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*RESEARCH PAPER SERIES*

## Best Practices in Disk-By-Mail Surveys

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# **BEST PRACTICES IN DISK-BY-MAIL SURVEYS**

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## **INTRODUCTION**

The proliferation of personal computers and the development of personal computer-based survey software in the 1980's have created the opportunity to conduct disk-by-mail surveys (henceforth referred to as DBM).

This paper is organized into ten sections, beginning with a brief review of the history and background of DBM surveying. It then discusses when it is appropriate to use DBM, and describes factors that affect response rate. The next few sections provide respondents' evaluations of the disk-based survey task, outline its limitations, provide a brief examination of non-response, and conclude with cost and timing comparisons for DBM surveys and other data collection methodologies. The document then describes a case example from Apple Computer, including a discussion regarding the uses of the information. The paper then summarizes the best practices for DBM surveys, and ends with a look at the future of DBM surveying.

This paper focuses primarily on conducting DBM studies in a business-to-business environment. In specific cases, such as a customer satisfaction or new product follow-up for personal computer products, DBM can also be used successfully in the home market. However, because the penetration of personal computers in the home market is estimated to be only 32% (Source: Electronic Industries Association, 1992) and many of the home computer systems are not IBM-compatible, IntelliQuest does not suggest using DBM for the general home market at this time.

## **BACKGROUND OF DISK-BY-MAIL SURVEYS**

A few companies and research agencies have been using DBM as a data collection methodology for years. Computer hardware, software, and telecommunications companies use disk-based surveys for product registration as well as custom research. Some of the types of research for which disk-by-mail is commonly used include:

- Product registration
- New product follow-up
- Customer satisfaction
- New product design
- Concept testing
- Pricing
- Product positioning
- Brand image/positioning
- Market segmentation

While for each of these types of research other methodologies may be used, DBM offers some advantage by collecting information in a manner that is superior to other data collection methodologies (see discussion next section).

IntelliQuest has used disk-by-mail surveys (DOS-based) since 1986, surveying 50,000+ respondents nationally and internationally. Apple Computer and IntelliQuest jointly developed MacSurvey software in 1990, designed specifically for DBM applications for the Macintosh computer.

## **WHEN TO USE DISK-BY-MAIL SURVEYS**

DBM surveys offer unique opportunities for collecting data. They are not, however, a panacea for data collection. As with other mail surveys, DBM surveys can offer lower cost, respondent convenience, anonymity of the respondent, ability to administer lengthy surveys, and elimination of interviewer bias (Alreck and Settle, 1985; Joselyn, 1977; Kress, 1988; Lehman, 1979; Peterson, 1982; Rossi, Wright, and Anderson, 1983). Additionally, DBM may perform better on issues usually considered disadvantages of paper surveys, such as low response rates and slow turnaround times. This section of the paper describes when DBM is an appropriate data collection methodology.

1. **Research Sample.** One of the decisions that must be made prior to choosing DBM as a data collection methodology is the selection of the research population. The research population affects the choice of DBM in two ways:

- Access of respondents to personal computers to complete the survey
- Appropriateness of a disk-based survey for the target audience

As businesses and consumers continue to adopt technology, the availability of a personal computer is becoming less of a hindrance to DBM surveys. Still, it is likely that less than 100% of the target audience has access to a PC to complete the survey. In each study, this incidence rate needs to be addressed.

Internationally, DBM surveys offer a methodology to collect more consistent information across many countries without the systematic differences which are introduced when using other data collection methodologies. As with all mail surveys, regulations and customs vary from country to country. DBM surveys may not be accepted in all countries (Sawtooth Software, 1991).

Many populations, such as data processing professionals or purchasing agents in Fortune 500 companies, have ready access to PCs. Other populations may not use a PC on a regular basis, but have access if they need it. Still some groups have no immediate access to a PC, and to the extent that these respondents are systematically different than other respondents, a bias is introduced into the sample. While respondents may be pre-screened for access to a PC, the potential respondents without access need to be analyzed carefully. Later in this paper, the issue of non-response for DBM surveys is addressed.

Further, not all office employees who have access to PCs are comfortable using them. While one advantage of DBM surveys is the familiar environment they provide for many respondents, this may introduce another type of bias when using DBM in populations with respondents who are intimidated by using computers.

2. **Questionnaire Design.** The next major issue which may dictate the use of a disk-based survey—if not necessarily a disk-by-mail survey—is the questionnaire design. DBM surveys provide a superior methodology for collecting many types of information, such as Adaptive Conjoint Analysis (ACA System by Sawtooth Software), while making others, such as unaided awareness, more difficult.

At the questionnaire design stage, certain study objectives may make a DBM survey an attractive alternative, such as an adaptive conjoint design or a concept test where it is vital that respondents not look ahead at the survey.

Other objectives, such as unaided awareness, may be easier to capture on a DBM survey than on a traditional paper-by-mail survey, since the respondent cannot look ahead at an aided list. However, such responses will require additional coding, which is not necessary when collecting unaided awareness data over the phone, since interviewers are likely to have lists of possible answers.

Similarly, DBM surveys offer an opportunity for collecting open-end information where the respondents can elaborate and record their thoughts without the concern of what "the interviewer" might think, and without interviewer transcription errors. While many respondents may provide better information in this environment, others may provide unclear or less detailed information than is desired when there is no interviewer present to probe and clarify the responses.

**3. Data Collection Methodology.** After the sample and questionnaire topics have been developed, a decision must be made regarding the data collection methodology. This decision must weigh the issues discussed above, and evaluate the benefits of each methodology within the available project budget.

