the sample invited to the KN panel and (ii) the subset of actual survey participants (i.e., the estimating sample);
 - To identify possible within-panel self-selection effects, statistically compare demographic and household characteristics of (i) the sample invited to a specific online panel survey and (ii) the panelists participating in the survey on which the estimates are based.

- Benchmark KN panel survey estimates by placing benchmarking survey questions on the KN panel survey instrument, and comparing the surveys estimates to benchmarks from gold-standard surveys (e.g., NHIS, GSS, SIPP, etc); the selection of the survey questions should be informed by a theory that the survey measures are related to the study topics of interest (e.g., political ideology measure in a study on attitudes towards an government regulation of an environmental good);
- (Optional, but not essential) Measure nonresponse bias directly through a technique sometimes called “double sampling” or a “nonresponse follow-up survey.” The procedure is to randomly subsample households that initially were selected to join KnowledgePanel but refused to do so, as well as subsample households that agreed to join the panel but subsequently refused to participate. In this approach, a subset of items from the main survey questionnaire is administered to the selected samples by either a mail survey or web survey.

In the next two sections, more information is provided on the Sampling and Nonresponse Bias Measurement Tasks.

Sampling

1. Restrict Panel Samples to ABS-Sourced Respondents

As of December, 2010, approximately 40% of the active KnowledgePanel households are sourced from a sample frame called “Address-Based Sampling,” while the remainder is sourced from random-digit dialing (RDD). For the information collections requiring OMB review, we recommend that the KnowledgePanel sample be restricted to the ABS-sourced sample in order to provide the most representative sample possible. ABS-sourced sample is advantaged by providing improved representation of certain segments, particularly young adults, cell-phone-only households, and nonwhites. In addition, by restricting the sample to ABS, valuable ancillary person-level and household-level characteristic data are available for the ABS sample units, making possible a descriptive comparison of the characteristics of the entire invited sample and the subset of survey participants.

Between 1999 and April 2009, KnowledgePanel’s probability-based recruitment had been based exclusively on a national RDD frame. In April 2009, Knowledge Networks added the ABS frame (to supplement the RDD frame) in response to the growing number of cell-phone-only households (CPOHHs) that are outside of the RDD frame. In January 2010, Knowledge Networks transitioned completely to ABS-sourced panel recruitment and ceased recruitment using RDD and telephone methods, with the exception of some Spanish-language telephone-based recruitment to support KnowledgePanel Latino.

ABS involves probability-based sampling of addresses from the U.S. Postal Service’s Delivery Sequence File (DSF). Post office boxes and rural route addresses are included.

Business and institutional addresses (i.e., dormitories, nursing homes, group homes, jails, etc.) are removed from the frame, as is military housing. Also removed are those multi-dwelling residential structures that have only a single address (called a drop point address) and for which there is no unit-level identifying information (mail is internally distributed).

Randomly sampled addresses are invited to join KnowledgePanel through a series of mailings. Telephone follow-up calls are made to nonresponders when a telephone number can be matched to the sampled address. Invited households can join the panel by one of several means:

- Completing and mailing back an acceptance form in a postage-paid envelope;
- Calling a toll-free hotline staffed by bilingual recruitment agents; or
- Going to a dedicated KN recruitment website and completing the recruitment information on line by using a unique PIN provided in the advance letter.

After initially accepting the invitation to join the panel, respondents are then “profiled” online, answering key demographic questions about themselves. This profile is maintained using the same procedures established for the RDD-recruited research subjects. Respondents not having an Internet connection are provided a laptop computer and free Internet service. Respondents sampled from the ABS frame, like those from the RDD frame, are provided the same privacy terms and confidentiality protections that we have developed over the years and that have been reviewed by dozens of Institutional Review Boards.

The key advantage of the ABS sample frame is that it allows sampling of almost all U.S. households. An estimated 97% of households are “covered” in sampling nomenclature. Regardless of household telephone status, they can be reached and contacted via the mail. Second, ABS pilot project has other advantages beyond the expected improvement in recruiting young adults from CPOHHs, such as improved sample representativeness for minority racial and ethnic groups and improved inclusion of lower educated and low-income households.

2. Include KnowledgePanel Latino Sample in the Panel Sample Draws

To achieve improved sample coverage, inclusion of the Spanish-language dominant households can be important for certain studies. Approximately 4% of the U.S. adult population is not covered for a general population study when the sample rule excludes Spanish-speaking adults who are insufficiently literate in English for self-administered English-language surveys.

