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Online versus postal data collection methods: An examination of issues and a comparison of results

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Abstract
New communications technologies often allow new ways of conducting market research. Determining the advantages of a new data collection method over established alternatives is difficult without thorough comparative testing. Computer-mediated marketing research is one such example of a new technology that has been enthusiastically embraced by marketing organisations and those servicing them. While researchers using the Internet (Net) and World Wide Web (Web) in its early years reported benefits such as high response levels, there is little in the way of comparative evidence to support any claimed advantages. This paper reports on the outcomes of three separate studies in which members (subscribers) of various organisations have been surveyed using both postal and online (e-mail invitation and HTML Web form) data collection methods. The conclusion here is that it would be unwise to assume that one method can be directly substituted for another and obtain the same response. Differences in both the response pattern and demographic profile of respondents between the groups are consistently noticed, such as to warrant further examination of the methods used in online marketing research, and to suggest the need for further study.

Introduction
Use of the Internet (Net) as a medium, and the World Wide Web (Web) as an evolving technology has increased productivity (Hanson, 2000) and allowed marketers to get information – both of low quality and high quality – much more quickly. Couper (2000, p. 468) notes "there is a wide array of approaches representing varying levels of quality and cost". Commentaries concerning the quality and cost of online marketing research have been made by many researchers such as Couper (2000), Dommeyer and Moriarty (2000), Weible and Wallace (1998), and Comely (1996). These authors, and others, discuss a number of issues arising from use of marketing research in general, and in online marketing research in particular, including declining response levels and the resulting representativeness of those responding. However, the results are conflicting and the issues warrant further examination. As increasing numbers of market research organisations either embrace on-line data collection, or consider it seriously (Davis 1999), data that clarified the issues involved in choosing between online, postal or a combination of both, becomes important.

Claimed advantages for on-line data collection

Traditional marketing research is suffering from falling participation rates (e.g., telephone survey hang-ups, poor mail return rates), rising costs (particularly in the case of personal interviews), respondent fears concerning misuse of personal information, and the time taken to conduct postal surveys (Forrest, 1999). In contrast, a number of claimed advantages are put forward for using online data collection methods in survey research.

Most of these advantages may be said to fall into the category of gaining efficiency
(Weible and Wallace, 1998). However, privacy concerns and fear of the misuse of respondent information is exacerbated in the online environment (Cho and LaRose, 1999), and has also contributed to falling confidence in online marketing and research (Australian Privacy Commissioner, 2001).

In particular, the claimed advantages of online data collection may be summarised as follows, although some aspects represent a two-edged sword for researchers:

- **Lower costs** – the costs of online surveys may be lower, depending on how software development costs are treated (Weible and Wallace, 1998; Zadeh, Adam and Deans, 2000). The need for printing, envelope filling, two-way postage and data entry is removed in the case of online surveys, making them less costly.

- **Faster turnaround** – Online surveys offer faster turnaround times (Adam and Deans, 2000), particularly in the case of email alone (Comely, 1996; Cho and LaRose, 1999; Dommeyer and Moriarty, 2000; Schaefer and Dillman, 1998).

- **Higher response levels** – Higher response levels are often claimed for online marketing research involving either e-mail or HTML forms or a combination of the two, over postal surveys (Bachmann, Elfrink and Vazzana, 1996; Bachmann, Elfrink and Vazzana, 2000; Jackson and DeCormier, 1999). A detailed examination of the literature shows that, although difficult to state with statistical certainty, over time there has been a decline in response levels for both postal and online surveys.

- **Lower respondent error** – lower respondent error as determined by such measures as the completeness of response and quality of the response to open text box questions has been claimed (Weible and Wallace 1998).

- **Broader stimuli potential through the inclusion of colour, graphics and sound** – although HTML form based questionnaires can easily become too complex for respondents simply because the technology permits intricate rank and rate matrices to be presented (Zadeh, Adam and Deans, 2000).

- **Flexibility in the form of adaptive questioning** – although this may at times mean that respondents are led into the unknown (and withdrawal from the questionnaire) simply because the technology is capable of such hyperspacial leaps when the respondent's mind is not.

- **and even greater enjoyment** (Forrest, 1999; Hoffman and Novak, 1997; Kehoe and Pitkow, 1996) – Enjoyment of the Web is usually discussed in terms of flow – an engrossing mental state that has been connected with computer-mediated environments and where the user's skills are met or challenged (Rettie, 2001). An issue for marketing researchers employing online data collection methods is whether poorly designed HTML form questionnaires interrupt this mental state, and if this results in item skipping and low completion levels.

The issue of flow cannot be taken lightly, for studies show that between 40 and 87 per cent of computer users enter such a state, and searching for information on the Web rates highly in this regard (Chen et al. 2000). Although untested, we suggest that this pleasant experience may have extended to completing survey questionnaires on the Web soon after its advent, but that this no longer applies.