While DBM surveys are often used where other data collection methodologies would suffice, there are many instances when it is a superior methodology:

- Programmed automatic skip patterns give respondents only relevant questions
- Survey can incorporate adaptive modules, such as ACA, which are most easily self-administered (discussion next page)
- Open-end questions capture lengthy verbatim answers without interviewer bias
- Respondents perceive the survey to take less time to complete than it actually does
- Randomization reduces order bias within lists and across questions
- Less respondent fatigue than for a phone survey
- Respondents cannot look ahead, as they can in a paper survey that is too long or too complex

For concept-testing, or studies that require display of visual information or control of the respondent task, DBM surveys:

- Prevent respondents from looking ahead to concept or follow-up questions
- Use survey software designed to allow incorporation of graphical images
- Allow for a greater range of measurement (allows the researcher to use scales not possible to administer via telephone)

For the implementation of complex survey designs, DBM offers or supports:

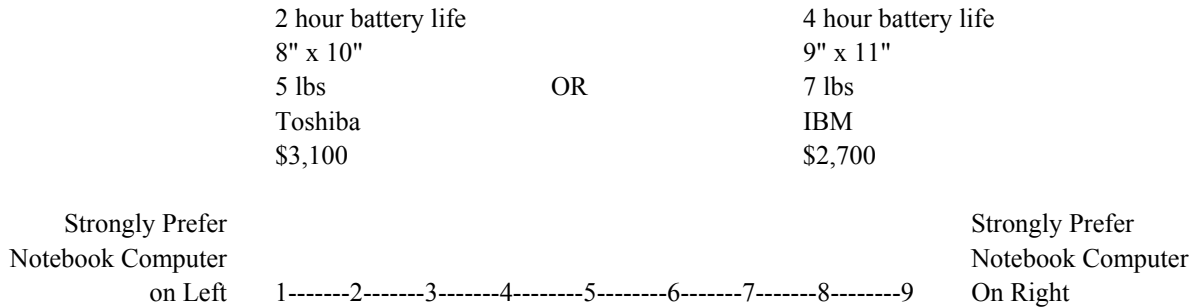
- Conjoint or other multivariate or adaptive techniques
- Ability to show lengthy explanations on complex lists of responses

For example, using ACA, it is possible to collect powerful data for use in product design, pricing, market segmentation, and other applications of market structure data. The questions provided by ACA, like the example below, are more easily asked in a DBM self-administered survey rather than over the phone.

**Figure 1**

**WHICH NOTEBOOK COMPUTER WOULD YOU PREFER?**

Type a number from the scale below to indicate your preference.



For populations that enjoy using technology, DBM surveys:

- Can improve response rates
- Create a very comfortable environment in which to work

For populations that are difficult to reach by phone and who have access to personal computers, DBM surveys:

- Allow respondents to complete the surveys at their convenience
- Produce response rates which tend to be higher than for paper-and-pencil surveys

For longitudinal studies, DBM surveys:

- Eliminate interviewer bias because survey administration is consistent across waves
- Permit complexly programmed surveys to be used repeatedly

Thus, the applications for DBM surveys are very broad, and are becoming more easily applied as the general business population adopts the use of personal computers.

**FACTORS AFFECTING RESPONSE RATE**

As with any mail survey, there are many factors in a DBM survey which affect response rate (Peterson, 1989). For DBM surveys, even more than for other types of data collection methodologies, non-respondents are potentially systematically different from respondents in at least one aspect: their access to personal computers. Although respondents may be screened for access to PCs, this may introduce a source of non-response bias.

It is critical to consider this and other sources of non-response in a study, and create a well-balanced approach, including such aspects as:

### **The Survey**

There are several aspects of the survey itself which affect response rate for any mailed survey. Here are several considerations along with an explanation of how each uniquely affects a DBM survey.

1. **Saliency of survey topic to respondent.** The more interesting and relevant the topic of the survey is to the target audience, the higher the resulting response rate. If the topic is somehow more relevant to some potential respondents in the research sample than others, the non-response rate may differ by the type of respondent, introducing a bias into the study.

2. **Length of survey.** There are two components to survey length which elicit behavioral responses from the potential respondents. The first is the expected length of time to complete the survey, if reported to the respondent in the cover letter. This eliminates certain respondents who are unwilling to commit that time to the interview. The second component is *perceived time* elapsed while taking the survey. While some respondents may begin an interview, they may terminate if they perceive the survey is too long.

An interview is "too long" if it takes longer than expected to complete. It may also be "too long" if it bores the respondents, or if respondents have a difficult time answering the questions (Bahner, 1987).

It is important to note that on disk-based surveys, respondents' perception of elapsed time is less than the actual time lapsed. In a study conducted by IntelliQuest (in 1989), respondents estimated that the questionnaire took less time to complete than it actually did. On average, respondents stated that it took nineteen minutes to complete the survey, when the average time registered by the clock on the survey disk registered thirty-three minutes. Published research supports this finding (Higgins, Dimnik, and Greenwood, 1987).

In another study recently conducted by IntelliQuest (in 1992), the time reported to the respondent was varied. One-third of the respondents (randomly selected) were told the survey would take approximately 15 minutes, one third were told 20 minutes, and the last third were not given an expected time to complete the study. Figure 2 shows the response rate for each group. (A reported time estimate of 15 minutes produced a significantly higher response rate than either the 20 minute reported time estimate or no time estimate. A chi-squared goodness of fit analysis (using Yates correction) shows a significant difference,  $\alpha = .10$ ).

**Figure 2**

<u>Stated time to complete survey</u>	<u>Response Rate</u>
15 Minutes	44% returned survey
20 minutes	36% returned survey
None	38% returned survey

3. **Limited time demands.** The shorter the survey, typically the higher the response rate. This is a critical component to gaining an appropriate response from the over-surveyed populations and the respondents who place a high value on their time (discussed below).

