With so many individuals linked to the Internet and so many possible ways to reach them, the debate for organizational scholars is no longer over whether Internet self-administered surveys are possible but rather over the comparative understanding and the relative advantages and disadvantages of these surveys. Because relevant research has generally been fragmented and narrow in scope, making comparisons difficult, the authors review and assess the research on Internet self-administered surveying modalities of electronic mail and the World Wide Web. Then, they provide recommendations that address problematic and controversial aspects of these modalities, including ways to increase the representativeness of samples, construct sampling frames, increase response rates, and manage anonymity and confidentiality.

Since the introduction of the World Wide Web, the number of individuals linked to the Internet has increased at a phenomenal rate. By one recent estimate, the number of Internet users doubles every 100 days, and by the year 2005, 1 billion people worldwide are expected to be linked to the Internet (Department of Commerce, 1998). In addition, developments in the area of Internet access hardware and software have multiplied the ways in which one can reach users. Not surprisingly, these factors have generated a growing interest among researchers regarding the feasibility of using the Internet as a means of data collection and conducting organizational surveys (Kiesler & Sproull, 1986; Schaefer & Dillman, 1998; Schmidt, 1997; Sproull, 1986; Stanton, 1998). Given that self-administered surveys are arguably the most widely used form of data collection in organizational studies (Kraut, 1996) and are relatively easily facilitated via such modalities as electronic mail and the World Wide Web, more attention is clearly warranted.

To date, the extant research has aided our understanding of the trade-offs between Internet and conventional surveys (e.g., between e-mail and postal surveys). As instructive as it is, this line of research has been narrow in scope, frequently limiting itself to addressing single issues such as response rates of e-mail surveys (e.g., Mavis & Brocato, 1998; Tse, 1998). The result has been a fragmented set of findings that limits

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our understanding of Internet surveys, particularly when a comparative assessment is needed. Clearly, no single survey approach can be judged effectively in the abstract because each is more appropriate under different circumstances (Kiesler & Sproull, 1986; Lockhart & Russo, 1996; Salant & Dillman, 1994). Missing from the extant work, then, is a more integrated assessment of Internet surveys that takes more fully into account their comparability to one another. Therefore, our first goal in this article is to evaluate Internet self-administered surveys in terms of sampling (representativeness, frame, and control) and nonsampling errors (nonresponse and measurement errors). We focus on these dimensions because they primarily determine the extent to which a survey can generate valid and reliable inferences about the population from which the sample is surveyed. We feel strongly that assessing Internet survey modalities along these dimensions will not only contribute to a comparative understanding of them but also assist organizational researchers in the successful choice and use of a particular modality.

Beyond this, we also believe that the relevant work does not provide enough practical recommendations for organizational researchers interested in using Internet surveys. Much relevant work focuses on findings and future research needs, rather than on providing specific and detailed guidelines to overcome the difficulties of conducting Internet surveys. Hence, based on a review of the literature and our own experiences, we also furnish practical strategies for the successful implementation of Internet surveys. We do this by providing a set of recommendations that addresses some of the most problematic and controversial aspects of Internet surveys, including representativeness of samples, sampling frames, response rates, anonymity, and confidentiality. We begin by briefly defining two promising Internet surveying modalities and discussing the persuasive benefits of each.

**Internet Self-Administered Surveys**

Differences in Internet self-administered surveying modalities via e-mail and the World Wide Web are primarily based on the manner in which respondents are identified and contacted. The e-mail survey (ES) involves a computerized, self-administered questionnaire, which the researcher sends and the respondents receive, complete, and return through e-mail systems (Simsek & Veiga, 2000). Such surveys can be categorized into three types (Bradley, 1999). The first involves sending an e-mail message with the survey as part of the message text. The second involves sending an e-mail message with the survey as an attachment that the respondent must open in order to respond. And the third uses a URL-embedded message in the text of the e-mail so that the recipient must simply be directed to click on this hypertext link, which then evokes his or her Web browser, presenting the recipient with a Web-based survey. The Web survey (WS), which currently receives the most attention from researchers, involves a computerized, self-administered questionnaire in which the researcher announces the survey on a World Wide Web site where individuals access and complete the questionnaire by using compatible Web browsers. Respondents can be diverted to the Web site through links to other Web pages or invited to the Web site through various means such as e-mail with URL-embedded links or postal notifications. We expect that most Web-based organizational survey respondents will be solicited through e-mail.

These survey modalities can be employed to conduct surveys in and out of an organizational context by using organizational and nonorganizational samples. Further-
more, it is possible to undertake a survey on an organization’s private network, or Intranet, which is accessible only to that organization’s employees. Because we organize our discussion around Internet surveying modalities rather than different contexts within which Internet surveys might be carried out, our arguments are generally applicable to both Internet and intranet surveys. In addition, Internet and intranet organizational surveys overlap to the extent the researcher follows widely accepted scientific principles of conducting sample surveys such as ensuring sample representativeness. There are, however, some differences between conducting a survey over the Internet and intranet as well as between using organizational samples and nonorganizational samples. We largely focus on organizational samples and internal survey applications.

