Nye datamuligheder:

Web Panels at National Statistical Institutes?

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Abstract

The market research industry seems to increasingly abandon traditional postal enquiries and telephone interviews in favour of self-selection web panels. Surveys through web panels are often much cheaper than traditional surveys. National statistical institutes are already (or will probably be) challenged by a new form of competition for ad hoc surveys and by invitations on co-operation on data collection through web panels. Some questions are: Should web panel methodology be used at all when producing official statistics or for surveys conducted on commission by a national statistical institute? How does the access panel approach compete with probability sampling? Is it relevant to talk about 'representativity'? What problems might occur with sampling bias and undercoverage?

Keywords: web panels, self-selection, probability sampling, representativity.

1. Web panels

1.1 The concept of web panels

A web panel – or online panel or Internet panel – is a kind of access panel, by which is meant a sampling database of potential respondents who are willing to participate in future surveys if they are selected. (This is something else than fixed or rotating panels in longitudinal surveys based on probability sampling. Media panels for estimation of numbers of viewers of TV programs are of course also not included in the web panel concept.) Practically all web panels used in market research are self-selected in the meaning that panels are not drawn with probability sampling from the population.

The concepts of web panels and web surveys should not be confused here with web questionnaires. The latter concept only means that data are collected via the Internet, regardless of how the sampling is made. Statistics Sweden is carrying out a relatively large amount of its data collection via web questionnaires, at least for business surveys. Usually, respondents are offered to send material by other modes as well, such as via traditional paper questionnaires. Statistics Sweden has so far *not* worked with web panels.

1.2 'Representativity'

In connection with the use of web panels we encounter much talk of 'representativity'. This concept is not applied as frequently among professional statisticians, as it easily causes thinking in the wrong direction. Bethlehem (2008) states that the term is rather confusing because it can have many meanings and is often used in a very loose sense to convey a vague idea of good quality. What

market researchers probably mean by 'representativity' is that the sampling objects are not different from the population objects in some important respects, but rather represent a miniature of it. This is thought to be indicated by the web panel (or sample from this) having the same structure on background variables, such as the socio-demographic variables gender, age, region and income. There are also attempts to confirm the 'representativity' by comparing the results from the web panel surveys with known data from registers or surveys with probability samples.

However, it is well known that a sample from a web panel can be 'representative' with respect to all known background variables, and thus represents the composition of the population, without giving rise to accurate estimates of the statistical target characteristics. It may simply be that the objects included in the survey only differ with respect to the study variable compared with those not included. This could be referred to as a self-selection error (or sampling bias or nonresponse bias). Couper (2001) classifies the quality of web panels in eight levels, from the lowest level with web 'surveys' as entertainment, then self-recruited panels through pop-ups or the like, voluntary panels, visiting invitations, registers with high Internet penetration, combined methods, probability samples among Internet users, and finally probability samples from the whole population. In Sweden, the sixth level, is common and is sometimes called 'gold panel': a combination of voluntarily recruited panels from the Internet and from other sources. The third level, using voluntary panels, is also much in use. About 20 companies work with access panels in Sweden.

1.3 Sampling methods

Recruitment for the web panels can be made in different ways. One approach has been to ask a question about participation in the web panel during a telephone survey. The response rate is often less than 50 percent in a telephone survey conducted by a market research company. It is said to be common that 20–30 percent of the respondents accept a bid. Thus, so far there is a selection of about one tenth of the objects or individuals. The next step is to draw a sample from the panel. Often, about 35–50 percent of the sampled individuals respond to the questionnaire. Then, the respondents correspond to less than 5 percent of the individuals. The market research industry avoids talking of nonresponse in this situation, but actually it would still in some way be fair to say that the nonresponse rate is higher than 95 percent. In this case there is absolutely no guarantee that you get accurate results from the survey, even if the background variables are used for weighting. In addition to nonresponse errors, there are of course also coverage errors: undercoverage results from the fact that online panels cannot represent people who are not online.

Either stratified or quota sampling is usually offered from web panels. Stratification is an effective method that often increases the precision of the final estimates. Here however, stratification is utilized outside the concept of probability sampling, and it is unclear how much is gained with the technique. *Quota sampling* is in itself a dubious methodology. One begins by identifying important subgroups of the population, and estimates their quotas in the population. The estimates can be based on other studies or registry data. Then in the data collection phase, respondents are recruited so that the proportions in various subgroups agree reasonably with the estimated proportions in the population. For instance, specified numbers of individuals are recruited in different age groups. Quota sampling is to some extent suggestive of stratified sampling, but the similarity is illusory, since quota sampling lacks the scientific basis of a stratified probability sample. This was made clear as early as in the 1930s. Quota sampling actually fell into disrepute after the unsuccessful opinion polls of the United States 1948 presidential elections. In recent years quota sampling has been used more again, mainly in connection with market research.

