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rigour – transparency – creativity – relevance

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## **Assessing Survey Research A Principled Approach**

Work-in-Progress Report

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*However, the advent of the Web as a tool for survey data collection does not obviate the traditional concerns of representativeness and replicability.*

*Mick P. Couper, 2000*

This document presents an assessment framework for survey research. It is based on four fundamental principles: rigour, neutrality, balance and transparency from which a series of assessment criteria are derived.

## ***Introduction***

Traditionally, the assessment of survey research has been an art more than a science. Every researcher uses their own criteria and put more or less emphasis on various aspects of the research.

This occurs in the literature when one author comments on the weight of the evidence brought to bear on a competing or supporting point. It also takes place when clients assess the value to give to survey evidence they commissioned or that is used, among other sources of information, in support of a business decision. It happens during one's self-examination of a research report to ensure that all elements of the required proof are offered.

However, the depth of examination of research evidence is nowhere more profound than when survey research is used in the judicial system. In this instance, two or more parties have every reason to either accept or reject the evidence; all parties tend to emphasize only the areas of the proposed evidence which support their position. Meanwhile, the courts and the quasi-judicial bodies need to be able to rely on a proven approach to assessing survey research so as to ensure that no important component of the research is left unexamined. The author's experience with the judicial system as a survey expert has motivated the development of a framework to assess survey evidence. It has also been used as a self-assessment tool and as a checklist to confirm the quality and completeness of the research.

This paper and this framework do not address the issue of whether or not survey research is the right approach to study a particular topic. Such an assessment would require investigating the relevance of the unit of analysis and the consistency of the use of the unit of analysis in the research (Grover, 1). This is beyond the objectives of this paper.

### ***Criteria for quality research***

The first fundamental question is that of the criteria defining quality research. We propose that four criteria are essential to passing judgment on a particular piece of survey research. They are:

- ***Rigour***: does the study systematically apply recognized best practices of survey research? Rigour is, of course, relative to the situation at hand. Certain research situations call for some methodological choices while others require other approaches. By essence, rigour is the most technical of the criteria used here; yet, the specific rules of assessment are likely to evolve through time as we develop more knowledge on best

survey practices.<sup>1</sup> This is particularly the case with innovative approaches such as Internet-based survey research.<sup>2</sup>

- **Neutrality:** does the study observe the phenomena of interest without biasing the observations? The object of research is to depict reality faithfully; therefore, sound research must take steps to ensure that its depiction is neutral in its representation, that reality has every chance of surging in a representative way from the observations made.
- **Balance:** does the study use sufficient resources to demonstrate its thesis adequately, but no more than are necessary for this purpose? Balance demands both sufficiency and parsimony. Balance is the position one adopts to achieve stated objectives with a minimum use of resources, efforts, burden, etc.. According to the Oxford dictionary, balance refers to, among other things, "harmony of design and proportion" and the verb "to balance" is defined as "to bring into or to keep in equilibrium".
- **Transparency:** does the study provide all the relevant background needed for an informed assessment? Science is based on the idea of reproduction: if the same observation is made repeatedly, the conclusion reached from these observations acquires more strength than conclusions drawn from idiosyncratic observations. Reproduction requires shared knowledge or intersubjectivity<sup>3</sup>. The corresponding

<sup>1</sup> For example, from Hirschi (1975, 7): "Ainsi, la méthodologie, ce n'est pas la vérité révélée et éternelle. C'est un corps vivant d'idées, qui change avec le temps. Nombreuses sont les méthodes, et ce qui est correct et valable aujourd'hui peut être incorrect et inacceptable demain."

<sup>2</sup> For example, Couper (2000, 473) wrote: "tried and tested motivating tools used in mail surveys (e.g., advance letters, personalized signatures, letterhead, incentives, etc.) cannot be implemented in the same way in Web surveys, and functional equivalents are yet to be developed and tested. There is at present little experimental literature on what works and what does not, in terms of increasing response rates to Web surveys. Many of the techniques developed and tested over time to increase response rates in mail surveys may not work the same way in fully electronic Web surveys. Finding electronic equivalents of response-stimulating efforts is work that remains to be done."

<sup>3</sup> "In saying that science is intersubjective, we mean that two scientists with different subjective orientations would arrive at the same conclusion if each conducted the same experiment. [...] If the earlier researchers had reported the design and execution of their studies in precise and specific details, however, and you were to replicate the study exactly, you should arrive at the same finding. This is what is meant by the intersubjectivity of science." (Babbie, 1990, 16–17)  
[...]il est évident qu'on ne peut pas s'attendre à ce que la science produise des vérités ou des connaissances absolues et irréfutables. Les résultats dits « scientifiques » ne sont vrais que temporairement, jusqu'à ce qu'une autre recherche ne les démontre suffisamment faux pour que la communauté scientifique les rejette et les remplace par des résultats plus fiables. [...] On ne peut jamais démontrer la vérité absolue d'un résultat. En effet, le caractère empirique (plutôt que logique) de la preuve

fundamental requirement is the full disclosure of all elements of methods which may have a bearing on the quality of the observations and on the strength of the conclusions. We label this "transparency" very much along the lines of the demand made by people and the media on politicians to be "transparent" in their decision making. Transparency is also a basic management principle according to the Ordre des administrateurs agréés du Québec.<sup>1</sup> Transparency is probably the most fundamental precept: without it, the other criteria have no meaning in terms of public communication of research results.

Other criteria have been used to assess survey research, but we contend that they are subsumed within the four proposed here. They include:

- the compliance with professional and ethical standards (Hebert, 1999);
- the representativeness of the sample (Stern, 1979, 32 & 77; Corbin et al., 2000, 16);
- the validity of the operational definitions of concepts (Stern, 1979, 77; Corbin et al., 2000, 16);
- the logic of the design (Babbie, 1990, 41);
- the sufficient size of the sample (Corbin et al., 2000, 16);
- controlled implementation of the stimulus that the survey represents for the respondent (Stern, 1979, 80);

requiert la vérification de tous les objets ou événements passés, présents et futurs relatifs à une certaine classe d'objets ou d'événements; cette condition, qui ne peut évidemment jamais être remplie, ni logiquement, ni pratiquement, circonscrit cette impasse qu'on ne peut éviter que par la convention. [...] L'intersubjectivité peut prendre un autre sens qui est beaucoup plus proche de la signification de l'observabilité et de la reproductibilité. L'intersubjectivité implique que toutes les étapes de la méthode puissent être traduites en termes publics de sorte que tous les tests puissent potentiellement être menés par au moins deux scientifiques." (Mellos, 1997, 500-501)