**Benefits of Internet Self-Administered Surveys**

The value of any new surveying technique, in part, depends on its ability to offer new opportunities or handle issues that take advantage of its unique strengths. Thus, we first briefly discuss several persuasive benefits of Internet surveys over the conventional methods.

**Cost.** Internet surveys have the potential of radically changing the economics of conducting surveys. The primary costs of Internet surveys include assembling and obtaining sampling frames, creating or buying software and supporting databases, and accessing the Internet. Even with these expenses, however, the marginal cost of conducting Internet surveys is much lower than costs of traditional ways of surveying (Mehta & Sivadas, 1995). Internet surveys do not require use of paper at any stage and simplify data analysis by a direct transfer from the form to the analysis software, where limited data cleaning would be necessary. Furthermore, although the costs of the other techniques tend to be proportional to the size of the sample, the cost associated with adding additional respondents in Internet surveys is relatively low. However, adding more responses to an Internet survey is not totally free of cost in that with increasing responses, technical issues such as storage space allotted for returns, bandwidth load, and server capacity must be satisfactorily addressed.

**Data collection speed.** Internet surveys offer the possibility of very rapid surveying, a feature that has been well documented in past research (Kittleson, 1995; Mehta & Sivadas, 1995; Sproull, 1986). Many of the existing survey techniques, including facsimiles, cannot provide researchers with such speed in reaching specified individuals. An Internet survey can be sent as easily to a thousand people as it can to one, and all potential respondents can immediately receive the questionnaire regardless of their location. Swoboda, Muhlberger, Weitkunat, and Scheneeweib (1997) reported that they were able to send 8,859 questionnaires to randomly selected respondents via e-mail in a single day. Moreover, Mehta and Sivadas (1995) reported that they received half of their e-mail responses in just 3 days compared with 3 weeks to receive a comparable number of postal survey responses. Although speed of response might not be a major concern for organizational researchers per se, it can be especially valuable at the pilot-testing stage of survey development, where pilot testing and instrument clarification are needed before the final survey can be launched. Internet surveys also save all the time that the conventional surveys require for photocopying questionnaires, stuffing envelopes, and addressing outgoing mail. Additional time saving can also be real-
ized when the research design calls for more than one contact with respondents, such as sending follow-up questionnaires, although there exist some other means, such as automated phone responses, that can be used for this purpose in organizational surveys.

**Media richness.** According to the information richness theory (Daft & Lengel, 1984; Daft, Lengel, & Trevino, 1987), media richness involves the processing of rich information to reduce equivocality and share meaning, and it varies with four characteristics of a communication medium (Daft & Lengel, 1984): (a) capacity for immediate feedback; (b) capacity to transmit multiple cues; (c) normal use of language, such as sentences or words rather than numbers or formulas, and language variety; and (d) capacity to have a personal focus. On the basis of these characteristics, communication media are ranked on a continuum of rich to lean, with rich having a high capacity for processing information and lean carrying a low capacity. In other words, a medium becomes less rich as it lacks the aforementioned characteristics and capabilities. For example, face-to-face communication is the richest communication medium because it allows for immediate feedback, multiple cues (visual, auditory, and spatial), and natural language. Telephone conversations rank below face-to-face but above electronic mail, letters, and memos.

Applying this theory to Internet survey modalities suggests that they have varying levels of richness. Compared with other surveying techniques, such as personal interviewing, ES involves low transmission of nonverbal cues, varied language, and timely feedback and a low sense of personalization. On the other hand, a WS allows for the transmission of many different types of cues, such as text, sound, graphics, and live interaction and personal contact (e.g., via e-mail), thereby providing a somewhat richer medium. Furthermore, the use of common gateway interface script allows for adaptive questioning in which questions that are asked of a respondent depend on his or her answers to previous questions (Kehoe & Pitkow, 1996). Schmidt (1997) also noted that with a WS, it is possible to use a form that displays feedback specifically tailored to the content of responses supplied by the user. For example, a WS can be designed so that as the survey proceeds, the questions presented are dependent on the respondent’s previous responses, a technique known as “item branching.” It is also possible to ensure that respondents answer all questions that are necessary before completing other aspects of the survey (Schmidt, 1997). If the user submits an incomplete questionnaire, a reminder can be displayed notifying the user of questions missing responses and directing the user to backtrack, correct the problem, and resubmit the questionnaire. These varying levels of richness afforded by Internet survey modalities, as we will discuss, can be particularly important in affecting response quality and quantity.

