INTERNET SURVEY RESEARCH: PRACTICES, PROBLEMS, AND PROSPECTS

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ABSTRACT

The Internet has a number of features that are attractive for marketing research surveys including low cost, fast response time, and access to any location. This paper presents a review and assessment of the use of e-mail survey and Web-site survey research methodology and examines their potential and problems. To date, there have been few studies of these data collection approaches. Most studies have found some serious problems or shortcomings with the methods. This paper discusses the methods and concludes with recommendations about the short-term prospects for the use of e-mail and Web-site surveys in marketing research.

The Internet has become our national showplace for the display of extraordinary statistics, amazing accomplishments, and incredible growth rates. Most of the hyperbole is well deserved and we can reasonably expect the Internet to continue to work its way into all aspects of public life and private enterprise. The changes brought about by the Internet have been particularly evident in areas that are information-intensive and relationship-based such as marketing. There may be no more natural alliance than between the ease of communication offered by the Internet and the commercial need for a steady stream of data about the fragmented marketplace and difficult to reach market segments.

A number of research vendors are already engaged in on-line surveys of "netizens" and, although most studies are proprietary and few details are available, reports from the leading edge suggest that on-line survey research is viable. For example, a four-day Web-site study by ResearchWeb using a banner-based solicitation system found over 1.8 million exposures to the randomly posted banners, 10,000 visits to the target Web-site, and 5,000 completed questionnaires (Petrecca 1997). Similarly, Digital Marketing Services claimed an annual total of 30,000 respondents to on-line surveys (Advertising Age 1996) and Georgia Institute of Technology's Graphics, Visualization, and Usability Center's Seventh World Wide Web User Survey during a two month period collected 19,970 responses (Pitkow and Kehoe 1997).

These very impressive studies with their mammoth sample sizes and research approach that is fast, low cost, and supported by automated data entry have generated great interest among academics. The portfolio of studies of the Internet by academics to date are still few in number and include mostly assessments of the use of e-mail and web-site surveys for studies of consumer behavior.

This paper reviews and discusses most of the published studies, describes the problems and advantages inherent in on-line survey research, and attempts an appraisal of prospects for this innovative data gathering approach.

DEFINITIONS

The Internet is a vast and complex network of networks that connects computers around the world. It is rapidly expanding and a recent report from CommerceNet (1997) identified 58

million adult (over age 16) users of the Internet in the United States and Canada. The dominant user application on the Internet is e-mail (Nua 1997) or sending documents between computers where they can be edited, used in programs, or stored in memory. E-mail has been text-based and, despite recent advances that permit transmission of images and multiple fonts within a document, the incompatibility among Internet browsers suggests that e-mail will remain primarily text-only for the immediate future.

Close behind e-mail in popularity is searching the World Wide Web. The Web is among the systems that comprise the Internet and is composed of interconnected, hyperlinked sites and files that are accessible with a browser such as Netscape or Microsoft Explorer. With the appropriate equipment, the Web is easy to use and serves as a source of information, entertainment, shopping, and interaction for millions of users daily around the world.

The Internet can be used for different marketing research functions including: secondary data searches through the hundreds of millions of documents available on millions of host computers, on-line focus groups that use "chat" for text-based, on-line conversations, observational studies involving users of newsgroups or discussion groups where users post messages, and survey research.

Strauss (1996) defines *on-line research* as marketing research that is conducted over a computer network. Here the interest is specifically on survey research. *On-line survey research* is conducted either through an e-mail questionnaire or by self-administered forms created with HTML and posted to a Web site. An *e-mail survey* is defined as any data collection form that is sent to the e-mail address of the respondent and returned by e-mail to a researcher. Some e-mail surveys may include the option of printing out the questionnaire and returning it by postal mail. A *Web-site survey* is defined as any survey research in which a questionnaire or response form is posted at a Web-site and accessed by respondents who connect to the site either through links or by using the Web-site URL (Universal Resource Locator) or address (Schonland and Williams 1996; Watt 1997).