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2.2-1: « Transparence » : Qualité de ce qui laisse paraître la réalité tout entière, sans qu'elle ne soit altérée ou biaisée. Il n'est d'autre principe plus vertueux que la transparence de l'acte administratif par l'administrateur qui exerce un pouvoir au nom de celui de qui origine le pouvoir. Celui qui est investi d'un pouvoir doit rendre compte de ses actes à son auteur.  
2.2-2: Essentiellement, on peut déterminer que l'administrateur doit rendre compte de son administration; que ce soit au mandant ou à une personne ou un groupe désigné par celui-ci, par exemple : à un conseil d'administration, à un comité de surveillance ou à un vérificateur.  
2.2-3: Dans la mesure où le mandant le permet et qu'il n'en subit aucun préjudice, l'administrateur doit également agir de façon transparente envers les tiers ou les préposés pouvant être affectés par ses actes.  
2.2-4: Ainsi, la transparence implique de rendre l'information accessible aux tiers, incluant les membres de son organisation afin d'assurer la saine gestion.  
2.2-5: L'administrateur doit divulguer à son mandant tous ses intérêts propres, financiers ou personnels, de même que ceux de sa famille immédiate (telle que définie au paragraphe 4.4.13-5), qui puisse affecter son travail ou ses fonctions. (Ordre des administrateurs agréés du Québec, 1)

- the availability of the sampled individuals (Blais and Durand, 1997, 362);
- the capacity for individuals to respond (comprehension and information) (Blais and Durand, 1997, 362);
- the lack of bias of the questions (Corbin et al., 2000, 16);
- the unbiased communication of information from the part of the respondent (Blais and Durand, 1997, 362; Corbin et al., 2000, 16);
- the faithful recording of the information offered by the respondents (Blais and Durand, 1997, 362; Corbin et al., 2000, 16);
- the disclosure of interviewer instructions (Corbin et al., 2000, 16);
- the use of accepted statistical principles (Corbin et al., 2000, 16);
- the objectivity of the process (Corbin et al., 2000, 16);

### ***Survey research building blocks***

The assessment framework is structured around the six building blocks of survey research. They are listed below, along with a brief definition.

- ***Questionnaire***: the development of the verbal or visual stimuli used to solicit answers from respondents; this is obviously the basic tool used in survey research.
- ***Sampling***: the selection of a subset of the population of subjects which is targeted for the study.
- ***Data collection***: the application of the questionnaire to the elements of the sample.
- ***Data management***: the transfer of responses provided by participants to electronic media as well as the editing of the data and the creation of new data; this includes devising weights.
- ***Data analysis***: the exploitation of data to answer research questions; this includes the use of statistics and could include the use of designs which are more sophisticated than simple one-survey descriptive research plans.

- **Reporting:** the presentation of the research process and the research findings, usually in the form of a written or graphical report.

### **Combining principles and building blocks**

The assessment framework posits that "sound" survey research exhibits evidence of the four quality principles, within each of the six building blocks. The particularity of this assessment framework is to combine the six building blocks with the four assessment principles to produce a matrix of 24 zones (see exhibit 1) which require attention in the review of survey research.<sup>1</sup>

Let's analyse what the specific assessment criteria would be within this 6x4 framework.<sup>2</sup>

(ARGUMENTATION TO COME)

#### **[q]uestionnaire**

- *[R]igour* qR combination
  - Content validity
  - Pretests
  - Response scales
  
- *[N]eutrality* qN combination
  - Reliability
  - Absence of bias
  
- *[B]alance* qB combination
  - Minimisation of response burden

<sup>1</sup> This cross-classification of functions or phases with principles mirrors that used by the Ordre des administrateurs agréés du Québec in the establishment of its standards of sound management: in this case, six principles ("transparence, continuité, efficience, équilibre, équité, abnégation") are applied to five management functions (planning, organizing, directing, controlling, coordinating) to form the basis for the management standards. See Breault, 1999.

<sup>2</sup> While the author identified, selected and classified the criteria, Exhibit 2 presents references which support the contention that the criteria outlined here deserve this status.

- *[T]ransparency* qT combination
  - Research objective
  - Sponsor
  - Complete reproduction of the questionnaire

## **[s]ampling**

- *[R]igour* sR combination
  - Adhesion to rules of random sampling
  - Justification of non random sampling
- *[N]eutrality* sN combination
  - Target population and population reached; filtering procedures  
"In litigation, the survey's universe must fit the facts of the case" (Hebert, 1999). Obviously, this applies beyond the courts. The theoretical target population must correspond to the topic studied.<sup>1</sup> Moreover, the population reached must fit the theoretical population sought. When applicable, the filtering procedures used during the fieldwork must provide a precise empirical match between the people selected for the study and the individuals whose behaviour or attitudes are important to the study topic.
  - Sampling frame
  - Final dispositions; response rate; refusal rate; replacement procedures
  - Sampling margin of error
- *[B]alance* sB combination
  - Appropriateness of the nature of the sample considering the research purposes
  - Sample size  
*Ceateris paribus*, the size of the sample determines the ability of the study to uncover statistically significant differences between subgroups of the sample and it is one of the determinants of the

<sup>1</sup> "To use a common example, in litigation involving plaintiff's claims that defendant's deceptive advertising destroyed the market for plaintiff's product, the universe consists of those consumers who intend to buy from the plaintiff or defendant in the future. The consumer who belongs to this universe should be the (1) potential purchaser; (2) potential decision maker; and (3) person to whom the advertising is addressed." (Hebert, 1999)

statistical accuracy of the estimates produced. Therefore, the sample should be large enough to support the claims of the study but not so large as to provoke type I errors (or the erroneous rejection of the null hypothesis). Every survey also contributes to the overall social burden represented by survey research; therefore any one survey should not acquire data from substantially more respondents than necessary.

- *[T]ransparency* cT combination
  - Population definition
  - Sampling method
  - Sample size
  - Response rate

### **data [c]ollection**

- *[R]igour* cR combination
  - Interviewer training
  - Quality controls, supervision
  - Call back schedule
- *[N]eutrality* cN combination
  - Criterion validity (corroboration)
  - Construct validity
  - Non-contamination
  - Double-blindedness
- *[B]alance* cB combination
  - Justification of the type of survey
  - Informed consent vs. hidden client. Sound research is based on the prerequisite that individuals accepted to participate knowing what the task was and being reasonably reassured about the use of the information they were about to offer.
  - Avoidance of scarring effects
  - Confidentiality of data
- *[T]ransparency* cT combination
  - Identification of the data collection agent
  - Dates, locations and periods of data collection

- Notable social events during the data collection period

### **data [m]anagement**

- *[R]igour* mR combination
  - Calculations and adjustments done correctly
  - Coding performed rigorously
- *[N]eutrality* mN combination
  - Weighting criteria used
  - Sources of population data
  - Assurance that adjustments do not unduly favour the researcher's hypotheses or interests
- *[B]alance* mB combination
  - Avoidance of excessive weighting
  - Effect of the adjustments made
- *[T]ransparency* mT combination
  - Mode of calculation of weights
  - Variance of the weighting scheme (design effect)
  - Calculations and adjustments made

### **data [a]nalysis**

- *[R]igour* aR combination
  - Technically correct use of statistical tools
- *[N]eutrality* aN combination
  - Risk of disputes on results and interpretations
  - Coherence of conclusions with results
- *[B]alance* aB combination
  - Appropriateness of methods considering the research purposes
  - Appropriate of the research design considering the research purposes

- *[T]ransparency* aT combination
  - Raw and weighted sample sizes in tables
  - Description of analysis methods used

## **[r]eporting**

- *[R]igour* rR combination
  - Disclosure of study weaknesses and possible bias
- *[N]eutrality* rN combination
  - Distinct presentation of objective results and of their interpretation
  - Selflessness of the researcher, absence of a link between study results and remuneration
- *[B]alance* rB combination
  - Level of support to conclusions offered by study results
  - Possible reservations on the internal and external validity of results
- *[T]ransparency* rT combination
  - Disclosure of all elements of information required by all 24 framework cells to assess the value of results

## **Codes of ethics**

Referring to the traditional literature in the field, one might ask: what about reliability, validity and ethics? We contend that traditional concerns related to research quality and, to a certain extent, to social acceptability or ethics, are contained within the framework proposed here; meanwhile, the framework goes much beyond that to offer more prescriptive guidance to researchers, auditors and assessors.