1.4 Estimation methods

Estimation methodology can vary for web panel surveys. If the parameters sought are proportions, unweighted estimation might work. There are also examples of weighting under *propensity score*

adjustment in the market research industry. This method requires good access to auxiliary information for the objects in the web panel and for the objects in a so-called reference sample that has been selected with probability sampling. For the reference sample, variables are reported that are relatively simple and inexpensive to measure. However, background variables like gender and age are not enough; attitude data and lifestyle data are also required. The propensity score adjustment method falls within the framework of calibration estimation and leads to estimates without bias if all assumptions on relations are true, but this is probably too often not the case. The Scientific Council of Statistics Sweden recommended in 2008 that the propensity score adjustment method should not be used.

1.5 Quality issues

Still, many market researchers and some statisticians would say that there may be times when a nonprobability online panel could be an appropriate choice. A less controversial case is when panels are used for explorative research, e.g. for qualitative purposes or pilot testing. Change estimations are also noted to be less prone to bias than level estimations. However, when using panels, there are many *quality issues* to address. Firstly, is it an actively managed panel – where the panelists have taken an active and conscious decision to participate in web surveys on a regular basis – or just a database? Furthermore, professional survey-takers have to be under control. The size of the panel is an important factor, especially when trying to reach a given target group. Is breadth of coverage ensured in relevant target groups? The recruitment channels should give necessary diversity, by sourcing respondents both from offline channels (telephone, TV ads, radio ads, ads in newspapers and magazines, addressed letters, outdoor posters, etc.) and online channels (emails, websites, banners, community sites, member programs, etc.). However, even if the 'source bias' is reduced, a probability sample would be the best recruitment method. Panelists ought to be admitted to the panel through a double opt-in validation procedure, which means that panelists must confirm their joining in the panel by email. The respondent integrity is defended by using the panel solely for surveys and not for sales or marketing purposes. The panelists should not be able to provide 'mechanical responses' or cheat – there are several approaches to guard against bad data, e.g. monitoring response times and the existence of pattern responses.

1.6 Recommendations from different organizations

In 2009 a new international standard was adopted: ISO 26362, *Access panels in market, opinion and social research*. The standard presents terms and definitions concerning access panels. Then requirements are given for organization and responsibility, panel members, panel structure and size, participation rates, panel management, panel usage, client reporting and professional rules of conduct. The term 'representativity' should only be used if it is strictly defined. The concept of 'response rate' must not be used – 'participation rate' should be used for panel efficiency, and a description should be given of how it is calculated. Whether or not Swedish market research companies will apply for certification is unclear.

The Swedish Survey Society has set up a special committee to look at statistical quality issues for web panels – issues that are not really addressed by the ISO 26362 standard. The committee is going to write a report with suggestions of standard indicators or metrics on quality in web panel surveys. Some of the indicators will refer to the panel itself, and some other indicators will refer to quality in the particular survey. A source of inspiration for the indicators is Callegaro & DiSogra (2008).

ESOMAR has formulated 25 questions intended to provide insight into the quality and transparency of market research web panels to help existing and future clients. Many panel companies give answers to these questions and are known to apply strict ethical standards.

AAPOR (2010) presents a number of conclusions and recommendations from a task force review. Among other things, they say that nonprobability online panels should be avoided when estimating population values. However, there are times when a panel of this kind is an appropriate choice, like when probability sampling is infeasible if not impossible. Better quality metrics are needed. Moreover, research aimed at evaluating and testing inference techniques from online panels should continue.

2. Probability sampling

When conducting a statistical survey you need to minimize various sources of error or uncertainty in a cost effective manner. The main sources of uncertainty can be categorized into sampling, frame coverage, measurement, nonresponse, data processing and model assumptions. In addition to estimating the statistical parameters and trying to reduce errors as much as possible, it is important to estimate or indicate the possible size of inaccuracy.

Statistics Sweden, like most national statistical institutes, almost always works with so-called probability samples. This means that each object in the target population has a chance to be selected in the sample and that this chance or probability is known for its size. Probability sampling means that there is a random element in the sampling mechanism. However, there is nothing to prevent the dividing of the population into strata or the assigning of varying inclusion probabilities to different objects in the population. Simple random sampling is not used very often (except within strata), as it would lead to low-precision estimators.

A major advantage of probability sampling is the avoidance of introducing systematic errors – as a result of selecting or not selecting objects with certain properties – as early as in the sampling phase. Probability samples are more 'objective' and lend credibility to the statistics produced. Another advantage of probability sampling is that the sampling error can be calculated.

In practice, there are almost always other errors besides the sampling error. In many surveys, nonresponse is problematic. If a sample of 1 000 individuals is selected and only 500 of them respond, there is a risk of nonresponse bias in the statistics. The selection of the 50 percent of the respondents has obviously not taken place with probability sampling. To reduce the bias, the estimations weights are often adjusted using auxiliary information, e.g. information on background variables from registers. The main principle at Statistics Sweden is to avoid introducing systematic errors as early as in the sampling design. The bias that may arise from the nonresponse is hard enough to overcome. A recommendation in Statistics Sweden (2008) is that nonprobability sampling should be avoided in most cases where the sample is more than a pilot study sample and where a nonrandom selection depends on subjective arbitrariness. Thus, probability sampling is preferred compared with web panels.