3. Use Modified Stratified Sampling with Completion Propensity Adjustment

Certain demographic segments have survey cooperation rates that are predictably lower or higher than average. If these groups are sampled for a panel survey in proportion to their share of the U.S. population, then the unweighted share of the interviews from the

low-cooperation-rate groups will be less than their share of the U.S population, while the unweighted share of the high-cooperation rate groups will be higher than their share of the U.S. population.

For studies requiring an ICR, Knowledge Networks employs a refinement to the KN standard protocol for drawing samples from the panel (see U.S. Patent No. 7,269,570). The modified approach is designed to improve further the demographic similarities between the completed panel interviews and the U.S. Census population benchmarks by factoring estimated survey completion rates for key demographic groups into the sample draw selection probabilities. Knowledge Networks has ample experiential data upon which to calculate reliable completion propensities for specific demographic groups. Essentially, by oversampling groups that have consistently lower completion rates and undersampling groups that tend to have higher rates, the valid completed interviews can mirror the Census demographic benchmarks more closely. This approach can be employed when it is essential to minimize the range of a study's post-stratification weights and the resultant design effect. This modified sampling approach is executed by first constructing 576 cells using the following six variables and then adjusting the fielded sample size for each cell by the response propensity for each cell: Age (18-24, 25-34, 35-44, 45-54, 55-64, 65+); Education (Less than high school, High school, Some college, College degree +); Hispanic (Hispanic, Non-Hispanic); Race (White, Black, Other); Gender (Male, Female); Household income (Less than \$75K, \$75K+).

Nonresponse Bias Measurement

This section will describe basic statistical tests of nonresponse bias measurement, and one direct measurement technique. A summary of past research on nonresponse bias measurement in the context of Knowledge Networks surveys is available.²

1. Statistical Comparison of Demographic and Household Characteristics of the Sample Frame versus the Subset of Actual Survey Participants

This approach attempts to measure self-selection bias among the estimating sample making up the completed interviews. The approach is possible only for general population studies of U.S. adults where the interview sample size requirement is 5,000 interviews or less (subject to increase as the ABS-sourced sample increases over time). The approach works best when limiting the KN panel sample draw to ABS-sourced panelists.³ ABS sourcing is important because a specific benefit of address-based sampling: the ability to append to the sample frame many person-level and household-level ancillary data associated with an address. Commercial databases (e.g., Experian, infoUSA, and Acxiom) are used to append to the sample frame observed and modeled information at various levels of aggregation. These same ancillary data are also used to

² See Dennis, J. Michael. 2010. KnowledgePanel®: Processes & Procedures Contributing to Sample Representativeness & Tests for Self-Selection Bias. The paper may be downloaded from <http://www.knowledgenetworks.com/ganp/reviewer-info.html>.

³ The approach is technically possible when using the RDD-sourced portion of KnowledgePanel; however, the ancillary data attached to the sample frame will have more unit-level missing data.

analyze nonresponse bias by comparing the ancillary data available for the entire sample invited to join the KnowledgePanel and the small subset of recruited study participants that participate in any given study. If the study requires a general population adult sample, the expectation is that the estimating sample of completed interviews will have marginal distributions on person-level and household-level characteristics that are statistically similar to the distributions of the entire invited sample.

Consider the following example from an analysis of ancillary data. The figure is a comparison of the distribution of household income for the ABS sample units making up the entire invited sample and the distribution from the sample agreeing to join KnowledgePanel. The data source is the ancillary data from all KN invited sample from 2008 through early 2010. All sample units fielded for panel recruitment during this time frame are included in the analysis. The results show statistical comparability between the total invited sample versus the subset of actually recruited adults. For instance, 22.4% of the invited sample was relatively low income (less than \$25K household income) compared to 20.4% of the recruited sample.