While this assessment model does not duplicate codes of ethics or rules of good practices such as the ones offered by AAPOR and PMRS, it offers the analyst a strong, defensible framework which ensures the thoroughness and balance of the review. The same approach can be used as a checklist for one's own research work.

In fact, this framework does not constitute a code of ethics. Research which would provide solid evidence regarding the issue at hand according to the criteria used here could still be considered unethical on other grounds. For example, the AAPOR code of ethics indicates that "If we become aware of the appearance in public of serious distortions of our research, we shall publicly disclose what is required to correct these distortions, including, as appropriate, a statement to the public media, legislative body, regulatory agency, or other appropriate group, in or before which the distorted findings were presented"; a contravention to this rule would not transform good research into bad research.

However, relative to qB (questionnaire–Balance) and cB (data collection–Balance), where the research endeavour interacts with the public, sound research criteria do include aspects which would usually be comprised in codes of ethics, such as the level of response burden, informed consent and confidentiality of the information collected.

This framework does not attempt to integrate all detailed prescriptions of codes of ethics. Rather, it reiterates the main themes which form the basis for responsible research behaviour. The debate is still open, however: can research be "sound" (i.e., pass the test of an assessment framework) without embodying every aspect of established codes of ethics?

### ***An application to Internet surveys***

It is our position that this framework provides an exhaustive depiction of the assessment territory for survey research. Based on these criteria for sound survey research, then, which areas of the 24 assessment zones are likely to be impacted by a switch to Internet-based surveying and to other technological advancements?

Mick P. Couper (2000) recently identified the methodological concerns which are specific to Internet-based research — or more prominent in this type of research. They are:

- ***Sampling frame coverage issues:*** "Coverage error is resently the biggest threat to inference from Web surveys, at least to groups beyond those defined by access and use of the Web. The problems of sampling

in many Web surveys also present a formidable barrier to probability-based sample surveys on the Web. Coverage error is a function of the mismatch between the target population and the frame population." (Couper, 2000, 467).

- **Non-response issues:** "Nonresponse error arises through the fact that not all people included in the sample are willing or able to complete the survey. As with coverage error, nonresponse error is a function of both the rate of nonresponse and of the differences between respondents and nonrespondents on the variables of interest. [...] Several recent studies have compared response rates from e-mail studies to those from mail surveys of the same populations. [...] For all but one study, the e-mail surveys failed to reach the response rate levels of the mail surveys." (Couper, 2000, 473)
- **Questionnaire design uniformity.** "While the importance of question wording in influencing respondent answers is well-recognized, there is a growing literature that suggests that the design of the survey instrument (such as the placement of questions, flow of instrument, typographical features, etc.) also plays an important role, in both self-administered and interviewer-administered surveys. [...] unintended design or layout changes can affect the responses obtained both in interviewer-administered and in self-administered surveys. On the Web, unlike on paper, the appearance of a survey can vary from respondent to respondent because of different browser settings, user preferences, variations in hardware, and so on. Design may thus be much more important for Web surveys, both because there are more tools available to the designer (color, sound, images, animation, etc.) and because of variation in how these may be seen by respondents." (Couper, 2000, 476–477)
- **Panel conditioning.** "Another source of measurement error that is unique to panel or longitudinal surveys (often employed in Web surveys) is that of panel conditioning (or time-in-sample bias). Panel conditioning occurs through the ongoing participation of members in a panel. Given their experience with the survey over time, their responses may increasingly begin to differ from the responses given by people answering the same survey for the first time. Given the current lack of a suitable

sampling frame, many survey organizations are creating panels of Web survey respondents, and panel effects remain a concern for such surveys. Even though the surveys may vary over time, the mere act of participating in an ongoing panel may change respondent behavior and attitudes." (Couper, 2000, 476)

Where, in our proposed assessment framework, do these four particular concerns of Internet-based research fall?

Sampling frame coverage issues are a sample neutrality (sN) issue, as is the non-response problem: studies using truncated sampling frames and suffering from low participation have a hard time demonstrating neutrality in the representation of the target universe.

Browser-related variations in rendering of questionnaire on-line and the ensuing lack of uniformity in the stimulus offered to respondents is a questionnaire neutrality (qN) issue: it may affect in a non-random fashion the way respondents answer questions, thereby affecting the reliability of the estimates produced.

Panel conditioning is a data collection neutrality (cN) issue since it produces a contamination effect — the data collection itself risking to affect respondents attitudes and behaviour.

A few conclusions are in order:

- First, based on Couper's analysis as applied to our assessment framework, Internet-based survey research issues focus on neutrality concerns and on the ability of this type of research to properly depict reality.
- Secondly, only three of the 24 assessment areas (sN, qN and cN) raise particular concerns in the context of Internet-based research. This is not to say that the other 21 assessment areas are of no interest, but rather that they garner the same importance in this type of research that they normally possess in any type of survey research endeavour.

- Finally, the necessary conclusion of this analysis is that Internet-based research does not represent a fundamental paradigm shift in social research. The same criteria apply to it as they do to other types of research, to the extent that the knowledge objectives are the same. If Internet-based research wants to compete with other types of research to quench managers' thirst for knowledge and competitive edge, it must be subjected to the same rules and abide by the same standards.

### **Conclusion**

This document presents the building blocks of an assessment framework for survey research. The framework aims at offering an organized set of criteria for evaluating survey research exhaustively, fairly and constructively. While it is not construed as a simple checklist which could provide an overall assessment without the use of experience and judgment, it is meant as a guide to the experienced researcher and as a heuristic tool for the beginner.

Work on this framework is only commencing. It is hoped that feedback on its value can help in identifying the areas which need additional substantiation.