**A Comparative Assessment of Internet Self-Administered Surveys**

**Sampling Issues**

Of all the sampling issues faced by researchers, representativeness of sample, sampling frame, and sampling control are the most important issues that have to be contended with when considering an Internet self-administered survey. Because Simsek
Representativeness of sample. Organizational surveys normally involve all members of the organization. In other cases, particularly when large organizations are studied, the researcher may collect survey information from a sample of organizational members. In such cases, the researcher must ensure that the sample represents the population from which it was drawn, which is currently difficult to achieve with Internet surveys. Internet surveys can only be conducted with those who can and do use the Internet and all that implies in terms of background, education, gender, and the like. Hence, depending on who or what is being researched, concerns over representativeness will vary considerably. For example, sampling representativeness will be a problem when the researcher surveys employees who are less likely to have access to computers or do not like the experience of participating in electronic surveys such as attached e-mail surveys wherein the respondent must undertake several steps for survey participation. However, Internet users may be exactly the individuals that the researcher is targeting if one is seeking opinions related to a new software program. Furthermore, representativeness of the sample will not constitute a major problem to the extent organizational researchers seek survey information for gaining initial insights into organizational phenomena. Finally, note that organizational research has traditionally relied on designs that are vulnerable to sample selection bias; hence, a strict application of the representativeness issue will mean ruling out a vast portion of fruitful organizational research. Indeed, Ostroff and Harrison (1999) reported that more than half of the studies in the Journal of Applied Psychology (1992-1997) used research survey participants from just a single organization. Viewed in this way, Internet surveys might prove extremely useful for conducting organizational surveys that are commonly used to assess attitudes and perceptions of employees about their work environment (Rogelberg, Luong, Sedeburg, & Cristol, 2000).

Sampling frames. The issue of sampling frames seems to be particularly problematic when the survey involves respondents from multiple organizations because the Internet lacks universal coverage of many populations. Also, there is no good frame that lists individuals or organizational members using or even having access to the Internet across organizational populations. Therefore, obtaining or constructing an unbiased, or at least usable, sampling frame that allows for the drawing of representative samples is currently a serious challenge that faces researchers. All these difficulties, however, do not justify abandoning all efforts toward obtaining samples from which one might generalize with more confidence. As we shall discuss later in our recommendations, this problem is to some extent surmountable. Furthermore, the issue of sampling frames is less likely to be problematic when the survey involves a single organization and the researcher gains cooperation of relevant organizational constituents, such as the top management team, to carry out the survey.

Sampling control. With Internet surveys, sampling control is desirable for two reasons. First, without an understanding of the size of the respondent pool in comparison with the size of the population and the sampling pool, it is difficult to generalize research findings beyond those responding to the survey. Second, sampling control is necessary because false identities are commonplace on the Internet, and stories abound about individuals misrepresenting such demographic characteristics as age,
gender, level of education, and so forth. The Internet survey modalities we have been discussing differ greatly with respect to sampling control.

The ES provides the greatest sampling control because the researcher sends the survey to individuals identified a priori (Stanton, 1998). However, this advantage is not “absolute” in that it can also be subjected to threats, such as when a sample member forwards the survey to a friend who in turn completes and returns it to the researcher. Unless the researcher has a way to verify respondents, this threat, however small, persists. The WS normally offers the lowest sampling control because not only can people outside the population of interest respond to the survey, but also multiple responses from a single individual are possible—a threat that Smith and Leigh (1997) labeled “subject fraud.” However, as Stanton (1998) and Smith and Leigh noted, the researcher can achieve a certain degree of control and reduce subject frauds with the WS by employing access protections and assigning unique passwords to individual subjects, which are quite possible with surveys that involve respondents from a single organization. This strategy, however, is not free of costs, as it tends to exacerbate concerns over confidentiality and anonymity as we discuss in the next section.

Nonsampling Errors

Nonsampling errors are all the other errors in a survey except for those due to sampling method and sample size (Sudman, 1996; Tull & Hawkins, 1993). More specifically, they include nonresponse error, measurement error, and coverage error, or what we have already discussed as representativeness of the sample (Lavrakas, 1996).

Nonresponse error. Nonresponse error occurs when some members of the targeted sample do not respond to the survey. Researchers using the Internet surveys have reported response rates ranging from 7% to 76% (see, e.g., Kehoe & Pitkow, 1996; Mavis & Brocato, 1998; Sheehan & Hoy, 1999; Simsek & Veiga, 2000). Therefore, although Internet surveys are not exempt from nonresponse error, an examination of the factors that lead actors not to respond needs to be addressed. Although this lack of research is understandable, especially given the difficulty of obtaining responses from actors who have a tendency not to respond, there are some exceptions. For example, building on the literature on noncompliance behavior, Rogelberg et al. (2000) recently reasoned that organizational survey nonresponses occur as a result of multiple factors, including personality traits such as agreeableness, survey-specific variables such as attitude toward the survey topic, and contextual variables such as social norms. Although they did not empirically examine the effects of all these factors, they hypothesized that noncompliant individuals have less organizational commitment, less job satisfaction, greater intentions to quit, and more negative beliefs regarding how their organization handles survey data than those individuals who say they would comply with a survey request. Grounding their arguments in the theory of planned behavior, which postulates that intentions are good predictors of actual behaviors (Ajzen, 1991), they tested these hypotheses by asking individuals whether they would or would not complete a survey for their employer if received at work. The survey that was given individuals was complete in that it included a cover letter and business reply, much like a survey package that they would receive under normal conditions. On the basis of their intentions to respond, individuals were classified as either anticipated respondents or noncompliers (i.e., those who said that they would or would not complete the
survey). Their findings suggest that, relative to anticipated respondents, the noncompliant had greater intentions to quit, less organizational commitment, less satisfaction toward supervisors and their own jobs, and less positive beliefs regarding their organization’s handling of survey data.