In many cases, the evidence concerning the claims made for the Web is contradictory, or it is inconclusive due to the nature of the studies undertaken. In this paper we look at three recently undertaken studies to test the claimed advantages of on-line data collection over postal data collection in a more complete manner.
Three comparative studies

Where antecedent studies have examined the claimed advantages of online surveys, a number of issues have arisen that may have affected the validity of these studies (Couper, 2000). Such issues include the use of small samples, low response levels, non-probability sampling and other matters such as the use of reminders and in some cases the application of incentives that do not allow for ease of direct comparisons. The three comparative studies we now describe use a common methodological framework between the two data-collection methods with regard to such elements as sampling, reminders and incentives, in order to measure similarities and differences in outcomes, such as response levels and response quality.

Comparing responses across two different populations

In this study, two similar organisations (two AFL Football Clubs) surveyed their membership bases with very similar questionnaires (91/106 questions were identical). Both Clubs had similar size membership bases (Club A – 23,500; Club B – 23,000). Club A delivered the questionnaire via the post, with all members receiving a printed questionnaire and a reply paid envelope. Club B administered the survey through a dedicated website and members were invited to participate through emails, club newsletters and links through the main AFL website. Both clubs gave members two weeks to complete their questionnaires, and a similar prize was offered as an incentive for timely completion.

Club A received 1669 (7.1%) responses in the two weeks to the postal census. Club B received 1291 (5.6%) in the same time period to the on-line survey. A comparison of some key demographics variables is shown in Table One.

<table>
<thead>
<tr>
<th></th>
<th>Club A</th>
<th>Missing Data</th>
<th>Club B</th>
<th>Missing Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>7.06 (45-47 years)</td>
<td>3.8% (30-34 years)</td>
<td>4.91</td>
<td>4.8%</td>
</tr>
<tr>
<td>Family Status</td>
<td>6.66 (older family, teenagers at home)</td>
<td>4.5% (young couple, no kids)</td>
<td>3.97</td>
<td>5.7%</td>
</tr>
<tr>
<td>Income</td>
<td>5.52 ($40,000-44,999)</td>
<td>16.9% ($40,000-44,999)</td>
<td>5.97</td>
<td>23.8%</td>
</tr>
</tbody>
</table>

A number of statistically significant differences are evident from Table One, in that the postal return respondents are older, have reached a later stage in the family lifecycle, are more likely to be retired, and receive a lower income. The question that arises at this point is whether differences are an artefact of the survey administration technique or are true reflections of the populations involved. Comparison with the population of each group suggests that the on-line survey respondents reflected the population of Club B better than the postal survey respondents reflected the population of Club A. In particular, the postal respondents (Club A) were older and of lower income than the population mean.

Also of interest is the consistently (and significantly) higher incidence of refusal / missing data on demographic questions in on-line data collection. This was the case across all eight personal questions asked. In the third study we soon report, the same survey was administered in two different ways to sub-groups of the total population of members, in order to remove the possibility that differences between the populations of the two clubs (A and B) were a moderator of response levels.
Same population, same survey, different methods of delivery

The third study we report employed a 70-item, seven page (postal version) questionnaire entitled "Club Name (withheld) Member Satisfaction Survey". The questionnaire, again, dealt with the satisfaction of members of a professional Australian Rules Football (AFL) club, which we hereafter refer to as Club C to maintain the club's anonymity. In the main, scale items were used, with an 11-point (0 – 10) "poor" to "excellent" scale.

In the year of the study (2001), Club C claimed over 21,000 paid up members. All members were invited to participate in the survey by way of communication from the club's website. The Club C also maintains an 'opt-in' e-mail list for those members who wish to interact with the club via this medium. The club sent an e-mail to the 3,900 members on this list inviting them to complete an online questionnaire (HTML form), and advising them of secure Web access details. The online responses were automatically recorded in a flat file database.

An additional 1,026 members who were not on the email list were randomly selected and sent a questionnaire through the post to their home address together with a reply-paid return envelope. An attempt was made to have the online questionnaire appear as close as possible to the printed version, except for the arguably preferred use of radio buttons (Couper, Traugott and Lamais, 2001) and in an arguably preferred 'scrollable' HTML form (Dillman 2000) that disclosed all questions to respondents.

The combined responses were then assessed for their representativeness. Both online and postal survey responses were compared with the overall profile of the full list of Club C members. No statistically significant differences were found between those who returned the survey and the full membership list, suggesting the sampling process was not biased toward a particular demographic or membership type.