**EXHIBIT 1 • Survey Assessment Framework**

Principles				
	<b>[R]igour</b> the systematic application of best practices in the matter of survey research	<b>[N]eutrality</b> nature of what represents reality faithfully	<b>[B]alance</b> the sufficient yet parsimonious utilisation of resources toward the development of proof	<b>[T]ransparency</b> nature of what depicts reality completely and without alteration
<b>Building blocks</b>				
<b>[q]uestionnaire</b>	<ul style="list-style-type: none"> <li>• Content validity</li> <li>• Pretests</li> <li>• Response scales</li> </ul>	<ul style="list-style-type: none"> <li>• Reliability</li> <li>• Absence of bias</li> </ul>	<ul style="list-style-type: none"> <li>• Minimisation of response burden</li> </ul>	<ul style="list-style-type: none"> <li>• Research objective</li> <li>• Sponsor</li> <li>• Complete reproduction of the questionnaire</li> </ul>
<b>[s]ampling</b>	<ul style="list-style-type: none"> <li>• Adherence to rules of random sampling</li> <li>• Justification of non random sampling</li> </ul>	<ul style="list-style-type: none"> <li>• Target population and population reached; filtering procedures</li> <li>• Sampling frame</li> <li>• Final dispositions; response rate; refusal rate; replacement procedures</li> <li>• Sampling margin of error</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriateness of the nature of the sample considering the research purposes</li> <li>• Sample size</li> </ul>	<ul style="list-style-type: none"> <li>• Population definition</li> <li>• Sampling method</li> <li>• Sample size</li> <li>• Response rate</li> </ul>
<b>data [c]ollection</b>	<ul style="list-style-type: none"> <li>• Interviewer training</li> <li>• Quality controls, supervision</li> <li>• Call back schedule</li> </ul>	<ul style="list-style-type: none"> <li>• Criterion validity (corroboration)</li> <li>• Construct validity</li> <li>• Non-contamination</li> <li>• Double-blindedness</li> </ul>	<ul style="list-style-type: none"> <li>• Justification of the type of survey</li> <li>• Informed consent vs. hidden client</li> <li>• Avoidance of scarring effects</li> <li>• Confidentiality of data</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of the data collection agent</li> <li>• Dates, locations and periods of data collection</li> <li>• Notable social events during the data collection period</li> </ul>
<b>data [m]anagement</b>	<ul style="list-style-type: none"> <li>• Calculations and adjustments done correctly</li> <li>• Coding performed rigorously</li> </ul>	<ul style="list-style-type: none"> <li>• Weighting criteria used</li> <li>• Sources of population data</li> <li>• Assurance that adjustments do not unduly favour the researcher's hypotheses or interests</li> </ul>	<ul style="list-style-type: none"> <li>• Avoidance of excessive weighting</li> <li>• Effect of the adjustments made</li> </ul>	<ul style="list-style-type: none"> <li>• Mode of calculation of weights</li> <li>• Variance of the weighting scheme (design effect)</li> <li>• Calculations and adjustments made</li> </ul>
<b>data [a]nalysis</b>	<ul style="list-style-type: none"> <li>• Technically correct use of statistical tools</li> </ul>	<ul style="list-style-type: none"> <li>• Risk of disputes on results and interpretations</li> <li>• Coherence of conclusions with results</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriateness of methods considering the research purposes</li> <li>• Appropriate of the research design considering the research purposes</li> </ul>	<ul style="list-style-type: none"> <li>• Raw and weighted sample sizes in tables</li> <li>• Description of analysis methods used</li> </ul>
<b>[r]eporting</b>	<ul style="list-style-type: none"> <li>• Disclosure of study weaknesses and possible bias</li> </ul>	<ul style="list-style-type: none"> <li>• Distinct presentation of objective results and of their interpretation</li> <li>• Selflessness of the researcher, absence of a link between study results and remuneration</li> </ul>	<ul style="list-style-type: none"> <li>• Level of support to conclusions offered by study results</li> <li>• Possible reservations on the internal and external validity of results</li> </ul>	<ul style="list-style-type: none"> <li>• Disclosure of all elements of information required by all 24 framework cells to assess the value of results</li> </ul>

**EXHIBIT 2 • Supporting evidence**

Framework cell	Criterion	Supporting evidence
qR questionnaire Rigour	Content validity	
	Pretests	<ul style="list-style-type: none"> <li>"Structured questionnaires should be pretested among eligible respondents prior to the start of the main field period to establish the clarity, flow, and appropriateness of questions.." (CASRO, 1)</li> <li>"All questions should be pretested to ensure that questions are understood by respondents, can be properly administered by interviewers, and do not adversely affect survey cooperation." (AAPOR, 2)</li> </ul>
qN questionnaire Neutrality	Response scales	
	Content validity	<ul style="list-style-type: none"> <li>"One must first ensure that the questionnaire domains and elements established for the survey or poll fully and adequately cover the topics of interest. Ideally, multiple rather than single indicators or questions should be included for all key constructs." (AAPOR, 2)</li> </ul>
	Reliability	<ul style="list-style-type: none"> <li>"Realistically however, existing (and preferably validated) scales should be adopted (or adapted) wherever possible in order to cultivate a cumulative tradition of research." (Grover, 1)</li> </ul>
qB questionnaire Balance	Absence of bias	<ul style="list-style-type: none"> <li>"The questions and questioning procedures are unbiased. The wording of the interview questions does not predetermine the answers to the research questions. The questioning and analytical procedures allow responses over the entire range relevant to the research objectives." (CASRO, 1)</li> <li>"Concepts should be clearly defined and questions unambiguously phrased. Question wording should be carefully examined for special sensitivity or bias." (AAPOR, 2)</li> <li>"According to Manual on Complex Litigation §21.493 at 102 (3d ed Federal Judicial Center 1995), there are seven topics you need to address to assess whether a survey was properly done, i.e.: Were the questions framed in a clear, precise, and nonleading manner?" (Hebert, 1999)</li> <li>"You might also need a survey expert to help you analyze the sequence of the questions in a questionnaire and whether the sequence is in itself leading and suggestive." (Hebert, 1999)</li> </ul>
	Minimisation of response burden	<ul style="list-style-type: none"> <li>"The purpose of interviewing must be limited to the finding out of information or observation of reactions relevant to the research problem at hand." (PMRS, 1, section II)</li> <li>"Overly long questionnaires should be avoided at all costs." (PMRS, 1, rule 2.13)</li> <li>"The types of information to be collected are driven by the information objectives of the research." (CASRO, 1)</li> <li>"The questions are relevant and appropriate to the research issues. Interview content focuses on the research objectives." (CASRO, 1)</li> <li>"The interview should recognize the value of the respondent's time and the respondent's right to privacy. Lengthy interviews can be a burden. Length of the interview should be weighed against the needs of the research objectives, with consideration to the burden on respondents, the quality of the responses obtained, and the availability of alternative methods of obtaining the data (split samples, other sources, etc.)." (CASRO, 1)</li> <li>"[...] statisticians should collect only the data needed for the purpose of their inquiry." (ASA, 1)</li> </ul>