Web-site survey forms typically are prepared in HTML and offer a number of data-entry methods including dropdown lists, radio buttons for variables that take a single value, check boxes which can be used for multiple response questions, and text areas for open-end responses or comments. The survey forms can be returned by use of the "mailto:" function and enhanced with customized CGI script or JavaScript. A proprietary "backend" software program may compile the data and prepare an analysis and printout of survey results.

BACKGROUND

This paper is based on a fairly comprehensive collection of twenty research articles that deal with the methodology of on-line survey research. The search for these articles relied on a combination of citation analysis of published articles and on-line searches of the World Wide Web for references. These searches turned up several recent articles that were electronically published in on-line journals. There is no other way to locate such publications except through careful on-line searching or knowledge of the URL. Every effort was made to identify as many relevant articles as possible but it is likely that some items were overlooked. In cases where an author published similar findings in more than one article, only the initial publication is included.

Inquiry on the topic of e-mail and the Internet as a research tool began in the mid-1980s but it is only in the past few years that the subject has begun to emerge as a serious research area. Smith

(1997) provides a brief but detailed summary of e-mail studies and Web-site survey research. She notes that there are "thousands of surveys and polls being conducted on the web" but little scholarly study about the new technique. Strauss (1996) provides a review of early survey research on the Internet. Her insightful paper describes results of 16 studies that use Web-site surveys and 6 studies based on e-mail. All of the Web-site research she cites was conducted by marketing research organizations. Strauss discusses the "methodological peculiarities" of on-line survey research including the inability to draw a probability sample, sample bias, difficulty of measuring response rates, problems of respondent authenticity, difficulty in providing incentives to respondents, and concerns about response accuracy in a "point-and-click" environment.

ON-LINE SURVEY RESEARCH PRACTICES

Table 1 presents a summary of the objectives, sampling methodology, survey distribution approach, response rate, and selected conclusions from the 20 studies. The objective here is to provide an overview and summary of the research practices. The salient features of this literature are that there is little continuity among the articles, no attempts at replication, and little similarity in terms of population of interest, topic of study, or specific features of the method of data collection. The lack of continuity is due, in part, to the rapidly changing technological environment of the Internet and the evolving communication software. Based on these publications, the area of on-line survey research does not yet have the consistency or continuity that might typically be associated with a research specialty or field of inquiry. This is understandable given the recent appearance of the methodology.

TABLE ONE ABOUT HERE OR AT END

A total of 14 out of the 20 studies are presented by authors with a U.S. affiliation. Among these, 6 used an international sample and 8 relied on a domestic sample. For the 6 articles with a non-U.S. author affiliation, 3 used an international sample and the remainder collected domestic data. Non-U.S. authors identified their country affiliations as United Kingdom (2), New Zealand (1), Germany (1), Canada (1), and Hong Kong (1). The substantial percentage of U.S.-based studies (43%) using a sample that includes international respondents is highly unusual in marketing or social science research in general.

The distribution of publication dates of the 20 articles cited in this paper is as follows: 1986 =1, 1991 = 1, 1992 = 1, 1994 = 1, 1995 = 6, 1996 = 5, and 1997 = 5. The earliest articles are focussed on the practicality of using e-mail for research. These are followed by studies that compare e-mail and postal or "snail" mail. More recently, there has emerged an interest in comparing e-mail with Web-site surveys.

The following are the primary sources of the samples used in the studies: participants in a FreeNet (2), memberships directories (5), subscriber databases (2), participants in a newsgroup (2), solicitation notices posted at sites on the World Wide Web (5), and members of an organization (4). In several studies, more than one method of generating a list of e-mail addresses was used. Half of the studies intended to make a comparison between data collection methods. Among these, 8 compared e-mail survey techniques with postal mail and 2 compared e-mail with Web-site surveys. The results of the comparisons are highly inconsistent with response rates for e-mail surveys ranging from a low of 6% to a high of 68% and mail surveys ranging from 17% to 80%. The wide variety of sample selection procedures and differences in questionnaire content make it very difficult to draw conclusions about the relative effectiveness

of the two approaches. However, all the authors conclude that e-mail has advantages and disadvantages as a survey technique. These will be discussed in the next sections.