Distributions of Household Income Comparing the Total Sample Invited to KN Panel Recruitment and the Subset of Actual Recruited Persons



Statistical comparisons for specific studies can be made between the total invited sample for the panel recruitment and the estimating sample for these variables:

- Household level
 - ✓ Number of adults in the household
 - ✓ Presence of children (yes, no)
 - ✓ Home ownership (own, rent)
 - ✓ Household income (12 levels recoded to <\$25K, \$25-\$49K, \$50-\$74K, \$75K+)

- Person level
 - ✓ Marital status (married, single)
 - ✓ Education of head of household (less than high school, high school, some college, BA, higher)
 - ✓ Age of householders
 - ✓ Race/Ethnicity (White, African American, Hispanic, Other)

The approach is explained in more detail in an article by DiSogra, Dennis, and Fahimi in the 2010 Proceedings of the Joint Statistical Meetings.⁴ An aggregate error rate can be calculated as the sum of the differences in the distributions between the expected values from the total invited sample compared to the actual values (from the estimating sample of completed interviews).

2. Statistical Comparison of Demographic and Household Characteristics of the Survey Participants versus the Non-Responders

For studies requiring ICRs, the within-panel survey cooperation rate will be less than 100%. There is the potential for self-selection bias at the stage of inviting KN panelists to participate in an actual survey. This technique attempts to identify nonresponse resulting from a survey cooperation or return rate of 70% to 80%. It involves a simple comparison using the approximately 20 person-level and household-level characteristics (available on all KN panelists). The sample invited to participate is compared to the sample that does participate. If the survey topic is preponderantly more attractive to some groups rather than others, this technique will identify such patterns.

3. Benchmarking KN Panel Survey Estimates

Benchmarking KN panel survey estimates by placing benchmarking survey questions on the KN panel survey instrument, and comparing the surveys estimates to benchmarks from gold-standard surveys (NHIS, GSS, SIPP, etc); the selection of the survey questions should be informed by a theory that the survey measures are related to the study topics of interest (e.g., political ideology measure in a study on attitudes towards an government regulation of an environmental good). For more examples of benchmarking studies, see Dennis, J. Michael. 2010, "KnowledgePanel[®]: Processes & Procedures Contributing to Sample Representativeness & Tests for Self-Selection Bias," <http://www.knowledgenetworks.com/ganp/reviewer-info.html>.

A limitation of this approach is that usually the benchmarking data were not collected by the online mode of data collections but instead by in-person interviewing. As a result, data differences observed in the KnowledgePanel estimates and those from the benchmarking survey could be the result of the mode differences (presence versus absence of an interviewer). Differences in mode is a hypothesized to be factor accounting for

⁴ The article may be downloaded from <http://www.knowledgenetworks.com/ganp/reviewer-info.html>. The citation is DiSogra, Charles, J. Michael Dennis, and Mansour Fahimi. 2010. On the Quality of Ancillary Data Available for Address-Based Sampling. Conference Proceedings of the 2010 Joint Statistical Meetings.

KnowledgePanel estimates between different on some items from the General Social Survey.⁵

4. Direct Measurement of Nonresponse Bias

Direct measurement of nonresponse bias is infrequently undertaken because of its cost and also because of a concern that it will introduce an additional source of error.

The technique is sometimes called “double sampling” or a “nonresponse follow-up survey.” The procedure is to randomly subsample households that initially were selected to join KnowledgePanel but refused to do so, as well as subsample households that agreed to join the panel but subsequently refused to participate. In this approach, a subset of items from the main survey questionnaire is administered to the selected samples by either a mail survey or web survey.

Additional error can be introduced by this approach as a result of the need to use more than one mode of data collection in order to achieve a satisfactory refusal conversion rate. Because the double-sampling approach is premised on the need to interview those who already refused to participate or else constitute non-contacted households, it is common to supplement the web mode of data collection with telephone-based and mail-based interviews. As a consequence, the supplemental interviews obtained in the nonresponse follow-up interviews are from different modes, introducing measurement differences that may be entirely attributable to the mode of data collection. The result is an inability to isolate the cause of estimation differences resulting from sample source (KN panel recruits, KN panel recruitment nonresponders) versus mode of data collection (online, mail, telephone, and in-person). For more discussion and examples, see Dennis, J. Michael. 2010, “KnowledgePanel®: Processes & Procedures Contributing to Sample Representativeness & Tests for Self-Selection Bias,” <http://www.knowledgenetworks.com/ganp/reviewer-info.html>.

⁵ See Smith, Tom W., and J. M. Dennis. 2005. Online Versus In-Person: Experiments with Mode, Format, and Question Wordings. *Public Opinion Pros*. December issue. Available under "Past Issues" at <http://www.publicopinionpros.norc.org/index.asp>.