4. **Respect for respondents' time; high professional ethics.** While there is evidence that respondents will respond to longer surveys using a DBM methodology, it is the responsibility of the researcher to always respect respondents' time.

## **The Sample**

5. **Composition of research sample.** Certain populations, such as purchase decision influencers and senior executives, are frequently asked to participate in surveys, and others place a very high value on their time. Both of these groups typically demonstrate lower than average response rates in research studies.

6. **Access to personal computers.** The majority of DBM surveys are conducted on IBM-compatible personal computers. Whether a Macintosh survey software diskette is offered as an additional option depends largely on the target audience and the objectives of the research. In either case, respondents must be known to have—or must be screened for—access to a personal computer. IntelliQuest estimates that approximately half of the Fortune 1000 business sites have Macintosh computers installed, and nearly 100% have IBM-compatible computers installed. Penetration of computers varies with company size and industry.

Depending on the subject matter being measured, respondents without access may or may not be systematically different than respondents with personal computers. It is recommended that respondents without access to PCs be asked to respond to primary demographic and firmographic questions, as well as attitudinal questions about the subject being measured to analyze the potential for bias in the non-respondent sample.

It is also important to provide both 3.5" and 5.25" diskettes to let respondents take the survey using a disk which is compatible with their system. While it is possible to pre-screen the respondents for the preferred disk size, IntelliQuest has not found that the most effective procedure. Sorting disks and respondents adds administrative time to the project, and even though the respondents have been asked which size they prefer, a portion will not know the correct size, or will indicate an incorrect size.

7. **Convenience of taking the survey.** A DBM survey provides the convenience of completing the survey at a time of the respondents' choosing. This convenience provides an advantage of DBM surveys over telephone or other data collection methodologies, and produces a higher response rate overall. Additionally, providing all materials necessary for the respondent to complete and return the survey, such as the postage-paid return disk mailer, will increase response rate.

## **The Presentation of the Survey**

8. **Sponsorship of survey disclosed.** One of the key factors impacting response rate is whether or not the sponsor of the research is disclosed. While it is clearly not appropriate in most studies, disclosure is recommended, when possible. This will have the benefit of increasing the response rate. Further, the sponsorship is most effective when the survey sponsor is respected by the target audience, such as in product follow-up surveys.

Disclosing the sponsor may also benefit the sponsoring company. In one IntelliQuest customer satisfaction study (in 1989), 35% of respondents stated that their attitudes toward the sponsor improved as a result of receiving the survey from the sponsor (Zandan and Frost, 1989).

9. **Guarantee of anonymity or confidentiality.** Mailed surveys in general offer respondents some degree of anonymity; the lack of anonymity is often a source of non-response in other data collection methodologies. This anonymity helps both on an item non-response and a unit non-response level.

10. **Priority or First Class mail.** Respondents react in some way to a package as soon as it arrives. The packaging and professional appearance of the package and its contents will be the respondents' first impression. At this point,

the goal is to have the respondents complete the survey immediately, or at least to have them keep the survey. Even if the survey is not thrown away at this stage, the respondent still may not choose to respond at a later time.

In one IntelliQuest study (in 1988), a split sample was used to test the effect of First Class vs. bulk rate postage on response rate. The response rate from the sample using First Class postage was 32%, while the response rate for the bulk rate sample was 27% (Pilon and Craig, 1988). Note that the response rates overall were low for this study, resulting from the nature of the sample and the length of the survey.

In debriefing with IntelliQuest respondents from another study (in 1992), it was found that faster mailing methods (for example, Federal Express or USPS Priority Mail) connote that the survey is of great importance to *the sponsor of the research*, and the respondents are therefore more likely to respond, and respond soon after receiving the survey.

**11. Personalized cover letters and envelopes.** This is a specific illustration of the packaging discussion above. The more professional the packaging and presentation from the research sponsor, the higher response from the sample. While personalized cover letters increase response rate, even small typographical errors in the cover letter may have an adverse effect on response rate.

One difficulty with using personalized cover letters is the availability of an appellation for the names in the research sample. It is difficult for the respondents to believe they are part of a select group when they are incorrectly addressed by assuming a "Mr." or "Ms." based on name instead of personal observation or self-reported data. A recommendation is that the respondent be addressed as "Dear Pat Jones" instead of "Dear Mr. Jones" or "Dear Ms. Jones" if no appellation is available.

**12. Incentive.** Incentives are one of the most interesting and most debated response rate enhancers in survey research. Most sources report that incentives of any kind increase response rate.

To examine the effect of offering an incentive, IntelliQuest performed an experiment (in 1989) where potential respondents were randomly assigned to one of two groups. One of these groups was offered a coffee mug as an incentive for responding. The other was not offered an incentive. The promised incentive increased the response rate from 45% to 54% (Zandan and Frost).

Selection of incentives may also impact response. Incentives should be appealing and motivating to the target respondents. Incentives may include job-related incentives such as an executive summary of the research results, or a chance to win office equipment, or a personal incentive such as a chance to win cash, a trip, or other such prizes. IntelliQuest has found that a choice of prizes is effective, particularly when the choices consist of targeted prizes. For instance, early adopters of technology respond to high-end technology gadgetry.

It should be noted that incentives are not appropriate in all instances. Interviewing respondents in the public sector may require alternative strategies to increase response rate. In targeting incentives, be cautious not to offend the intended respondents. In a debriefing of Fortune 500 senior executives, IntelliQuest found that some respondents felt the use of a \$1 bill was insulting to them, considering the value of their time; conversely many thought \$1 communicated that the survey was important to the survey sponsor.