Web-site surveys are highly innovative approaches to data collection. Despite their surface similarities to computer-assisted personal interviewing (CAPI), which also makes use of an on-screen self-administered questionnaire, the environment of the Web-site survey suggests that there are significant differences between the two (Strauss 1996). The Web-site surveys identified in Table 1 share some features in common. They all rely on what amounts to on-line advertising in the form of "banners" or postings at Web-sites in order to attract a sample. Some of the studies indicate problems with respect to attaining reasonable sample size while others have very large samples involving thousands of respondents.

All the authors indicate concern about the quality of their sample in terms of representativeness. In an attempt to resolve this problem, a few studies made use of e-mail solicitations sent to respondents inviting them to visit a Web-site in order to participate in the survey. Unfortunately, the response was not always positive and one survey that relied on this methodology had a very low response rate.

Most of the studies represent steps into the unknown as they attempt to utilize sample selection procedures and questionnaire distribution methods with little track record. In the case of Web-site surveys there is no precedent whatsoever, as the data collection method did not exist until recently. Generating a sample of newsgroup participants and soliciting participation by placing links and information at selected Web sites also represent entirely new methods.

PROBLEMS WITH ONLINE SURVEY RESEARCH

The problems cited in the articles have been grouped into the following categories: sampling and representativeness, problems with e-mail, selection bias, software problems, response rate, data quality, privacy issues, and problems specific to Web-site surveys. A number of the problems associated with on-line survey research were cited in several studies suggesting that the problems are now fairly well known. Many of the problems are related and, as a consequence, there is overlap in the discussion presented below.

Sampling and Representativeness. Sample bias is a pervasive problem in on-line survey research (Kehoe and Pitkow 1997; Coomber 1997). Many of the studies presented here state that the samples obtained do not represent a cross section of the population of users of the Internet or e-mail. However, the samples do appear to have some characteristics in common. Specifically, respondents to the surveys are more likely to be frequent users of computers and heavier users of the Internet and e-mail than non-respondents (Andersen and Gansneder 1995). This is a bias that appears throughout the studies in Table 1.

Problems with e-mail. There are a number of problems associated with e-mail surveys. First, a high percentage of e-mail addresses turned out to be invalid or inaccurate. Oppermann (1995) reported 25% of e-mail addresses invalid and Comley (1996) reported 35%. Bachmann, Elfrink, and Vazzana (1996) identified 18.3% of e-mail as undeliverable and Schuldt and Totten (1994) found 36.4% of e-mail undeliverable. Second, e-mail lists are subject to considerable inaccuracy and do not constitute good sampling frames. Unfortunately, it is difficult to obtain quality lists of e-mail addresses. Several studies resorted to "stripping" the addresses from newsgroups with programs such as "NetContacts" (Blankenhorn 1996) or relied on on-line or published

directories, which go out of date quickly. Finally, Andersen and Gansneder (1995) found that 20% of e-mail was never even read by respondents.

Selection bias. A critical feature of a random sample is that the researcher has control over the composition of the sample and selection of participants in the study. Neither e-mail nor Web-site surveys allow for such control and respondents are essentially self-selected (Bonchek, Hurwitz, and Mallery 1996). This self-selection bias is intensified by the fact that there may be repeat responders. Despite the use of software to screen out duplicate addresses, some respondents may reply from more than one address or may find ways to overcome the software controls on repeat participation (Coomber 1997).