Although we suspect that these findings are equally applicable to Internet surveys, there has been no theoretical work that addresses nonresponses in Internet surveys. Indeed, there is simply a great deal that we do not know about the characteristics and, more important, the mind-set of actors who do not participate in Internet organizational surveys. In the context of mail surveys, a number of theories have thus far been employed, including reference group theory, exchange theory, helping behavior theory, socialization and balance theory, and cognitive dissonance theory (Ratneshwar & Stewart, 1989). For example, Groves, Cialdini, and Couper (1992) argue that actors use a number of principles in deciding to cooperate, including the tendency toward reciprocation as repayment for a perceived gift or favor; the tendency to be consistent with earlier commitments such as drawing connections between committed beliefs, values, and attitudes and participating in the survey; the tendency to follow the lead of similar others; the tendency to follow suggestions of authority; the tendency to comply with requests when the opportunity is limited; and the tendency to favor liked individuals. Rogelberg et al. (2000) also provided a ready framework that draws on some of these theories, which awaits empirical attention in the context of Internet surveys.

**Measurement error.** Measurement error is simply the deviation between the “true” and the observed responses (Dillman, 1991) and can be random or systematic (Dutka & Frankel, 1993). Measurement error due to the surveying instrument has been widely discussed and, like any other survey, requires everything be done that is needed in terms of developing a reliable scale to collect survey information. Hence, we do not discuss random measurement error (i.e., unreliability) in Internet surveys. Systematic measurement error in Internet surveys can be attributed overall to the respondent and/or the surveying modality itself (Simsek & Veiga, 2000).

Measurement error due to respondents can result, for example, when respondents systematically refuse to answer certain questions, give incomplete answers, do not follow instructions, underreport socially undesirable or threatening information, overreport socially desirable information, choose some certain categories more often, and the like (Kiesler & Sproull, 1986). Many of these issues have not been examined in the context of Internet surveys. However, guided by the idea that the experience of completing a survey on a computer might be different from completing a paper survey, a considerable body of research has examined whether computerization of the survey has an effect on survey data (e.g., Weisband & Kiesler, 1996). In addition, because an ES generally conveys little social information, some researchers have reported that respondents experience less evaluation anxiety than when they respond using other survey modalities (Ayidiya & McClendon, 1990; Kiesler & Sproull, 1986; Kiesler, Zubrow, & Moses, 1985; Sproull, 1986). Several other researchers have examined how Internet surveys might influence responses to open-ended questions. For example, Mavis and Brocato (1998) found that of the e-mail respondents, 63% provided additional written comments compared with 58% among postal survey respondents. E-mail survey respondents provided written comments for an average of 2.2 questions, whereas postal survey respondents averaged 1.9 questions. Bachmann, Elfrink, and Vazzana (1996) found that there were no significant differences in responses, or in a
respondent’s tendency to leave an item blank or to comment on questions, between individuals receiving a postal survey and those receiving an ES. Yet, the e-mail respondents showed a greater willingness to respond to open-ended questions (21.9% vs. 4.8%). Finally, Stanton (1998) examined whether a WS would produce a lower amount of missing data and higher data quality as measured by high variability in item responses and identical factor structure relative to a postal survey. Data collected from 50 individuals who completed a WS and 181 individuals who completed a postal survey indicated that the WS had fewer missing values, comparable survey information in terms of item variability, and a similar factor structure to postal survey data. Overall, these findings seem to indicate that Internet self-administered surveys generate data that are comparable with those found in postal surveys, suggesting that there is little in the way of systematic nonresponse bias between electronic and traditional self-administered surveying methods.

Measurement error can also occur because of the surveying modality employed (e.g., Tourangeau & Smith, 1996). In this context, we believe that an important factor contributing to measurement error in Internet surveys is the extent to which a survey modality affords the respondent anonymity (e.g., Singer, Mathiowetz, & Couper, 1993). A respondent is anonymous when nobody, including the researcher, can associate a given response with that respondent. Thus, true anonymity with Internet surveys would mean that no one could identify the respondent. Anonymity is compromised when an ES is used. When respondents return questionnaires using the reply function in an e-mail package, their e-mail address and their name and affiliation are automatically conveyed to the surveyor. In addition, many companies are beginning to monitor employee e-mails, so that although respondents may be anonymous to the researcher, they are identifiable by their firms. Furthermore, sending a completed survey through e-mail may be less secure because it travels unencrypted. In sum, although few people might actually attempt to intercept and read e-mails, until encryption becomes standard, many potential respondents are likely to feel that their anonymity is compromised.