Also, the law which applies to survey incentives is related to the one which governs lotteries and contests such as the *Publisher's Clearing House* drawing. In many cases, incentives must be offered to all potential respondents, not just to those who complete the survey. The practice of allowing nonrespondents to write their names and addresses on a

postcard and mail it in generally meets the legal requirements. IntelliQuest typically has less than one percent of respondents pursue this option.

**13. Printed supplementary materials such as a glossary of terms.** In addition to providing information within the text of the disk-based survey, it is often helpful to provide respondents with supplementary materials. These materials may be anything from simple definitions of terms (an example is provided in the Appendix), to elaborate illustrations of product concepts. These materials should be professionally presented and easy to interpret.

## **Logistics**

**14. Timing of the survey (time of year mailed).** In an analysis of response rates from IntelliQuest DBM studies over the last six years, for the U.S., December is the worst time of year to mail, since many people take vacations or are too busy with other activities to respond. The second worst time, at least in a business-to-business environment, is summer, when again a large percentage of the population takes vacations. Here IntelliQuest has found that even when the desired individuals can be reached, they are often busy covering for co-workers who are on vacation, and hence do not have time to participate in a research study.

When conducting DBM research in other countries, as with any international study, consider each country's holiday schedule and incorporate it into the timeline of the data collection phase of the project.

**15. Pre-notification/pre-screening.** In many studies it is necessary to contact respondents in advance of the mailed survey to:

- Identify the individual who should receive the survey
- Pre-qualify individuals for the study
- Identify to which market segment, or quota group a respondent belongs
- Screen for access to a personal computer
- Verify address

Even in instances where it is not necessary to conduct a pre-screening call for the reasons stated above, IntelliQuest has found that it increases response rate to pre-notify respondents, either by mail or phone, prior to the receipt of the DBM survey. Pre-notification legitimizes the survey and communicates its importance to the survey sponsor.

Additionally, pre-qualifying respondents by telephone ensures that all respondents receiving the survey are eligible to participate. If non-qualified respondents receive survey disks and do not respond, they are likely to be counted in the non-response. It is not non-response bias if an *unqualified* respondent does not respond (Pilon and Craig, 1988).

It is important for respondents to receive the survey package soon after the pre-notification. For a telephone pre-notification, IntelliQuest has found it most effective for respondents to receive the package within two to three days. With written pre-notification (letter or postcard), IntelliQuest has found it most effective for the package to be received approximately five to seven days after the notification.

**16. Second mailing or follow-up postcard or phone call.** As with pre-notification, a reminder call or postcard increases response rate. This follow-up may be used to thank respondents if they have already responded, and gain share of mind among those who have not yet responded. In one IntelliQuest DBM study, the use of reminder phone calls almost doubled the response rate with a difficult-to-survey population.

## TYPICAL RESPONSE RATES ON DBM STUDIES

Response rates on IntelliQuest DBM studies have ranged from 35% for an over-surveyed group conducted during the summer, to 70% when a high profile client was disclosed as the sponsor. With follow-up phone calls, a response rate of over 40% was achieved for the first group (in a 1991 study). With this potential 2X difference in response rate, it is important to heed all factors affecting response rate.

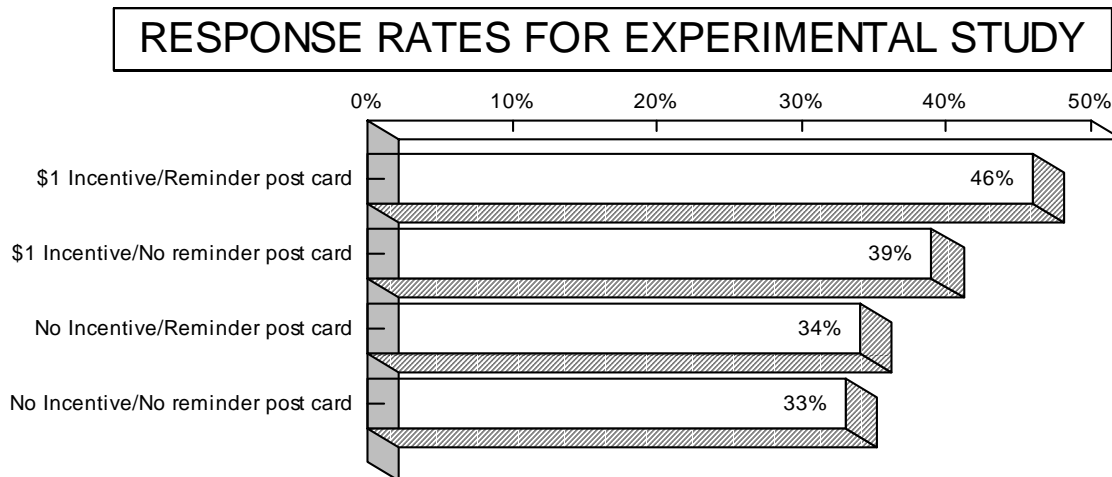
IntelliQuest typically aims for a minimum of a 40% to 50% response rate on DBM studies. Despite reports of other methods such as phone and traditional paper-by-mail having declining response rates, IntelliQuest has not experienced a decline in response rates overall on DBM surveys over the past seven years.

IntelliQuest has determined that the most influential factor to impact response rates is the disclosure of a highly respected corporate sponsor. The next most important aspect is the sample itself. Very senior executives, decision makers, and employees with select functions, for instance, will produce lower response rates. Additionally, the reported survey length affects the response rate dramatically.

To study the effects of incentives and reminder postcards on response rate, IntelliQuest conducted a study in 1987 where four groups were selected to receive a combination of a \$1 incentive/no incentive and a reminder postcard sent five days later/no reminder postcard.