**EXHIBIT 2 • Supporting evidence**

Framework cell	Criterion	Supporting evidence
qT questionnaire Transparency	Research objective	<ul style="list-style-type: none"> <li>"For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: [...] iii) the specific objectives of the study [...]." (PMRS, 1, rule 4.6)</li> <li>"The purpose of <i>clearly stating the research objectives</i> is to have complete agreement between the professional resaerch firm and the client [...]." (CASRO, 1)</li> <li>"The objectives of a high quality survey or poll should be specific, clear-cut and unambiguous. Such surveys are carried out solely to develop statistical information about the subject, not to produce predetermined results [...]". (AAPOR, 2)</li> </ul>
	Sponsor	<ul style="list-style-type: none"> <li>"For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required:[...]; ii) the name of the organization for which the study was conducted [...]." (PMRS, 1, rule 4.6)</li> <li>"Standard for Minimal Disclosure: Who sponsored the survey" (AAPOR, 1, rule III.1)</li> </ul>
	Complete reproduction of the questionnaire	<ul style="list-style-type: none"> <li>"For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: i) copy of the questionnaire [...]." (PMRS, 1, rule 4.6)</li> <li>"Standard for Minimal Disclosure: The exact wording of questions asked, including the text of any preceding instruction or explanation to the interviewer or respondents that might reasonably be expected to affect the response" (AAPOR, 1, rule III.2)</li> </ul>
sR sampling Rigour	Adhesion to rules of random sampling	<ul style="list-style-type: none"> <li>"Survey reporting guidelines: [...] Sample design, including method of selecting sample elements, qualifying/ disqualifying criteria. Method of selection within household" (CASRO, 1)</li> <li>"A survey's intent is not to describe the particular individuals who, by chance, are part of the sample, but rather to obtain a composite profile of the population. In a bona fide survey, the sample is not selected haphazardly or only from persons who volunteer to participate. It is scientifically chosen so that each person in the population will have a measurable chance of selection. This way, the results can be reliably projected from the sample to the larger population with known levels of certainty/precision." (AAPOR, 2)</li> <li>"Virtually all surveys taken seriously by social scientists, policy makers, and the informed media use some form of random or probability sampling, the methods of which are well grounded in statistical theory and the theory of probability." (AAPOR, 2)</li> <li>"According to Manual on Complex Litigation §21.493 at 102 (3d ed Federal Judicial Center 1995), there are seven topics you need to address to assess whether a survey was properly done, i.e.: Did the expert select a representative sample of the universe to interview?" (Hebert, 1999)</li> </ul>
	Justification of non random sampling	<ul style="list-style-type: none"> <li>"[...] the suitability of a specific sampling method for the research purpose will always involve some judgment [...]." (CASRO, 1)</li> <li>"If a non-representative sample is to be used, possible implications and effects of the sampling method should be discussed." (CASRP, 1)</li> <li>"Survey reporting guidelines: [...] Implications and limitations of non-representative sampling methods, if used." (CASRO, 1)</li> </ul>

**EXHIBIT 2 • Supporting evidence**

Framework cell	Criterion	Supporting evidence
sN sampling Neutrality	Target population and population reached; filtering procedures	<ul style="list-style-type: none"> <li>• "For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: v) the universe covered (intended and actual) [...]." (PMRS, 1, rule 4.6)</li> <li>• "A universe which is relevant to the problem being studied, [is a] vital requirement of high quality research." (CASRO, 1)</li> <li>• "Survey reporting guidelines: [...] Definition of the universe which the survey is intended to represent [...] Respondent qualification requirements." (CASRO, 1)</li> <li>• "Standard for Minimal Disclosure: A definition of the population under study." (AAPOR, 1, rule III.3)</li> <li>• "Standard for Minimal Disclosure: information on eligibility criteria and screening procedures." (AAPOR, 1, rule III.5)</li> <li>• "According to Manual on Complex Litigation §21.493 at 102 (3d ed Federal Judicial Center 1995), there are seven topics you need to address to assess whether a survey was properly done, i.e.: Was the survey universe properly determined?" (Hebert, 1999)</li> </ul>
	Sampling frame	<ul style="list-style-type: none"> <li>• "[...] a sample which adequately represents that universe, [is a] vital requirement of high quality research." (CASRO, 1)</li> <li>• "The source of the sample (lists, on-line groups or services, randomly generated phone numbers, mall intercepts, etc.) should be revealed and the adequacy of the source given the study purpose should be discussed." (CASRO, 1)</li> <li>• "Survey reporting guidelines: [...] Definition of the sampling frame, i.e., sampling points actually used and the procedures used in selecting sampling points. If lists used, source and name of list." (CASRO, 1)</li> <li>• "Standard for Minimal Disclosure: a description of the sampling frame used to identify this population." (AAPOR, 1, rule III.3)</li> <li>• "Critical elements in an exemplary survey are: (a) to ensure that the right population is indeed being sampled (to address the questions of interest); and (b) to locate (or "cover") all members of the population being studied so they have a chance to be sampled. The quality of the list of such members (the "sampling frame") whether it is up-to-date and complete is probably the dominant feature for ensuring adequate coverage of the desired population to be surveyed." (AAPOR, 2)</li> <li>• "At the minimum, any IS survey research should describe and justify the sample frame . Estimation of possible frame error bias (or lack thereof) by a comparison estimation of the probability of the target population being included in or excluded from the sample frame is desirable." (Grover, 2)</li> </ul>
	Final dispositions; response rate; refusal rate; replacement procedures	<ul style="list-style-type: none"> <li>• "For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: vii) the contact record based on the last attempt to obtain an interview with the exception of mall surveys and quota samples where it is not appropriate [...]." (PMRS, 1, rule 4.6)</li> <li>• "Callback and replacement procedures, if used, should be described." (CASRO, 1)</li> <li>• "The final disposition of the sample should be described in detail [...]." (CASRO, 1)</li> <li>• "A low cooperation or response rate does more damage in rendering a survey's results questionable than a small sample, because there may be no valid way scientifically of inferring the characteristics of the population represented by the nonrespondents." (AAPOR, 2)</li> </ul>
	Sampling margin of error	<ul style="list-style-type: none"> <li>• "Survey reporting guidelines: [...] If statements are made regarding the overall sampling error of the survey, it should be stated that total survey error includes both sampling error and response error." (CASRO, 1)</li> <li>• "Standard for Minimal Disclosure: A discussion of the precision of the findings, including, if appropriate, estimates of sampling error" (AAPOR, 1, rule III.6)</li> <li>• "Sampling errors should be included for all statistics presented, rather than only the statistics themselves." (AAPOR, 2)</li> </ul>