On the other hand, a WS can provide greater anonymity because there is no authenticated method of verifying the identity of the individual participating in such surveys. Clearly, greater anonymity does not mean complete anonymity, as it is still possible to identify respondents. As with e-mail, some companies are also monitoring Web-browsing activities of their employees and can identify all the Web sites an employee has visited. Moreover, once on a Web site, a respondent can be tracked by means of a “cookie,” a small piece of information that the HTTP server sends to the visitor’s browser when the browser connects for the first time. Although the use of a cookie might be beneficial in that it allows the researcher to determine if a person has filled out the survey multiple times, it could negatively influence a respondent’s perception of anonymity. From an ethical point of view, the researcher should inform potential respondents if a cookie is being used and how it is being used. Moreover, because many Web browsers can be set to alert the individual that a cookie is being installed to block installation, such an alert—if not previously disclosed—would clearly damage the credibility of the surveyor.

We also note that the extent to which anonymity affects measurement errors in Internet surveys might also have to do with individual-level variables. In an organizational survey conducted almost four decades ago, Pearlin (1961) contended that “anonymity is not simply a response to questionnaire content; it is, rather, behavior conso-
nant with personality characteristics” (p. 641). Pearlin found that the extent to which an individual wished to remain anonymous was positively related to (a) feelings of incompetence, (b) a cautious approach to people and things, and (c) lack of enthusiasm for the work. Most recent organizational research also documents that variations in quality of Internet survey information might correlate with respondent-level variables. For example, McClough, Rogelberg, Fisher, and Bachiochi (1998) argued that the reason why some individuals provide high-quality data and some do not is related to their level of cynicism, which they view as an individual’s beliefs in the fixability of work problems but futility of efforts at changing them due to shortcomings inherent in the system. Their empirical analysis revealed no difference in level of cynicism between those who answered or did not answer open-ended questions. However, they found a significant correlation between respondent cynicism and the quality of recommendations provided to improve division effectiveness (i.e., cynical employees produced higher quality responses than less cynical employees).

Finally, we expect that confidentiality will influence response quality and hence measurement error of Internet organizational surveys, although research that has examined this issue in the context of mail surveys has reported conflicting results overall. For example, in a meta-analytic analysis of experimental research, Singer, Von Thurn, and Miller (1995) found no support for the hypothesis that a stronger assurance of confidentiality improves survey response, as measured by a higher response rate, lower item nonresponse, better response quality, or more favorable respondent reactions. Despite this, we expect that when conducting organizational surveys through the Internet, confidentiality will be strongly correlated with measurement errors because complete confidentiality is almost never possible with Internet surveys. In most states, electronic communications are unprotected; hence, supervisors or managers can legally intercept, monitor, and read employees’ e-mail and electronic responses. With fear of retribution and reprisal heightened by a business environment of layoffs, downsizing, mergers, and acquisitions, it is plausible to expect that as confidentiality decreases, candidness of survey responses will decrease. In particular, when the survey involves providing personal and/or sensitive information or opinions, individuals might be more reluctant to respond honestly because they fear that their responses could be held or used against them. In such cases, it is not unusual to expect that respondents might engage in role-playing, providing socially desirable responses, and/or reporting what they think management wants to hear (Dutka & Frankel, 1993).

**Recommendations**

**Reducing Sampling Bias**

As noted, one of the most critical problems with Internet surveys is that they suffer from coverage error because the Internet does not have universal coverage for many populations. We believe the single best strategy that can be used to deal with this problem is the simultaneous use of multiple survey modalities. Although we have focused on each surveying modality separately, they can and should be used in combination with each other. For example, using an ES with a WS can allow experimentation with much more diverse populations, not only with populations having nearly universal coverage in terms of having e-mail addresses. It also is possible to collect survey infor-
mation through an ES while posting the same survey on a bulletin board to collect information from group members who have not completed the survey. Furthermore, Internet surveys can be used in combination with almost any other data collection technique, including telephone interviews, personal interviews, and postal surveys. Schaefer and Dillman (1998) have noted that an ES can be used in combination with a postal survey to reduce coverage error that is often associated with an ES. Specifically, they suggested that because of its cost and speed advantages, the ES is ideal for a first mode of contact in surveys. This way, a researcher could begin with a short ES to determine the willingness of respondents to complete a more comprehensive Internet survey, postal survey, and so forth. Or, the researcher could simply use an ES among respondents having e-mail addresses and use a postal survey for those without access—if it can be reasonably assumed that sample members will not react differently to the surveying modality or that some confounding bias is not operating between the two groups. Indeed, a study by Clayton, Applebee, and Pascoe (1996) demonstrated that such mixed modality usage could help increase the reliability of the survey instrument as well as the response rate while reducing the cost of the survey.

After the data are collected through this strategy, the researcher can work toward making sure that the data do not suffer from sampling bias. For example, the researcher can compare the validity of the data with those collected via traditional surveying methods. If the results are comparable, then the argument could be made that the Internet sample is also representative of the general population (Smith & Leigh, 1997). Moreover, when such comparable data are available, the researcher could apply poststratification weights to the Internet data such that, for example, the number of individuals in each age, gender, and education cohort would be the same as in the actual population.