Findings

Response Level, Speed, and Efficiency

The response levels are reported in Table 2 for each of the three club studies. The postal data collection method resulted in a response level more than twice that of the online data collection for the Club C study. This finding is in line with Dommeyer and Moriarty's (1999) argument that online data collection methods do not result in higher response levels. The postal survey response level is the same as that achieved by Bachmann et al. (2000). Moreover, the online response level is similar to the levels achieved by Adam and Deans (2000) (17 per cent) and by Bachmann et al. (2000) (19 per cent).

<table>
<thead>
<tr>
<th></th>
<th>Club A</th>
<th>Club B</th>
<th>Club C</th>
<th>Club C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sent/invited to participate</td>
<td>23,500</td>
<td>23,000</td>
<td>3,900</td>
<td>1,026</td>
</tr>
<tr>
<td>Undelivered</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invalid address</td>
<td></td>
<td>*</td>
<td>700 (18%)</td>
<td>6 (&lt;0.5%)</td>
</tr>
<tr>
<td>Completed</td>
<td>1,669</td>
<td>1,291</td>
<td>826</td>
<td>471</td>
</tr>
<tr>
<td>Response level</td>
<td>7%</td>
<td>6%</td>
<td>21%</td>
<td>40%</td>
</tr>
<tr>
<td>Total cost per usable response</td>
<td>*</td>
<td>*</td>
<td>$1.16</td>
<td>$4.84</td>
</tr>
<tr>
<td>Response speed: Cum. day seven</td>
<td>*</td>
<td>55%</td>
<td>87%</td>
<td>9%</td>
</tr>
<tr>
<td>Response speed: Cum. day 10</td>
<td>*</td>
<td>69%</td>
<td>91%</td>
<td>53%</td>
</tr>
</tbody>
</table>

* Not available.
The findings from the Club C study support a number of earlier studies in that 75 per cent of the online questionnaires were completed within four days following the e-mail invitation to participate, and 40 per cent were received within the first 24 hours. When discussing response speed it is usual (although perhaps unfair) to present average response times in the case of postal surveys, and to include weekends and other days when post is not delivered. This artificially exaggerates the time taken to respond. The data presented here does not include non-postal delivery days to give a more accurate representation of the relative response speed. On this basis we find that postal data collection is slower, taking an average of 10.8 days compared to 3.9 days in the case of online data collection (t=58.9, p=0.00).

As shown in Table 2, the total costs of the online survey are lower than those involved in administering the postal survey, thereby supporting the claim that on-line data collection is lower in cost.

**Data Quality**

A comparison was made of the combined item-missing and 'don’t know' responses in the postal survey and the number of 'don’t know' responses in the case of the online survey. Numerically, there was more item-missing data in the postal surveys in four out of the five demographic questions. However, the level of item-missing data is significantly different in only two of the five cases, viz., occupation, and life cycle stage. In direct contrast to the studies involving Clubs A and B, the Club C results suggest that there is a higher incidence of item-missing data on personal demographic questions in the case of the postal survey. This finding supports Basi (2000), who suggested that those who complete online questionnaires complete more questions than those completing postal questionnaires. We reiterate that this may be a consequence of the notion of flow in such computer-mediated activities.

**Comparability of Resulting Data and Respondents**

Analysis of responses to the Club C survey shows that for the non-demographic questions, the two groups (online and postal) are statistically different on 26 of the 65 questions (40 per cent of cases). Even when the online survey was matched against a more demographically equivalent group of postal surveys (n = 182), the groups still differed on 22 of the 65 questions (34 per cent). We therefore conclude that the two groups of respondents do not respond to the questions in the same way using the two data collection methods employed here.

The two groups of respondents also differ in their demographic profile. Income, Age, Years as a Member, Occupation and Lifestyle Category were all significantly different between the two groups of respondents (p<0.01). There are also marked differences within the demographic measures. The online respondents were clearly younger with only the under-nineteen age group statistically the same for both collection methods. The online respondents were more likely to be professionals, and report higher incomes. In terms of income, all categories were significantly different at the p=0.05 level. We, therefore, conclude that the two data collection methods clearly engaged respondents with different demographic profiles.

**Conclusion and Future Research**

In the reported studies we see clear evidence of advantages of using on-line versus postal data collection methods in survey research. However, we also see differences between the profiles of the respondents and the answers they gave.
There is a need for further research into measurement error where online data collection methods are employed, and particularly where HTML forms are used. The clear message for managers and practitioners from this research is that online surveys should not be expected to produce equivalent results to the more established methods of data collection, such as the postal survey examined herein. There is no doubt that it is less costly to use online data collection methods, and that research companies suggesting the use of this method to their clients are portraying an image of modernity. However, we suggest that in many cases inappropriate use of the Web in data collection may be a case of style over substance, and that this may give rise to negative perceptions of the marketing research industry by enlightened clients.

References


Hanson, W., 2000. Principles of Internet Marketing, Cincinnati: South-Western College Publishing.