**EXHIBIT 2 • Supporting evidence**

Framework cell	Criterion	Supporting evidence
sB sampling Balance	Appropriateness of the nature of the sample considering the research purposes	
	Sample size	<ul style="list-style-type: none"> <li>• "The sample size should also be specified, and there should be some discussion of its appropriateness, considering the purpose of the study." (CASRO, 1)</li> <li>• "The sample must be large enough to allow the expert to extrapolate his or her findings to the universe. Experts will testify that, in general, the larger the sample size, the more reliable the survey results. On the other hand, a survey with a sample size of 5000 could have useless results if it uses improper questions or picks the wrong universe." (Hebert, 1999)</li> </ul>
sT sampling Transparency	Population definition	<ul style="list-style-type: none"> <li>• "For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: v) the universe covered (intended and actual) [...]." (PMRS, 1, rule 4.6)</li> </ul>
	Sampling method	<ul style="list-style-type: none"> <li>• "For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: v) [...] details of the sampling method and selection procedures; [...] viii) the method of recruitment when prior recruitment of respondents is undertaken [...]." (PMRS, 1, rule 4.6)</li> <li>• "The following guidelines are [...] aimed at insuring that sample design and management are disclosed in sufficient detail to allow clear judgments of a sample's adequacy for the stated research purpose." (CASRO, 1)</li> <li>• "The description of the sampling plan should include the criteria by which a given sample element (i.e., an individual consumer, household, business, etc.) is selected to be in the sample." (CASRO, 1)</li> <li>• "Standard for Minimal Disclosure: A description of the sample selection procedure, giving a clear indication of the method by which the respondents were selected by the researcher, or whether the respondents were entirely self-selected." (AAPOR, 1, rule III.4)</li> </ul>
	Sample size	<ul style="list-style-type: none"> <li>• "For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: vi) the size and nature of the sample [...]." (PMRS, 1, rule 4.6)</li> <li>• "The sample size should also be specified [...]." (CASRO, 1)</li> <li>• "Survey reporting guidelines: [...] Sample size." (CASRO, 1)</li> <li>• "Standard for Minimal Disclosure: Size of samples" (AAPOR, 1, rule D.5)</li> </ul>
	Response rate	<ul style="list-style-type: none"> <li>• "For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: [...] xi) a statement of response rates, how they were calculated, and a discussion of possible bias due to non-response [...]." (PMRS, 1, rule 4.6)</li> <li>• "The final disposition of the sample should be described in detail, as should any completion rate or incidence rate calculations." (CASRO, 1)</li> <li>• "Standard for Minimal Disclosure: if applicable, completion rates" (AAPOR, 1, rule D.5)</li> </ul>

**EXHIBIT 2 • Supporting evidence**

Framework cell	Criterion	Supporting evidence
cR data collection Rigour	Interviewer training	<ul style="list-style-type: none"> <li>"For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: ix) the method of field briefing sessions [...]." (PMRS, 1, rule 4.6)</li> <li>"A properly trained interviewer is one who has been instructed in general interviewing techniques and who has been briefed on the particular project." (CASRO, 1)</li> <li>"Train interviewers carefully on interviewing techniques and the subject matter of the survey." (AAPOR, 2)</li> <li>"According to Manual on Complex Litigation §21.493 at 102 (3d ed Federal Judicial Center 1995), there are seven topics you need to address to assess whether a survey was properly done, i.e.: Did the interviewers use sound interview procedures and did they lack knowledge of the purpose of the survey?" (Hebert, 1999)</li> </ul>
	Quality control, supervision	<ul style="list-style-type: none"> <li>"The practitioner must automatically verify or monitor a minimum of 10% of each interviewer's completed interviews unless it is specifically made clear that this practice will not be followed." (PMRS, 1, rule 4.5)</li> <li>"For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: [...] xv) an adequate description of verification or monitoring procedures and results of the same [...]." (PMRS, 1, rule 4.6)</li> <li>"Standard industry practice requires that the data collection agency validate 15% of the interviews, using validation questions supplied by the researcher." (CASRO, 1)</li> <li>"Controlling the quality of fieldwork is done by observing/monitoring, verifying and/or redoing a small sample of the interviews." (AAPOR, 2)</li> </ul>
	Call back schedule	<ul style="list-style-type: none"> <li>"Callback and replacement procedures, if used, should be described." (CASRO, 1)</li> <li>"Survey reporting guidelines: [...] number of callbacks" (CASRO, 1)</li> </ul>
cN data collection Neutrality	Criterion validity (corroboration)	<ul style="list-style-type: none"> <li>"Criterion-related validity or predictive validity check must also be performed, and refers to the ability of the scale to predict (or at least relate to) one or more external variables." (Grover, 1)</li> </ul>
	Construct validity	
	Non-contamination	
	Double-blindedness	<ul style="list-style-type: none"> <li>"The survey should be double-blind. The people who implement the survey should have no involvement in its design and the interviewers and their supervisors should not know the purpose of the survey. If they know who is sponsoring the survey, or what the survey is supposed to test, it is possible that they will unconsciously or consciously skew the results by the way they ask and record the questions. For the same reasons, the survey expert should not implement the survey, other than to ensure the accuracy of the data collection and to analyze the data." (Hebert, 1999)</li> </ul>
cB data collection Balance	Justification of the type of survey	<ul style="list-style-type: none"> <li>"For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: [...] xii) the method by which the information was collected (e.g., mall, intercept, telephone) [...]." (PMRS, 1, rule 4.6)</li> </ul>
	Informed consent	<ul style="list-style-type: none"> <li>"You will always be told the name of the person contacting you, the research company's name and the nature of the survey" (Council for Marketing and Opinion Research, 1). Most important here is the last requirement that the participant must be told about the survey</li> </ul>

**EXHIBIT 2 • Supporting evidence**

Framework cell	Criterion	Supporting evidence
		<p>exercise they are about to embark.</p> <ul style="list-style-type: none"> <li>• "Upon request interviewers will provide the Respondent with the name, address, and phone number of the head office of the organization on whose behalf the interviewer is conducting the survey research as well as the CSRC registration number and toll free telephone number." (Canadian Survey Research Council, 1)</li> <li>• "IRBs should consider, in other words, the impact of informed consent procedures on the data collection objectives of the research. In the normal survey which presents minimal risk, detailed information about the objectives of the survey and the questions to be asked is apt to bias respondent participation without safeguarding respondent rights. In these surveys, the usual practice of a short introduction about the purpose of the study, the sponsor and the topics to be covered is sufficient. This statement should include the instruction that responses will be held in confidence and that questions the respondent does not want to answer can be skipped. More detailed methods of informing respondents may be considered when survey participation does pose substantial risk. The key here is to provide necessary information for informed choice without dramatic increases in nonresponse or response error, which can render survey efforts useless." (AAPOR, 4)</li> <li>• [...] statisticians should [...] inform each potential respondent about the general nature and sponsorship of the inquiry and the intended uses of the data." (ASA, 1)</li> <li>• "We at the American Statistical Association recommend strongly that everyone cooperate with surveys, if those who sponsor them can: [...] provide you with information so that you can make an informed decision about whether or not to participate." (ASA, 2)</li> </ul>
	Avoidance of scarring effects	<ul style="list-style-type: none"> <li>• "No procedure or technique shall be used in which the respondent is put in such a position that he or she cannot exercise the right to withdraw or refuse to answer at any stage during or after the interview." (PMRS, 1, rule 2.3)</li> <li>• "Questions or procedures that might put respondents "at risk," by asking confidential, disturbing , or threatening information should only be included where directly necessary to the research issues, and techniques should be used to minimize discomfort, concerns about security, apprehension, and/or misreporting." (CASRO, 1)</li> <li>• "We shall strive to avoid the use of practices or methods that may harm, humiliate, or seriously mislead survey respondents." (AAPOR, 1, rule D.1)</li> <li>• "Survey participation can, however, put respondents at significant risk when, for example, the inquiry concerns stigmatizing or illegal activity and inadequate attention is paid to ensuring respondent anonymity and the confidentiality of responses." (AAPOR, 4) The document provides an in-depth discussion of the possible scarring effects.</li> </ul>
	Confidentiality of data	<ul style="list-style-type: none"> <li>• "Confidentiality of respondent data will be maintained. Individual respondents' data will not be provided to clients or other third parties without the permission of the respondent." (Canadian Survey Research Council, 1)</li> <li>• "The identity of individual respondents must not be revealed by the practitioner to the client or anyone other than persons belonging to the organization of the practitioner concerned [...]." (PMRS, 1, rule 2.5) Exceptions are listed.</li> <li>• "At every stage in the design, development, execution, and reporting of the research, procedures should insure the confidentiality and security of data provided by respondents, or by clients." (CASRO, 1)</li> <li>• "Unless the respondent waives confidentiality for specified uses, we shall hold as privileged and confidential all information that might identify a respondent with his or her responses. We shall also not disclose or use the names of respondents for non-research purposes unless the respondents grant us permission to do so." (AAPOR, 1, rule D.2)</li> <li>• "Exemplary survey research practice requires that one literally do "whatever is possible" to protect the privacy of research participants</li> </ul>