Software problems. There are notorious incompatibilities among Web browsers and related software programs. Not all browsers will work effectively with on-line surveys (Comley 1996). Some e-mail programs are now capable of sending both graphics and multiple fonts but not all e-mail readers can handle these amenities (Patrick, Black, and Whalen 1995). In particular, Smith (1997) reported serious difficulties with the software designed to support data collection indicating that software programs are far from reliable at this time.

Response rate. A comparison of mail and e-mail surveys shows that mail response rates are typically higher then e-mail (Kittleson 1995; Schuldt and Totten 1994). In many cases, there is simply no accurate and reliable method of determining the response rates to either e-mail surveys or Web-site surveys. The sample frame of e-mail lists is often inaccurate or, in the case of Web-site surveys, may be nonexistent. A related problem stems from the ability of the researcher to identify the e-mail respondent and this lack of anonymity may be a deterrent to survey participation. In "real life," respondents may be offered incentives to encourage survey participation and it is possible to do this on the Internet. For example, America Online offered free time to respondents to a survey. However, for most researchers the use of on-line incentives may prove impractical if not impossible pending the adoption of standards for some type of so-called "digital cash" or "e-cash." Of course, incentives can be sent to respondents by postal mail if their addresses are available (Comley 1996).

Data quality. There are two significant problems associated with data quality and both are related to the issue of sample control. First, even if there is a response from a specific e-mail address, it is not possible to determine who the actual respondent is. Of course, this is a problem endemic to all "mail" surveys but, given the propensity of Internet users to adopt multiple identities, it may be exacerbated in cyberspace. Second, there is no method to determine the accuracy of the responses to the survey. Again, this is a common survey problem but some sectors of Internet "culture" tend to support misrepresentation and the problem may prove to be substantial.

Privacy issues. The use of unsolicited e-mail to request participation in a survey or to actually send a questionnaire can raise serious problems for researchers (Jones 1994; Andersen and Gansneder 1995). Several studies report being "flamed" by e-mail recipients or having complaints about unsolicited messages sent to Internet providers. Since "spamming" or the mass mailing of e-mail messages is already a common but widely vilified practice, it is possible that there will be spillover of negative reactions into the research area. A related problem for researchers is that Internet users can install software programs such as "e-Filter" (Blankenhorn 1996) that will screen out junk messages and surveys. The volume of survey activity may prove to be a problem as consumers and, perhaps legislators, grow tired of the onslaught. Indeed, anti-

spam legislation has been enacted in Nevada and legislation is under consideration in five other states to prevent spamming and the abuse of the Internet communication system (Evans 1997).

Problems specific to Web-site surveys. Unlike an e-mail study in which a questionnaire is sent directly to the respondent, a Web-site survey requires that the respondent "visit" the site. In addition to sending e-mail notification, this may also require posting notices at high volume or specialized Web sites in order to attract attention and solicit participation. This methodology raises concerns about the representativeness of the sample and repeat participation. Only a proportion of those attracted to a Web-site survey will actually complete the survey. White (1996) found that 60% of visitors completed at least a portion of the study and the recent on-line survey offered by the Research Institute for Telecommunications and Information Marketing of the University of Rhode Island (http://aptiva.cba.uri.edu) achieved a completion rate of only 40% of site visitors. In addition, since anyone can access a Web site, the researcher loses any claim to privacy about the survey or the contents of the questionnaire. Several studies have attempted to solve these problems by sending an initial e-mail message asking for participation and then sending a password to the respondents that would allow them to access the restricted Web-site. Of course, this method is subject to many of the problems associated with e-mail surveys.

ADVANTAGES OF ON-LINE SURVEY RESEARCH

While there are clearly numerous problems associated with on-line survey research, there would be little interest in this methodology if it did not offer a number of important benefits for marketing researchers. The advantages of on-line survey research are divided into seven categories: cost benefits, time benefits, flexibility, completion, sampling advantages, interactivity, and context.