**Constructing Sampling Frames**

Accessing or constructing a sampling frame is another major problem with Internet surveys; however, even when none is available, it might still be possible to construct a reasonable sampling frame (Cho & LaRose, 1999). First, the researcher could cull sampling frames by distributing solicitations through listservs, discussion groups, and search engine banners. Second, public directories that include e-mail addresses and are kept online by some organizations such as WhoWhere and BigFoot can be used to cull a sampling frame. Academic staff and trade association directories are, in particular, beneficial for organizational scholars because a growing number are online in publicly accessible formats. Jones and Pitt (1999), for example, were able to use a convenience sample of 10 English universities whose staff directories were located on the Internet. *Trolling*—or the recording of e-mail addresses of participants in newsgroups, chat rooms, and multiuser environments—is another way of compiling sampling frames. For example, Mehta and Sivadas (1995) constructed their sampling frame by using a program that collected e-mail addresses of people who posted articles on newsgroups. In addition, software for extracting e-mail addresses from the Web and list servers are typically inexpensive, and some are even free. However, we recognize that most organizational researchers would not advocate or employ this culling strategy because it is considered a breach of Internet usage ethics.

For surveys that involve employees of a single organization, we suggest that the method that currently holds the greatest potential is using traditional sampling frames,
such as staff records, and then inviting selected respondents to complete the survey. For example, employee databases, which are part of management information systems in many companies, can be accessed for the construction of a sampling frame. When such an accurate frame is used, calculating response rates, which is perhaps the most widely refereed indicator of generalizability of survey data, will also be possible, even with Web surveys (Duffy, 2000).

**Increasing Responses**

A plethora of studies has been undertaken to identify factors that might potentially influence responses to mail surveys, including monetary offerings, lottery tickets, contributions to a charity, an offer of survey results, cover letters, personalization, anonymity, topical interest, sponsorship, questionnaire design, prior notification, follow-up, humor, type of mailing, and deadlines. Excellent reviews of this body of research have been written by Church (1993); Fox, Crask, and Kim (1988); Heberlin and Baumgartner (1978); Jobber (1986); Linsky (1975); Veiga (1984); Yammarino, Skinner, and Childers (1991); and Yu and Cooper (1983). Although Internet surveys resemble mail surveys, not all of these techniques are easily transferable to the Internet context. For example, attaching a monetary incentive to an electronic survey (such as a dollar bill) or a nonmonetary incentive (such as a pen), is impossible in a direct sense, although it is possible via alternative means. However, several scholars believe that in the absence of a general modus operandi for achieving high response rates in Internet surveys, it is still possible to build on existing mail survey knowledge to improve responses (e.g., Kittleson, 1997; Schaefer & Dillman, 1998).

Internet users are less likely to participate in surveys because they can easily navigate around voluminous amounts of information, which makes them less tolerant toward material that is not of interest to them. Further reducing their likelihood of participation is that some people are effectively paying to participate in Internet surveys because they pay a fee for Internet access. Therefore, what researchers say to potential respondents about themselves and their research in the introduction to their surveys is likely to be influential. Unfortunately, this issue has received almost no empirical attention. It appears that most norms about what to include in the introduction of an Internet survey are set by example, not evidence. Relevant research on other modes of surveying emphasizes establishing the legitimacy of the surveyor, eliciting the cooperation of the potential respondent, and enhancing rapport in the survey (Sobal, 1984). Although no key patterns have emerged from the empirical work on postal surveys with respect to these issues (Sobal, 1984), we believe that the introduction is critical.

Beyond the introduction, we believe there are several additional steps possible to improve response rate. First, it may prove beneficial to notify sample members about the incoming questionnaire through an e-mail or postal prior notification (Emery, 1995; Mehta & Sivadas, 1995). In postal surveys, advance notice positively influences response rates across settings and populations. Prior notification should not only seek permission but also include (a) a social utility appeal that emphasizes the worthiness of the survey, (b) an egoistic appeal that stresses the respondent’s place and importance in completing the survey, and (c) an appeal to help the researcher in completing an important project (Yu & Cooper, 1983). The sponsor of the survey, a person or persons to contact for questions, expected date of the survey, and a statement indicating the strict confidentiality of the respondent’s response should also be included. When possible,
the researcher should also mention some possible steps that will be taken toward ensuring anonymity and confidentiality. For example, the researcher may state that screen headers will be deleted once the responses are received (Goree & Marszalek, 1995), offer some options for responding anonymously such as placing the questionnaire on a Web site, or mention the possibility that the respondent could send the completed questionnaire through regular mail.

Second, the literature on postal surveys strongly suggests that follow-up mailings are an effective way of increasing response rates (Salant & Dillman, 1994). The underlying argument here is that properly timed follow-up mailings provide additional stimuli for responding. We believe that this strategy can work with Internet surveys as well, although the existing literature on Internet surveys does not offer any guidance as to how this contact should be made. Because the cost of resending an Internet survey is trivial, follow-up mailings should include a copy of the survey as well. Some empirical evidence supports the observation that follow-up e-mailing can be an effective method of augmenting responses to Internet surveys. For example, the first mailing in the study by Schleyer, Forrest, Kenney, Dodell, and Dovgy (1999) brought the total response to 50.2% from 32.9% and the second mailing to 57.1%.