**EXHIBIT 2 • Supporting evidence**

Framework cell	Criterion	Supporting evidence
		<p>and to keep collected information they provide confidential or anonymous." (AAPOR, 2)</p> <ul style="list-style-type: none"> <li>• [...] statisticians should [...] establish their intentions, where pertinent, to protect the confidentiality of information collected from respondents, strive to ensure that these intentions realistically reflect their ability to do so, and clearly state pledges of confidentiality and their limitations to the respondents; ensure that the means are adequate to protect confidentiality to the extent pledged or intended, that processing and use of data conform with the pledges made, that appropriate care is taken with directly identifying information (using such steps as destroying this type of information or removing it from the file when it is no longer needed for the inquiry), that appropriate techniques are applied to control statistical disclosure; ensure that, whenever data are transferred to other persons or organizations, this transfer conforms with the established confidentiality pledges, and require written assurance from the recipients of the data that the measures employed to protect confidentiality will be at least equal to those originally pledged." (ASA, 1)</li> </ul>
cT data collection Transparency	Identification of the data collection agent	<ul style="list-style-type: none"> <li>• "For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: [...] ii) [...] name of the organization conducting it, including sub-contractors [...]." (PMRS, 1, rule 4.6)</li> <li>• "Standard for Minimal Disclosure: Who sponsored the survey, and who conducted it." (AAPOR, 1, rule III.1)</li> </ul>
	Dates, locations and periods of data collection	<ul style="list-style-type: none"> <li>• "For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: [...] iv) the dates on or between which the fieldwork was done and the time periods of interviewing [...]." (PMRS, 1, rule 4.6)</li> <li>• "Survey reporting guidelines: [...] Where interviewing was conducted (localities, or national if national). Dates interviewing conducted." (CASRO, 1)</li> <li>• "Standard for Minimal Disclosure: Method, location, and dates of data collection." (AAPOR, 1, rule III.8)</li> </ul>
	Notable social events during the data collection period	
mR data management Rigour	Calculations and adjustments done correctly	<ul style="list-style-type: none"> <li>• "Cleaning specifications should be written for all information collected, including information collected by computer assisted interviewing systems and on-line or interactive interviews." (CASRO, 1)</li> <li>• "Standard for Minimal Disclosure: description of any weighting or estimating procedures used." (AAPOR, 1, rule III.6)</li> <li>• "Special codes should be provided for missing items, indicating why the data are not included. And, ideally, the "filling in" or imputation of these missing data items (based on rigorous and well validated statistical methods) should be undertaken to reduce any biases arising from their absence." (AAPOR, 2)</li> </ul>
	Coding performed rigorously	<ul style="list-style-type: none"> <li>• "Coders should not individually and independently set codes. A senior person should review codes.." (CASRO, 1)</li> <li>• "Because the interviews might result in ambiguous responses, the expert should be able to show that he or she had a written system for categorizing responses. The expert should be able to show that he or she can rationally account for the ambiguous responses in the survey results, and how; or that he or she threw out these responses, and why; and how these responses affected the survey results." (Hebert, 1999)</li> </ul>

**EXHIBIT 2 • Supporting evidence**

Framework cell	Criterion	Supporting evidence
mN data management Neutrality	Weighting criteria used	<ul style="list-style-type: none"> <li>• "For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: [...] vi) [...] details of any weighting methods used [...]." (PMRS, 1, rule 4.6)</li> <li>• "If the sampling procedure requires that the resulting sample be weighted, the objectives of the weighting [...] should be specified." (CASRO, 1)</li> <li>• "Standard for Minimal Disclosure: description of any weighting or estimating procedures used." (AAPOR, 1, rule III.6)</li> </ul>
	Sources of population data	<ul style="list-style-type: none"> <li>• "For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: [...] xiv) list of sources of secondary research [...]." (PMRS, 1, rule 4.6)</li> <li>• "The practitioner should provide to the client in the report, or in a supporting document, in addition to the items listed in 4.6, the following information: [...] ii) an assessment of the reliability of the sources used in secondary research [...]." (PMRS, 1, rule 4.15)</li> <li>• "If the sampling procedure requires that the resulting sample be weighted, [...] the sources of the weights should be specified." (CASRO, 1)</li> </ul>
	Assurance that adjustments do not unduly favour the researcher's hypotheses or interests	<ul style="list-style-type: none"> <li>• "Editing should be done before data are to be entered and should remove all illegible, incomplete and inconsistent interviewer errors. If correct responses are not obvious from the questionnaire, then responses should be coded as no answer or the questionnaires should either not be used or returned to data collection." (CASRO, 1)</li> </ul>
mB data management Balance	Avoidance of excessive weighting	
	Effect of the adjustments made	
mT data management Transparency	Mode of calculation of weights	<ul style="list-style-type: none"> <li>• "If data are weighted, weights should be fairly and consistently applied." (CASRO, 1)</li> </ul>
	Variance of the weighting scheme (design effect)	<ul style="list-style-type: none"> <li>• "The effect of the weighting on sampling error should be disclosed." (CASRO, 1)</li> </ul>
	Calculations and adjustments made	<ul style="list-style-type: none"> <li>• "Force cleaning, which is done by having the computer change all answers meeting certain criteria, should only be used when changes are logical. It is advisable to make the client aware that force cleaning is being used and the specifications under which data are being changed." (CASRO, 1)</li> <li>• "Survey reporting guidelines: [...] If an index or some other constructed variable is used, show the method of calculation." (CASRO, 1)</li> </ul>
aR data analysis Rigour	Technically correct use of statistical tools	<ul style="list-style-type: none"> <li>• "According to Manual on Complex Litigation §21.493 at 102 (3d ed Federal Judicial Center 1995), there are seven topics you need to address to assess whether a survey was properly done, i.e.: Was the data analyzed in accordance with accepted statistical principles?" (Hebert, 1999)</li> </ul>