3. A Swedish example

Statistics Sweden was in 2009 asked by a retail trade organization if statistics on cross-border trade could be produced utilizing web panels. The statistics were also planned to be used for tourist satellite accounts and to some extent for the national accounts. The need for information was considered to be urgent. Available statistics so far are of poor quality, mainly based on data on currency exchange and transactions via credit cards combined with expert assessments. An ambitious cross-border trade survey with on-site sampling and face-to-face interviews has been discussed, but it is unclear if and when this survey will be conducted.

A fieldwork company within the market research industry offered Statistics Sweden their services on web panel surveys. The company is specialized in tracking studies through web panels and has advanced techniques for automation of selections, like algorithms for adaptation with weekly quotas in mind. The survey approach proposed means that one starts with a combination of web panels in the respective Nordic countries (Norway, Denmark and Finland). The panels are recruited in different ways and probably cover individuals with different lifestyles. The approach is called blended sampling. Combining panels in this way and thus having a better coverage would increase quality. In all, some 500 000 individuals are included in the 80 Nordic (including Swedish) panels. This is claimed to be a very large group that can deliver enough quality in online panel surveys. But the size of the merged panels represents only about 2 percent of the population. Selections from such a panel could not be said to correspond to a probability sample from the entire population. Moreover, the cross-border purchases are mostly done by people living near the borders to Sweden, and it is unclear how well this fact will be considered through the web panel approach. Screening questions are necessary to reach the target group.

The panel supplier stated that the survey data collection would be made at a total cost of around 30 percent of the cost of an offline survey and with only marginal differences in the data. However, the interesting difference does not lie in whether data collection is done via the online or not, but in how respondents are selected. There is no scientific basis for claiming that the estimates would be as accurate from web panels as from probability sampling. The fact that Internet penetration in the Nordic countries is high or that (possibly) complex weighting procedures are applied does not ensure reliable results. An online panel survey *could* provide reliable results, but to verify this extensive quality studies are required for the specific case.

It was also noted that the panel supplier began to provide panel data in 2009 for public opinion polls. The final statistics are produced by another market research company and are published in one of the major Swedish newspapers. It is not known how well these web surveys work. However, it is relatively easy to measure political party preferences for several reasons: The questions being asked are simple and relate to opinions that almost all Swedes have been considering. It is not necessary to remember a lot of facts, as in a cross-border survey. The participation in the elections is relatively high in Sweden, making it easier to end up right in an election forecast. Moreover, there are many other polls to compare with, and finally an election result to be utilized. Succeeding with a poll like this through a web panel survey is thus no guarantee of success for other types of surveys.

4. Conclusions

When using probability samples of sufficient size, there is no need to worry about the ‘representativity’ of the sample. The random element in the sampling procedure leads to ‘representativity’ with respect to all possible variables of the objects. Trust is therefore not entitled to background variables or comparisons with other data sources, but to the probability sample itself. The procedure is transparent and built on a scientific basis.

For a national, independent statistical institute, it is essential to use probability sampling in sample surveys as much as possible. Practical circumstances might make it necessary to depart from this methodology in some cases, but there must be strong reasons for this. It is true that the nonresponse (if it is not completely at random) leads to a set of respondents that is not a probability sample from the population, but it is not considered reasonable to build in a risk of bias as early as in the sampling methodology. The risk of systematic nonsampling errors is not a strong argument for giving up the whole idea of probability sampling. Rather, it is essential to build on a solid foundation of probability sampling and minimize nonresponse etc. and adjust as effectively as possible for the remaining nonresponse.

Surveys using web panels are often much cheaper than surveys based on probability sampling. Market research companies working with web panels do often have effective systems of production and technically elaborated algorithms for selection. So far, web panel surveys are not commonly used for official or other statistics produced by national statistical institutes in Europe. Probably, institutes will be much more challenged by competition from web surveys for ad hoc surveys in the coming years. Invitations on cooperation on data collection through web panels are also expected to increase. National statistical institutes therefore need to examine the use of web panels and maybe conduct some quality studies in order to gain more information on pros and cons with the new approach.

To broaden the perspective, using rapporteurs or experts to report on statistics is even cheaper than conducting web panel surveys. Expert assessments could be looked upon as kinds of model-based estimations. The risk of bias is obvious, but in some cases the method might be considered, thus giving the best quality for money. An alternative to producing statistics by using inexpensive methods such as web panels or expert assessments is simply not to provide statistics. The justification for this is that the statistics will be too inaccurate and most likely to mislead users. One consequence of this approach is that either statistics of sufficient quality for the intended use are produced, and then the required cost is accepted, or no statistics are provided. In some cases there might be ethical reasons to abstain from producing statistics.

National statistical institutes should not, without a lot of consideration, endorse or make any general guarantee of quality for a survey based on web panels. Such a survey *could* lead to reliable results, but the risk of substantial bias in the statistics is too high. Thus, nonprobability online panels should be avoided when one of the survey objectives is to accurately estimate population values. Moreover, it is not possible to compute margins of error with an approach like that. The Scientific Council of Statistics Sweden gave a recommendation in 2008 to use probability sampling and refrain from convenience sampling, to which sampling from web panels can be classified.

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