Cost benefits**.** It is nearly universal among the studies presented in Table 1 to state that both e-mail surveys and Web-site surveys represent substantial savings in cost for the researcher. The savings for an e-mail survey or Web-site survey are estimated by Virtual Architects (http://www.surveybuilder.com) at about one-third the cost of a mail survey. Comley (1996) estimated e-mail cost to be about 15% of that of postal mail. In terms of the minimal expense in sending e-mail, it might be expected that the cost difference would be greater. However, on-line research also includes the cost of software programming, site maintenance costs, equipment expense, and overhead related to the Internet connection. For academic researchers many of these expenses may be absorbed by their institution and that support makes on-line surveys a very appealing methodology.

Time benefits. It is widely accepted that the response time to on-line surveys is much faster than any other method of data collection. E-mail requires only a matter of minutes to reach its target and Web-site surveys are tirelessly collecting data 24 hours a day, 7 days a week. This fast reaction time is highlighted by Mehta and Sivadas (1995) who note that in the time it takes for the postal service to deliver a mail survey, an impressive number of responses will have already been received via the Internet. It is worth noting that in comparison to a telephone survey, the time advantages do not appear to be as great but the combination of rapid response and low cost make the e-mail or Web-site survey appear as attractive alternatives to the telephone.

Flexibility**.** In comparison to printed questionnaires and interview schedules, the e-mail and Web-site surveys are highly flexible. Both methods permit rapid, easy-to-make, and low cost adjustments to the survey instrument. In addition, they allow for use of multiple versions of questions and multiple versions of the entire survey form itself with little additional cost.

Completion**.** Respondents to e-mail are more likely to fill in answers to open-ended questions than are those who receive postal mail (Bachmann et al 1996; Mehta and Sivadas 1995). Answer completion levels may be higher with Web-site surveys insofar as the computer can be programmed to require that respondents finish all items on one screen before proceeding to the next (Pitkow and Recker 1994).

Sampling**.** A major advantage of the on-line survey is that it permits global surveys with extensive international data collection (Mehta and Sivadas 1995). There is simply no other methodology that currently offers this. A second advantage is that, due to the low cost involved, it is possible to use what has been termed "oversampling" (Kehoe and Pitkow 1997) to try to compensate for under-representation of certain demographic groups. Finally, on-line research is effective at contacting difficult to reach populations. Coomber's (1997) use of a Web-site solicitation resulted in an international sample of a very hard to reach group of respondents, drug dealers.

Interactivity**.** In the case that additional information is needed, on-line survey research makes it easy for the researcher to contact the respondent (Oppermann 1995). It is also relatively easy for the respondent to get in touch with the researcher with questions and comments. This is particularly valuable in the pre-test phase of a study when researchers would like comments on the instrument and methodology.

Context**.** An on-line survey may be very near ideal as a data gathering tool when the focus of the research is specifically on users of the Internet (Gordon and De Lima-Turner 1997). Similarly, problems of bias may be less critical when the interest is in reaching the upscale, well-educated, Internet user population.

PROSPECTS FOR ON-LINE SURVEY RESEARCH

Despite the many drawbacks and problems, the overwhelming response to survey research on the Internet is favorable. Most researchers are in agreement that we are still in the very early stages of an emerging research methodology. Some believe that it has great potential and may transform the entire field of marketing research. A 1995 study by the Council of American Survey Research Organizations (CASRO) found that 17 percent of marketers employed in the largest U.S. companies have used data from on-line studies (Edmondson 1997). This suggests that the Internet is too important to ignore as a vehicle for survey research and experimentation will continue.

Everything on the Internet seems to be "under construction" and, if recent history is any guide, there will be a rapid improvements in software that will eliminate some of the problems of incompatibility between browsers and e-mail programs. For example, research vendors are continuing to experiment with on-line focus groups that rely on chat software that permits participants to type interactive dialog (Gaiser 1997; Hamlin 1997). Videoconferences are now feasible but the video images are inconsistent and the voice transmission quality is typically poor. Improvements in software may permit on-line focus group videoconferences. It is also possible that researchers will use videoconference technology to conduct point-to-point personal interviews at any location on the planet at reasonable expense.