As shown in the following graph, the group that received both the \$1 incentive and the reminder postcard had a 46% response rate. The group that received neither had a 33% response rate. The group that received \$1 incentive and no reminder had a 39% response rate, and the group that did not receive an incentive, but did receive a reminder postcard had a 34% response rate. For this study, it seems that a \$1 incentive worked well by itself and better in conjunction with the reminder card. The reminder card, when used alone, increased response rate only slightly (Pilon and Craig).

Figure 3



Other factors in the process, including incentive, pre-notification, reminder phone calls or postcards, a second mailing, packaging, and time of year mailed, each work to increase or decrease the response rate slightly. IntelliQuest recommends using a combination of these to accomplish the highest response rate within the project budget.

Achieving a high response rate is beneficial in two ways:

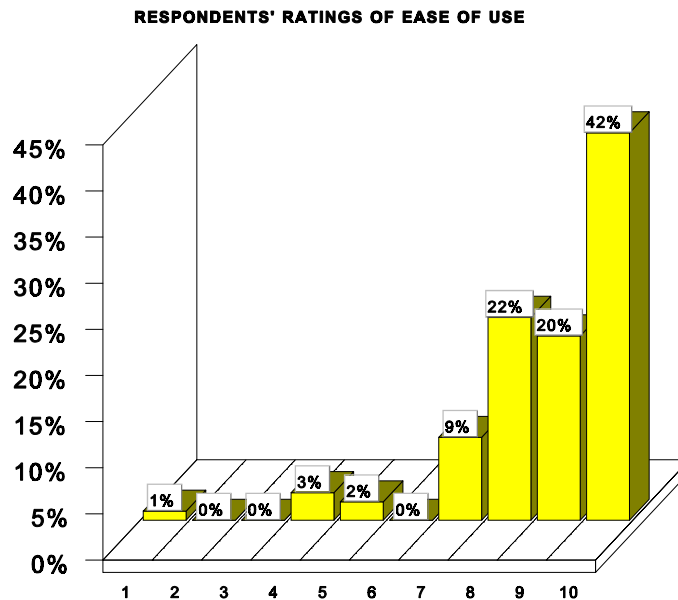
- increases representativeness of survey results
- decreases cost per completed interview

IntelliQuest has found that incentives typically pay for themselves because the increased response rate requires fewer survey packages to be mailed to achieve the same number of completed interviews.

### REACTIONS TO DISK-BASED SURVEYS

Reactions to disk based surveys are generally favorable as compared to paper-by-mail and telephone methodologies (Morrison, 1988; Zandan and Frost). In a 45-minute self-administered IntelliQuest disk-based survey in 1989 of computer users, 84% rated the survey an 8, 9, or 10 on a scale of 1 to 10 with 1 meaning "very difficult to use" and 10 meaning "very easy to use."

Figure 4



Additionally, respondents indicated that the disk-based surveys were interesting, and that they were more likely to respond to a disk-based survey than to a paper survey. The novelty of disk-based surveys is one factor which produces higher response rates in DBM as compared to paper-by-mail and telephone surveys.

## NON-RESPONSE FOLLOW-UP

Response rate drives much of the cost of a DBM data collection methodology. In addition to providing an economically attractive methodology to clients, the primary reason for examining response rate is to examine the extent of potential non-response bias.

**What is non-response bias?** Non-response bias occurs if those respondents who do not respond are systematically different from those who do respond, and if the differences affect what is being measured by the study.

**Reasons for non-response bias.** To examine the non-response biases for DBM surveys in 1989, IntelliQuest conducted a telephone non-response follow-up study which measured key demographic and firmographic variables, attitudinal information about the product being studied, and reasons for non-response (Zandan and Frost). The reasons given for not responding included:

- No time to complete survey
- Do not participate in surveys
- Suspect sales pitch instead of research
- Concerned about computer virus

The most sizeable of these was "do not participate in surveys," at 37%. Approximately 10% were concerned about a computer virus. Some respondents who fear computer viruses call IntelliQuest offices to confirm the validity of the survey, then proceed to complete and return the survey. In more recent non-response studies, IntelliQuest has found a small number of companies who forbid employees from using diskettes from outside the organization in the company's computer systems. To date, these companies have not been found to be systematically different from other companies in the populations studied.

The responses during a follow-up telephone interview with the DBM non-respondents were compared to those of the survey respondents, and no differences were found to exist between responders and non-responders with regard to:

- Overall satisfaction with manufacturer
- Job title
- Gender
- Income
- Education
- Age
- Company size (sales and number of employees)
- Computer expertise

Further comparisons of respondents and non-respondents did reveal two differences:

- Non-respondents were more likely to state they thought the sponsoring company was trying to "sell something" through the survey
- Respondents were more likely to express the belief that the survey would have a positive effect on the sponsoring company's customer relations

In the absence of non-response follow-up, a standard practice is to compare early returns versus late returns. Those who return surveys later tend to be more like non-responders than those who return early. If no significant differences are found between early responders and late responders, non-response bias is less likely to be a problem.

Later, this paper discusses best practices for DBM studies. These guidelines incorporate practices to minimize non-response bias.

### **DISK-BY-MAIL SURVEY LIMITATIONS**

Although DBM surveys offer many benefits, the researcher should approach DBM studies with three cautions in mind.

1. **Abuse of medium.** DBM is subject to the same misuses other data collection methodologies have experienced, as well as some misuses unique to the medium. In particular, some potential misuses include:

- Over-burdening the respondent with a questionnaire that is too long
- Excessive branching so that too few respondents get particular questions and data are meaningless

2. **Added complexity.** Changes in questionnaire content and flow after a questionnaire has been programmed cost time and money, and introduce possibilities for error.