Third, sponsorship might positively influence responses to Internet surveys. In postal surveys, the attributes of the researcher and the authority of the organization that supports the survey affect response rates (Groves et al., 1992). However, three meta-analyses found mixed results. Two suggested that university sponsorship is associated with higher responses (Bruvold, Comer, & Rospert, 1990; Fox et al., 1988), but one found little relationship (Yammarino et al., 1991). Despite these contradictory findings, we believe that the effect of sponsorship on responses to Internet surveys will be stronger because identities on the Internet are often in question and questionnaires are suspect due to low anonymity provided by the Internet. In particular, the Internet domain name system provides a widely recognized and credible means of certifying where a survey request originates from and that survey results are being sent to credible sources. Likewise, when making contacts through e-mail, a generic e-mail account is less likely to be well received than the researcher’s actual organizational account. Thus, when possible, researchers should seek collaborators that they think will be perceived as trustworthy by potential respondents (Cho & LaRose, 1999).

Fourth, some incentives could be employed to increase responses. Indeed, Church (1993), in a meta-analysis of the effects of incentives on mail survey response rates, indicated that prepaid incentives, either monetary or nonmonetary, had a significant effect on response rates. For example, monetary incentives were associated with increased response rates of between 12% and 19% over control groups, depending on the size of the incentive (Church, 1993). Having an individual complete a survey on the Internet is essentially a manifestation of helping behavior. It is about asking “strangers” to donate some of their resources in the form of time (sometimes money as well) and to release some personal information that they may prefer to keep private. Within this context, it makes sense to offer the respondent some incentive to augment his or her cooperation. Respondents can be offered gifts such as computer games, coupons for some online gift, or free online time from an Internet provider. The growth of electronic commerce also affords an opportunity to offer monetary incentives. Gift certificates to popular Web shopping sites are a current option, and it soon should be possible for researchers to transfer incentive payments to online credit repositories (Cho & LaRose, 1999). However, there is still a lack of focused research on determining how
these different strategies might work. From a theoretical point of view, we believe that research on helping behavior (e.g., Bendapudi, Singh, & Bendapudi, 1996; Drago & Garvey, 1998) and social exchange theory might provide some important clues for future researchers interested in this issue. Both of these theories suggest that the use of incentives might help in gaining cooperation of respondents because human behavior is also motivated in part by psychological returns and costs (Roth & BeVier, 1998).

And finally, questionnaire layout and design issues should be taken into account. Internet surveys in general should be accompanied by very clear and simple instructions, such as how to reply, that will not consume much of the respondents’ time and cognitive adjustments. In particular, “extra” features that would minimize questionnaire completion time and maximize respondent convenience should be pursued. For example, scrolling, jump screen, quitting, no automatic next, no keyboard responses, help screens, and a progress thermometer indicating completed percentage of the questionnaire were incorporated and successfully used by Beebe, Mika, Harrison, Anderson, and Fulkerson (1997). Like many others (e.g., Johnston & Walton, 1995), we also believe that whenever possible, simple graphics-animated questionnaires should be used, for many people’s perceptions of computers are similar to that of TV rather than postal mail. But we caution that such devices and features consume enormous amounts of memory and make opening such messages time-consuming and frustrating if the respondent’s computer differs in terms of power, memory, connection speed, and Web browser. In addition, graphics, sounds, and special formatting of the questionnaire may not translate across various e-mail and browser packages. Likewise, not everyone who has access to the Internet has a graphical interface (e.g., Netscape) on their computer, making it difficult, if not impossible, to respond. To solve such problems, the survey instrument should be tested thoroughly to reduce the number of software defects and incompatibilities and to make sure that the formatting and appearance of the questionnaire remain the same after transmission (Tse, 1998). To that end, a pilot test of the survey among a random sample of potential respondents might prove extremely useful to detect problems in terms of operating systems, browsers, and the like. When such testing is not undertaken and the researcher’s knowledge of the Internet capacity of potential respondents is limited, we suggest it is best to keep the survey as simple and short as possible.

Managing Anonymity

The issue of anonymity and security is particularly important in the Internet environment in which actors have potential access to one another’s personal information. Thus, when conducting Internet surveys, one of the researcher’s primary tasks should be safeguarding respondents’ anonymity and data integrity and taking measures that alleviate respondents’ anonymity concerns. Two excellent places to start are the Usenet newsgroups alt.security.pgp and alt.privacy.anon-server, which are exclusively dedicated to security and privacy issues on the Internet.