A resolution of the problems with sample control and response rate is crucial for on-line survey research to flourish. At some point in time, the Internet population should begin to stabilize and

e-mail addresses could become as reliable as phone numbers and used as frequently. But it may be a long period of time before such a researcher's dream comes true, if ever. Until then, interim solutions are needed. NFO Interactive (http://www.nfor.com), Cyber Dialogue Inc. (http://www.cyberdialogue.com), and E-valuations Research (http://www.e-valuations.com) are among the research vendors that have established panels of Internet users. The on-line panel can be constructed to match the known demographics of the Internet population. In addition, the panel approach ensures a reasonable level of respondent cooperation with a survey and permits the use of some form of incentive.

For academics, establishing a survey panel may prove a daunting task but not out of the question. Building alliances among business schools may provide sufficient resources for the establishment of an on-line research center. Given the nature of the Internet, these alliances may just as easily be international in scope as domestic. The panel may be supplemented with an on-line community or a group of people who interact on the Internet and share some common interests (Armstrong 1996; Hof 1997). However, many of these groups are spontaneous and establishing one intentionally could be difficult (Nicovich 1997). On-line survey research is but one of the many Internet data collection methods. Researchers are also actively pursuing studies that involve dipping into the vast reservoir of secondary data available online or scanning the massive amounts of up-to-date news and reports. These research methods are likely to flourish.

It is interesting to note that, with respect to sales, the Internet is essentially a direct marketing medium. The Direct Marketing Association defines direct marketing as an "interactive system of marketing that uses one or more advertising media to effect a measurable response and/or transaction at any location, with this activity stored on a database." Unlike many consumer-goods marketers, the direct marketing field makes little use of survey research about consumer attitudes. Rather, direct marketing relies on testing actual offers and compiling statistical data about consumer response. They are interested in what specifically appeals to consumers and how much they spend on purchases as opposed to finding out how they feel about products or how they think they will behave. As electronic commerce expands, on-line companies will gradually accumulate huge databases consisting of records of purchases, e-mail addresses, and possibly many other items of information about consumers. An alternative offered by the World Wide Web is to conduct test marketing on-line through the use of a "virtual store" that measures consumer response to products (Burke 1996; Direct Marketing Association 1997). In this environment, the contribution of survey-based consumer research may be less important.

Despite the pervasive interest in the Internet as a marketing medium and in on-line survey research as a data collection tool there appear to be few immediate solutions to the associated problems of on-line research. Nevertheless, as we are in the day-to-day process of watching the dramatic unfolding of a global communication system without precedent, it is vital to marketers and the rest of the society to know as much as possible about its applications and uses. The experts in this area are the marketing researchers and we can be sure that they will continue to work toward achieving accurate and reliable information about the Internet and its millions of citizens.

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Table 1
Summary of online survey research