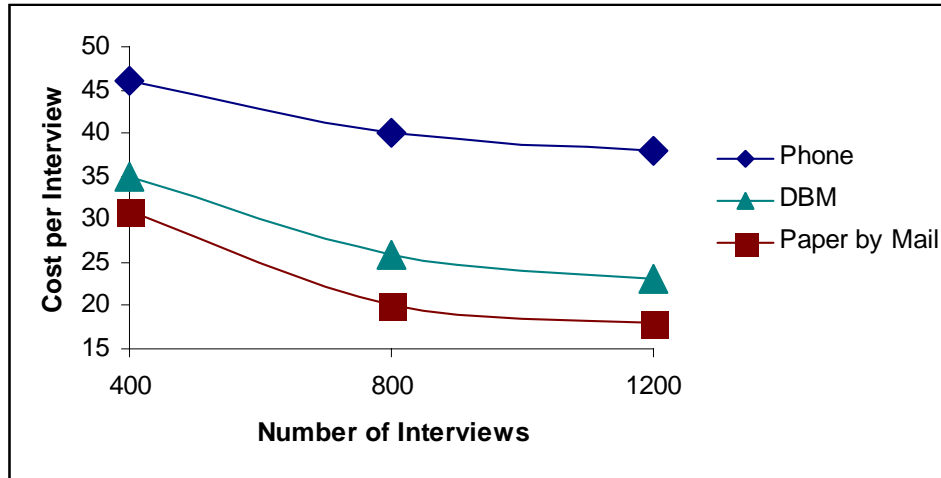
3. **Respect for the respondent.** Respondents value their time, and the researcher must provide the respondents with surveys that are professional in presentation, and, as with all surveys, ask important, relevant questions so that respondents do not feel that completing the survey is a waste of their time.

### **COST AND TIMING COMPARISONS**

DBM surveys are most efficient for collecting complex data and for administering lengthy surveys. For comparison, Figure 5 shows a per-interview cost comparison for a lengthy survey which could be administered by phone, paper-by-mail, or DBM (centralized interviewing and personal interviews are excluded from this comparison for purposes of simplification). Data collection estimates are for a survey that would take 20 minutes by phone. Estimates are based on the following assumptions:

- For phone interviews, 1 completed interview per interviewer hour, including programming the disk-based survey
- For disk-by-mail interviews, a 40% response rate, \$1 incentive, providing both 3.5" and 5.25" disks, including programming the disk-based survey in color
- For paper surveys, a 25% response rate, \$1 incentive, 6-page (3 page duplex) survey, including data entry of coded data, but not verbatim responses
- All estimates are for a business-to-business survey

Figure 5



These costs include data collection costs only. If the lengthy survey also collects complex information, the alternative methodologies are further limited to telephone or DBM. It should be noted that when a pre-screen interview is required, DBM will likely be more expensive than telephone interviewing. Also, a DBM survey needs to be programmed in color to increase respondent interest. DBM should not be used *simply to save money on data collection*.

In published research available comparing DBM and paper surveys, Higgins et al found a significant difference in response rates between the two methodologies, holding other factors affecting response rate constant. In this study, 78% returned the disk-based survey, and 63% returned the paper survey.

Additionally, while split sample comparisons are not available, IntelliQuest has generally experienced a quicker response time on DBM surveys as compared to paper surveys. Higgins et al also examined response speed. In their study, the average response time for a paper-by-mail survey was 8.85 days. Their average response time for DBM was a significantly lower 6.68 days.

#### MAXIMIZING RESPONSE RATE IN APPLE COMPUTER'S RECENT MAC BUYERS STUDY

As an example of an application of DBM surveying, Apple Computer is in the midst of completing the third wave of a disk-by-mail survey of recent Macintosh buyers. Since by definition every member of the population of recent Macintosh buyers has a Macintosh, this provides an ideal application for DBM.

The software being used, discussed earlier, is called MacSurvey. While it does not have adaptive conjoint or perceptual mapping capabilities, it is very easy for the respondent to use, taking full advantage of Macintosh's mouse and graphical features. Its capabilities include constant sum, sorting, and analog rating scale measurements that are virtually impossible to use in phone surveys, and are often difficult in self-administered paper-and-pencil surveys. The software can also include sounds and graphics in the questionnaire, though Apple really has not taken full advantage of this yet.

In the recent buyer study, Apple is clearly—some might say aggressively—identified as the sponsor of the survey. Since the survey questions reveal the sponsorship from the beginning, there is no point in trying to conceal Apple as the sponsor, so it is played to the hilt.

The source for the sample is Apple's database of returned customer registration cards. A separate research project recently showed that Apple's registration card returns have very little non-response bias along the dimensions that matter in this study.

Respondents first received a postcard from IntelliQuest announcing the survey and asking them to participate. The postcard came from IntelliQuest, but Apple's logo was prominently displayed. Several days later, a cover letter arrived, signed by Steve Bernstein, a market research manager at Apple, on Apple letterhead, thanking the respondents for their recent purchase and asking them to complete and return the survey on the enclosed diskette. Included was an IntelliQuest 800 number respondents could call if they had any problems. Finally, IntelliQuest sent a follow-up postcard if the diskette was not returned within about two weeks.

A pilot test showed that the questionnaire required between 20 and 30 minutes to complete.

In wave I, an experiment was conducted to see if an offer to participate in a drawing would increase response rate. Half the respondents were told that if they returned the completed questionnaire, their names would be entered in a drawing for a Style Writer (ink jet) printer. The other half received no offer. The offer had no influence on response rate.

The response rate in wave I, after six weeks in the field, was 70%. In wave II, data collection was cut off after three weeks, with a 57% response rate. Needless to say, Apple was very happy with the response.