**EXHIBIT 2 • Supporting evidence**

Framework cell	Criterion	Supporting evidence
aN data analysis Neutrality	Risk of disputes on results and interpretations	<ul style="list-style-type: none"> <li>"Members must not provide or allow interpretations of the research which are inconsistent with the data without protest" (PMRS, 1, rule 1.1ii)</li> </ul>
	Coherence of conclusions with results	<ul style="list-style-type: none"> <li>"We shall not knowingly make interpretations of research results, nor shall we be tacitly permit interpretations that are inconsistent with the data available." (AAPOR, 1, rule 1.3)</li> <li>"[...] great care should be taken to be sure that the conclusions and the findings presented are consistent." (AAPOR, 2)</li> </ul>
aB data analysis Balance	Appropriateness of methods considering the research purposes	<ul style="list-style-type: none"> <li>"Members must recommend those techniques and methodologies which are appropriate to the objectives of the research, avoiding those which they believe may give misleading results" (PMRS, 1, rule 1.1i)</li> <li>"A wide variety of methods are available to collect primary research data. The professional research organization selects the method that provides the most effective means of reliably and validly achieving the study's information objectives." (CASRO, 1)</li> <li>"We shall recommend and employ only those tools and methods of analysis which, in our professional judgement, are well suited to the research problem at hand." (AAPOR, 1, rule 1.1)</li> </ul>
	Appropriateness of the research design considering the research purposes	<ul style="list-style-type: none"> <li>"The structure of the questions is suitable for the statistical techniques that will be used in the analysis of the data." (CASRO, 1)</li> </ul>
aT data analysis Transparency	Raw and weighted sample sizes in tables	<ul style="list-style-type: none"> <li>"For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: [...] x) weighted and unweighted bases for all conventional tables, clearly distinguished between the two [...]." (PMRS, 1, rule 4.6)</li> <li>"All tables should clearly indicate the response base, whether it is total respondents, respondents meeting certain criteria, or any other base, such as total units or households." (CASRO, 1)</li> <li>"Weighted data should carry a notation to that effect." (CASRO, 1)</li> </ul>
	Description of analysis methods used	<ul style="list-style-type: none"> <li>"For each survey, a practitioner must provide to the client [...] information sufficient to replicate the study [...]. If applicable, the following information is required: [...] xvi) the detail of any special statistical methods used in the analysis of the results [...]." (PMRS, 1, rule 4.6)</li> <li>"Survey reporting guidelines: [...] If special scoring, data adjustment or indexing methods are used, these should be described." (CASRO, 1)</li> <li>"Survey reporting guidelines: [...] If statistical significance is noted, there should be an indication of the test used, significance level, and number of tails." (CASRO, 1)</li> </ul>
rR reporting Rigour	Disclosure of study weaknesses and possible bias	<ul style="list-style-type: none"> <li>"Survey reporting guidelines: [...] If the survey is a non-probability survey, it should be clearly stated that the results are not projectable to the entire universe. [...] In reports of qualitative research, a statement should be included to the effect that the research is based on a small, geographically limited sample and that, accordingly, the findings should be regarded as hypotheses subject to confirmation. The "tone" of the text reporting results should reflect this limitation. [...] In reports where a non-representative sample is used for the study, a statement should be included, either in the results or the technical appendix, discussing the implications and limitations of using a</li> </ul>

**EXHIBIT 2 • Supporting evidence**

Framework cell	Criterion	Supporting evidence
		<ul style="list-style-type: none"> <li>non-representative sample and the "tone" of the report should reflect these limitations." (CASRO, 1)</li> <li>"[...] statisticians should be prepared to document data sources used in an inquiry; known inaccuracies in the data; and steps taken to correct or to refine the data, statistical procedures applied to the data, and the assumptions required for their application." (ASA, 1)</li> </ul>
rN reporting Neutrality	Distinct presentation of objective results and of their interpretation	<ul style="list-style-type: none"> <li>"When reporting findings of a study in either written or oral form, the practitioner should make a clear distinction between the objective results and his or her own opinions and recommendations." (PMRS, 1, rule 4.14)</li> <li>"The practitioner should provide to the client in the report, or in a supporting document, in addition to the items listed in 4.6, the following information: i) a discussion of any aspects of the research which may bias the results; ii) an assessment of the reliability of the sources used in secondary research [...]." (PMRS, 1, rule 4.15)</li> <li>"Findings and interpretations should be presented honestly and objectively, with full reporting of all relevant findings, including any that may seem contradictory or unfavorable." (AAPOR, 2)</li> <li>"Conclusions should be carefully distinguished from the factual findings [...]." (AAPOR, 2)</li> <li>"According to Manual on Complex Litigation §21.493 at 102 (3d ed Federal Judicial Center 1995), there are seven topics you need to address to assess whether a survey was properly done, i.e.: Was the data that was gathered accurately reported?" (Hebert, 1999)</li> </ul>
	Selflessness of the researcher, absence of a link between study results and remuneration	<ul style="list-style-type: none"> <li>"The practitioner should make known any current involvement in the same general subject area before accepting a project." (PMTS, 1, rule 4.12)</li> <li>"For these reasons, statisticians should [...] disclose any financial or other interests that may affect, or appear to affect, their professional statements." (ASA, 1)</li> <li>"[...] statisticians should inform a client or employer of all factors that may affect or conflict with their impartiality and accept no contingency fee arrangements". (ASA, 1)</li> <li>"According to Manual on Complex Litigation §21.493 at 102 (3d ed Federal Judicial Center 1995), there are seven topics you need to address to assess whether a survey was properly done, i.e.: Was the objectivity of the entire process assured?" (Hebert, 1999)</li> </ul>
rB reporting Balance	Level of support to conclusions offered by study results	<ul style="list-style-type: none"> <li>"Members must not present research results with greater confidence than the data warrant." (PMRS, 1, rule 1.1iii)</li> <li>"We shall not knowingly imply that interpretations should be accorded greater confidence than the data actually warrant." (AAPOR, 1, rule 1.4)</li> </ul>
	Possible reservations on internal and external validity	<ul style="list-style-type: none"> <li>"Instead, as responsible professionals, members must point out the relevant limitations of the research." (PMRS, 1, rule 1.1iii)</li> </ul>
rT reporting Transparency	Disclosure of all elements of information required by all 24 framework cells to assess the value of results	<ul style="list-style-type: none"> <li>"Excellence in survey practice requires that survey methods be fully disclosed reported in sufficient detail to permit replication by another researcher and that all data (subject to appropriate safeguards to maintain privacy and confidentiality) be fully documented and made available for independent examination.[...] Exemplary practice in survey research goes beyond such standards for "minimal disclosure," promulgated by AAPOR and several other professional associations ." (AAPOR, 2)</li> </ul>

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