As far as specific strategies are concerned, any time a survey is sent via e-mail, the researcher should suggest to everyone surveyed that they can use anonymous remailers to send the completed survey so that the recipient cannot identify their real names or e-mail addresses. Remailer computers are set up to receive incoming electronic mail, strip the messages of the sender’s identifying information, and forward
them anonymously to recipients—whether to a single electronic mail box or thousands of addressees or often through a series of other remailers. Because these messages are remailed in a random sequence, different from the order in which they arrive, people who may be monitoring the remailers cannot match the outgoing messages with the incoming messages to identify who sent which message. Furthermore, the remailer itself does not store messages but serves as a channel for message transmission. As an aside, we should note that some sites that handle remailing have unsavory reputations because they are often used for illicit purposes. In any case, remailing software is readily available in the public domain, so researchers can set up their own remailers. However, given that the remailing node can record incoming addresses, this could defeat its purpose if the remailer is run by the researcher. Hence, we recommend that remailers be run by third parties whom respondents are likely to consider trustworthy, such as a university’s human subjects committee (Cho & LaRose, 1999). Likewise, we strongly recommend against the use of cookies in Web surveys. As noted, many users may simply refuse to access the survey because their browsers will warn them that a cookie is being sent to their computer. Thus, unless researchers disclose the exact information that is included in the cookies by making the cookies’ content visible to potential respondents, they should not be used (Cho & LaRose, 1999). To alleviate respondents’ anonymity concerns in the WS, respondents could be directed to an alternative Web site; for example, from Anonymizer.com, the respondent can browse the Web or send e-mail from behind a firewall that the company says will render the user completely untraceable.

Finally, it must be recognized that guaranteeing complete data security and anonymity is not possible with Internet surveys. Hence, even when measures such as the aforementioned ones are in place, the researcher should not make the promise of complete anonymity. Most Internet users seem to have a good knowledge of the lack of anonymity in Internet communication, such that a promise of complete anonymity might raise serious doubts about the credibility of the researcher. On the contrary, we believe it behooves the researcher to inform potential respondents of this matter. Recall that a potential respondent is considered to be informed if the researcher provides the following information: (a) the nature and degree of anonymity afforded and the voluntariness of the research situation, (b) specification of the research and the general purpose of the research, and (c) specification of the ultimate state of documents or records of data obtained in the research (Boruch, 1971).

Managing Confidentiality Concerns

Much like anonymity, complete confidentiality of responses is not possible with Internet surveys. For example, a WS placed on an organization’s Web page can be accessed by anyone, and even devices such as passwords and encryption may be of little use in ensuring total confidentiality. It is also true, however, that some modalities are likely to invoke greater perceived levels of confidentiality. For example, when an ES is used to send the survey to the respondent’s personal e-mail account, concerns over confidentiality are likely to be high: “If they know my e-mail address, they also know me and how I am responding.” Indeed, most e-mail packages are currently programmed to include identifying information of the respondent, including his or her name. On the other hand, when a respondent completes a survey that resides on a Web
page or downloads and returns the survey via postal services, he or she might be less worried about confidentiality because of greater anonymity. Clearly, it is not possible to associate an anonymous individual with any part of the collected data.

A factor that complicates the confidentiality issue is that many Internet users are likely to have established beliefs that Internet surveys lack confidentiality because of the popular media coverage that often calls attention to the lack of privacy on the Internet. Therefore, strategies aimed at effectively improving potential respondents’ perceptions about confidentiality might prove extremely useful in dealing with the negative effects of confidentiality on Internet surveys. To that end, the researcher should try to gain the trust of respondents. As Singer et al. (1993) suggested, in managing confidentiality concerns, what matters more than the nature of the assurance given respondents is trust in the integrity of the researcher. In this context, we believe what the researcher tells potential respondents about the survey is very important. For example, the researcher should provide a clear explanation of the purpose of the survey and how the respondent was selected to avoid suspicion that they were compiled through trolling (Cho & LaRose, 1999). The respondent should also be told how the data will be used and who will have access to it. Respondents can be reminded that although no complete guarantee of confidentiality with Internet surveys is possible, some steps, such as daily downloading of submitted responses, will be undertaken to minimize such risks. And finally, the use of passwords and access protections can also alleviate respondents’ suspicions about confidentiality (Stanton, 1998). For example, by using unique identifier codes, the researcher can minimize the risk that a third party will link a specific data set to a certain individual (Smith & Leigh, 1997).

Conclusion

Internet self-administered surveys offer organizational scholars exciting new possibilities for data collection. However, researchers have to make and are making a number of trade-offs when they decide to use Internet surveys to collect survey information. Therefore, although it is important that Internet surveys are given the appropriate attention, it is equally important that limitations of these surveys are understood from a comparative and comprehensive perspective. Internet surveys provide a good opportunity for those researchers who have a limited research budget or who are interested in fast data gathering. Because they obliterate time and location constraints, Internet surveys can also prove very beneficial when the sample is scattered or mobile. On the other hand, the full potential of Internet surveys is at present inhibited by the Internet’s lack of universal coverage, difficulties in accessing appropriate sampling frames, lack of sampling control, and the lack of respondent anonymity and confidentiality.

Although we have suggested some possible strategies that can be used to overcome some of these limitations posed, we urge researchers to undertake research that focuses on Internet surveys as its primary goal rather than treating it as a topic of secondary importance and making convenient post hoc investigations and predictions from project data designed for another research agenda. Only by developing a theoretical understanding of this modality can we truly understand and make significant progress in the science of conducting Internet organizational surveys.
References


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