As a safety check, a follow-up phone survey with non-respondents was conducted to see if they differed from the respondents in any meaningful way. They did not. Further, with such a high response rate, it is unlikely that non-respondents' answers would have moved sample means.

## **VERBATIMS FROM OPEN-ENDED QUESTIONS**

Another benefit of DBM surveys mentioned previously is the potential quality of verbatim answers to open-ended questions. Apple believes DBM is the ideal medium for gathering this kind of data from their customers for three reasons:

- No interviewer bias
- Interviewer abbreviation or paraphrasing
- More efficient for both the respondent and the researcher than pencil-and-paper

The first two points are self-evident. Disk-by-mail verbatims are more efficient because no transcription is necessary and no errors can be introduced during data entry. Of course, this is true for all data gathered disk-by-mail. Apple also believes that entering an answer on a computer may be easier for many respondents because they can edit their work.

In the last wave, respondents were asked several open-ended questions, two of which were, "Why did you buy this Macintosh," and (at the end of the survey) "What else would you like Apple to know?" In response to these two questions alone, 1,100 respondents typed in over 70,000 words.

This volume of information would be virtually impossible (at reasonable cost) to deal with if gathered through a paper-and-pencil survey. Given the unstructured nature of the questions, it is probably inappropriate to code the answers anyway, since people often addressed multiple topics in one answer.

## **USES OF THE INFORMATION**

Apple takes two approaches to disseminating information from this rich, yet potentially overwhelming source of open-end and survey data:

1. **File-server access.** Open-end data files can be accessed by everyone at Apple. Interested employees, from entry-level marketers and engineers to the CEO, John Scully, can access the files. They can read as much or as little as they like, but it is recommended that they use a key-word search available with any word processing package. At the beginning of each file, a conventional researcher's caveat about the appropriate use of qualitative information has been inserted.

2. **Research summaries.** The research staff takes a little time each week to explore the data and develop brief summaries explaining patterns or hypotheses that are developed. It provides an opportunity to show off the abilities of the research staff to speculate about forces at play among Apple's customers. The summaries are distributed through Apple's internal electronic mail (E-mail) system.

Though the open-end data are qualitative, they share some features of quantitative data. Since the sample is random and the measurement device is uniform for all respondents, it is reasonable to make certain projections to the population of recent Macintosh buyers. For example, counting the number of occurrences of the word "compatibility" gives an indication of the salience of this issue compared to other like issues. However, when there are unanticipated synonyms for a particular topic, one has to be careful about making such projections.

## **BEST PRACTICES FOR DISK-BY-MAIL SURVEYS**

In designing and executing DBM surveys, each phase should be approached in a conscious, professional manner to minimize biases and maximize response rate. Some of these approaches include:

1. **Research sample.** Prior to finalizing DBM as the data collection methodology, it is necessary to analyze the sample for the study, ensuring that no biases are being introduced by using a disk-based survey methodology. Additionally, the following points should be considered as discussed earlier:

- Determine whether a pre-screen interview is necessary to identify the correct respondent, the respondent's market segment or quota group, and access to a PC
- Determine type of computer available (Macintosh vs. IBM-compatible)
- Pre-notify of approaching survey to increase response rate

2. **Questionnaire design.** As discussed earlier, the decision to use DBM as a data collection methodology may be driven by objectives of the research which translate to long or complex surveys. Once the decision has been made to utilize DBM, a proven approach is to:

- Develop the questionnaire on paper, as usual, to provide an easy form of communication between the client and researcher, and to create the questionnaire text which can be imported for use in the computer-aided interviewing package
- Finalize question types, question order, respondent instructions, and skip patterns before programming on disk
- Where possible, pre-test the survey on paper prior to programming, and then again on disk once it has been programmed

3. **Survey disk.** To lessen the likelihood of respondents terminating during the course of the interview, and to enable them to provide accurate, actionable answers, the following guidelines are suggested for DBM surveys:

- The layout of questions should be consistent, professional, and non-distracting from the content of the questions
- Use appealing, easy-to-use software to collect the data, such as Sawtooth Software's Ci3 System
- Include adequate instructions in the cover letter, on the diskette sleeve, or the diskette label for the respondent to start and stop the survey, if possible, and to provide accurate responses for doing so
- When appropriate, graphics on the diskette label, such as a sponsor logo, will enhance response rate
- Pre-test the survey on disk prior to fielding to ensure that all instructions are clear, questions are interpretable, and the intent of questions is clear to the respondent

4. **Disk duplication and serialization.** The best-laid plans can fail in implementation. A critical component of DBM surveys is the duplication of the survey instrument and the serialization of the disks with unique respondent numbers. To avoid potential problems during this phase, the following procedures are recommended for Ci2 (Ci2 System, by Sawtooth Software), and Ci3 surveys:

- After duplication and serialization, randomly select 5% to 7% of the survey disks and confirm:
  - The correct files are present, by checking the disk directory
  - The “numstart” file has the correct respondent number and is accurately set to deliver one or multiple survey modules
  - No detectable viruses are present on the disk

It is recommended that procedures be set up and that regular personnel be trained on quality disk duplication and serialization. When outsourcing this component of the research study, as with other phases, it is best to establish a relationship with a regular supplier whose processes can be incorporated into the planning of the project and whose quality control can be assured.