Authors (Date)	Methodological Objectives	Sample	Distribution Method	Response rate	Conclusions
Anderson and Gansneder (1995)	Test effectiveness of e-mail surveys	Random sample of active Free-Net users	E-mail	68%	Online surveys are effective
Bachmann, Elfrink, and Vazzana (1996)	Compare mail and e-mail data collection methods	Samples drawn from various membership directories	E-mail	52.5%	E-mail survey can be effectively substituted for mail
			Mail	65.6%	
Bonchek, Hurwitz, and Mallery (1996)	Evaluate online document distribution service	18,000 current and past subscribers to service	Initial e-mail survey. Web site or e-mail response option	Overall 6% (79% e-mail and 21% web-site survey)	Low response rate and self-selection raise issues of representativeness
Comley (1996)	Compare mail and e-mail data collection methods	Magazine database of e-mail addresses	E-mail	13.5%	E-mail surveys are feasible but due to address problems recommends using a panel
			Mail	17.0%	
Coomber (1997)	Use of Internet to survey hard to reach populations on sensitive topics	Posted solicitation at specific newsgroups with link to online survey at Web site	Web-site survey	80 self-selected responses from 14 countries	Method is effective for this type of study but lack of representativeness is a serious limitation
Gordon and De Lima-Turner (1997)	Internet users' attitude toward online advertising	Solicitations at newsgroups with links to survey at Web site	Web-site survey	30% of "hits" at Web site com-pleted survey.	Nonrandom sample is subject to self-selection bias and lacks representativeness
Kehoe and Pitkow (1997)	Description of Web-user characteristics and attitudes	Nonrandom sample solicited through postings on Web sites, and e-mail announcement	Web-site survey	55,000 respondents to 5 surveys in past 3 years	Methodology relies on "oversampling" to increase credibility of non-random web-based survey
Kiesler and Sproull (1986).	Compare mail and e-mail data collection methods	Randomly assigned sample to either mail or e-mail condition	E-mail	67%	E-mail responses were faster and less socially desirable
			Mail	75%	
Kittleson (1995)	Assessment of email as survey tool in public health research	Directory of health professionals	E-mail	28.1%	E-mail is faster but response rate is not as good as traditional mail
			Mail	76.5%	
Komsky (1991)	E-mail survey to examine e-mail usage and factors that affect it	All nonstudent active users of e-mail at a university	E-mail sent to user population	41%	Frequent users are more favorable toward the system and tolerant of system problems

Table 1 (continued)
Summary of online survey research

Authors (Date)	Methodological Objectives	Sample	Distribution Method	Response rate	Conclusions
Mehta and Sivadas (1995)	Compare mail and e-mail data collection methods	Random sample of names collected from newsgroups	E-mail (3 groups) Mail (2 groups)	40%-65% 45%, 80%	E-mail can be an effective but limited survey research method
Oppermann (1995)	Evaluate e-mail survey method	Directory of members of an academic association	E-mail sent to list	48.8%	E-mail surveys are fast and effective. Main limitation is number of users.
Parker (1992)	Compare mail and e-mail data collection methods	Employees at a large international corporation	E-mail Mail	68% 38%	E-mail is effective survey method.
Patrick, Black and Whalen (1995)	Characteristics and attitudes of members of a FreeNet system	Survey made available to all members. Sample is self-selected	Either Web-site survey or by e-mail	8.9%	E-mail is effective survey method.
Schonland and Williams (1996)	Evaluate the Internet as a medium for survey research	Solicited response from self-selected members of relevant newsgroups	Web-site survey	17,700 survey responses over 12 months	Web survey format is viable but there are concerns about response bias
Schuldt and Totten (1994)	Compare mail and e-mail data collection methods	Sample selected from directories of academic associations	E-mail Mail	19.3% 56.5%	Low response rate indicates that researchers should test e-mail method before using it
Smith (1997)	Compare email and web-site survey methods	Randomly divided sample taken from directory of Web consultants	E-mail survey (2 groups) E-mail solicitation to Web-site survey	8%, 13.3% 2%	Numerous technical problems interfered with data collection. Lack of standardization is a major problem
Swoboda, Muhlberger, Weitkunat and Schneeweis (1997)	Use of newsgroups in e-mail surveys	Program scanned newsgroups and collected 8,859 e-mail addresses	E-mail survey sent to entire sample	20.8%	Concerns about low response rate and selection bias
Tse et al (1995)	Compare mail and e-mail data collection methods	Sample selected from telephone directory and randomly assigned to mail and e-mail conditions	E-mail Mail	6% 12%	Subjects found mail surveys more convenient. Concerned about lack of anonymity with e-mail
White (1996)	Evaluate Web-site survey methodology	Solicited response through links placed at various Web sites	Web-site survey	60% of visitors at site completed a portion of study	Lack of control over sample selection is a significant problem with this methodology