5. **Survey package.** As discussed previously, the appearance of the survey package impacts the response rate. The packaging also provides critical instructions to the respondents, communicates the incentive being offered, and protects the lawful use of the survey software. To most effectively address these issues, the following approaches are recommended:

- Create a better-looking package to get a better response
- Include instructions for operating the disk-based survey in the cover letter, on the diskette sleeve, and on the diskette label
- Communicate the benefit(s) to the respondent for participating in the study
- Decide what, if any, an appropriate incentive should be, and present it accordingly
- Include Sawtooth Software (or other appropriate) copyright on diskette label
- Use a fast method or First Class mail (stamping "First Class" on the envelope), using stamps when possible, to help draw attention to the packaging

Mail-out packages should consist of:

- Personalized cover letter on letterhead signed by the president of research firm or sponsor communicating the benefit(s) to the respondent for participating in the study
- Incentive/description of incentive
- Printed supplementary materials such as a glossary of terms (see the Appendix for an example) or concept illustrations
- Survey disks (both 3.5" and 5.25" for IBM-compatible machines)
- Postage-paid return disk mailer

6. **Fielding.** Thus far, this paper has discussed the preparation for, and execution of, the mail-out. Additionally, some overall guidelines need to be kept in mind when designing a DBM survey:

- Provide an 800 number for respondents to call toll free with questions about the diskette-based survey, since technical support is an issue unique to DBM surveys
- While responses to IntelliQuest surveys indicate that the majority of responses are returned in the first three weeks, allow adequate time in the field (5 weeks or more unless sent by a fast method such as Federal Express or USPS Priority Mail), since the return rate does not decline significantly until approximately the sixth week

7. **International.** There are many issues which are unique to international studies, in addition to those previously presented in this document:

- Questionnaires should be translated to the language of the target country, and then reverse translated by a different party to confirm that it has been correctly translated
- Questionnaires should be reviewed by someone familiar with the customs and peculiarities of the country, as well as with the product category (Sawtooth Software, 1991)
- Legal requirements should be verified regarding obtaining mailing lists, collecting certain types of information (for example, demographics), and transmitting data to companies outside the country
- Use of a local client office or international mailing house such as TNT Express Worldwide will facilitate distribution and collection of surveys in other countries, as well as assist with local customs
- When possible, provide respondents with a local number to call if they encounter problems with the survey disk
- Incentives should be appropriate and legal for each country
- Expect projects to run longer than planned

DBM surveys, as some other data collection methodologies, are impractical for some countries, but where they can be utilized they can be a benefit by providing consistent data collection in all regions.

### **MULTIMEDIA AND THE FUTURE OF DISK-BY-MAIL SURVEYS**

Survey software and DBM survey techniques are improving every year. At the 1987 Sawtooth conference, Sawtooth set up a demonstration of a product called Interactive Video. It used a PC, a TV monitor, and a VCR to gather reaction to video stimuli. By selecting items on the PC's menu screen, the respondent could view any of a series of brief video segments in any order—a very powerful tool for measuring response to stimuli.

Unfortunately, this solution was too cumbersome and perhaps too expensive for most research applications. Sawtooth discontinued the product. Current multimedia (MM) systems can perform the same function with much less hardware and for less cost.

At present, awareness of multimedia computing is very low, and comprehension of what it is, what it is for, and what its benefits are much lower.

In a nutshell, MM is a way to convey concepts using sound and full-motion (digitized) video alone, or as part of a presentation, or as part of a document. That is really all there is to it. Much like the original personal computers, it will be some time before people figure out how they can benefit from it.

MM will be, without doubt, a powerful tool for disk-based research.

MM technology is available now on Macintosh and some IBM-compatibles. On a Macintosh, all that is needed is modification to current disk-based survey applications. The modification is minor, and a standard Mac hardware configuration (CPU/monitor/hard disk drive) will run multimedia "movies." To convert available video from analog videotape to bits & bytes on a hard drive, you'll need to buy a \$450 add-in card (for Macintosh). You don't need the card to play movies, only to convert them.

The application of MM to disk-based research is limited only by one's imagination. Here are examples of possible applications:

#### Advertising Research

Design monadic ad tests by randomly inserting alternative executions among a collection of competitive and non-competitive ads. The order of all ads in the "clutter reel" can be fixed or randomized for every respondent. Do this for any medium, TV, print, radio, billboard, or direct mail.

#### New Product Research

In many industries, the high cost of developing alternative prototypes prohibits testing in the market. Mock-ups can be developed for smaller scale testing, but they are often too flimsy to allow much hands-on testing by respondents. On the other hand, measuring new product ideas with concept statements or story boards is too unreliable.

A reasonable compromise could be a movie of a prototype in use by an end-user, or an animation of the product concept when even a prototype is too expensive to develop. This would be a powerful application for consumer durable industries.

#### Packaging and Merchandising Research

Test alternative packaging, on-shelf location, or point-of-sale materials by showing a picture of a store shelf and instructing people to point and click the product(s) they're interested in.

Even better, create a "virtual" store by videotaping a walk through the aisles and splicing in different shelf configurations and so forth for random exposure to respondents. As the respondent watches the movie, she can "stop walking" at anytime and scrutinize a product on a shelf, turn around and go back, turn left or right, or whatever. In short, she can simulate the entire shopping experience. This is because the digitized frames in a multimedia movie can be accessed "randomly" as opposed to serially, as they are on videotape.

#### Conclusion

Disk-based research application developers can exploit the multimedia technology available today. Compared with technology available five years ago, the solutions are easy-to-use, inexpensive, and not difficult to set up. Moreover, MM solutions run on standard, non-specialized equipment that can be used for all the other personal computing solutions a research firm needs.

If we market researchers can grasp this technology, we can reap a qualitative improvement in the power of disk-based research, an already powerful medium.

## **SYNOPSIS**

Disk-based surveys are an additional tool which offer unique advantages in certain situations. However, they will not replace telephone or paper-by-mail methodologies for all studies. When conditions are right for using them, DBM surveys can be cost-effective and accurate.

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