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SME Survey Methodology: Response Rates, Data Quality, and Cost Effectiveness

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Cost effective data collection is an important methodological issue for small and medium enterprise (SME) researchers. There is a generally held view that mail surveys are the most efficient means of collecting empirical data, despite the potential difficulties associated with low response rates. To enhance the usefulness of mail surveys, researchers have suggested a variety of strategies aimed at improving response rates. While previous studies have examined the effect on response rates of many of these strategies, their impact on data quality and on the cost effectiveness of data collection is less well understood. This study evaluates four response-inducing strategies (printing the survey instrument on colored paper, telephone pre-notification, payment of a monetary incentive, and a follow-up mailing) in terms of their effect on data quality, response rates, and cost effectiveness for a population of SMEs.

Introduction

Small and medium enterprise (SME) researchers are frequently confronted by the need to collect substantial quantities of empirical data, often from a reluctant population. Despite potential difficulties with non-response bias, mail surveys are commonly used for such purposes. For example, an examination of *Entrepreneurship Theory and Practice*, the *International Small Business Journal*, the *Journal of Business Venturing*, and the *Journal of Small Business Management* from 1991 through 2000 revealed that one in three published articles were based on a mail survey.

A myriad of strategies have been suggested to stimulate questionnaire returns and increase external validity. While the impact on response rates for these various strategies has been reasonably well researched and documented in broader consumer and industrial populations (Yammarino, Skinner, & Childers, 1991), their influence on data quality and the cost effectiveness of data collection has seldom been examined (Fox, Robinson, & Boardley, 1998). This is particularly true for the narrower SME population where there have been relatively few studies that have tested the impact of response-inducing

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strategies on response rates, let alone on data quality and cost effectiveness. This lack of research within the SME setting is quite surprising given Turley's (1999) view that these effects may be population specific, and that the rationale for studying SMEs is that they are expected to be different (Welsh & White, 1981).

This article makes an important contribution to the SME literature, and possibly the broader consumer and industrial literature, by evaluating the impact of a variety of suggested mail survey response-inducing strategies on response rates, the quality of questionnaires returned, and the cost effectiveness of the process. We hope our findings will help guide future SME researchers intending to use mail surveys.

The next section provides a brief overview of the literature concerning response-inducing strategies. This is followed by a discussion of the methodology employed in this article. Next we present and discuss our results. We conclude with a summary of our findings and some suggestions for future SME researchers intending to use a mail survey.

Literature Review

Given the paucity of research on the effect of response-inducing strategies for SME surveys, this review relies primarily on studies of the broader consumer and industrial populations. We have classified the strategies into four types: *attention-seeking*, *questionnaire completion*, *questionnaire return*, and *incentives*.

Attention-seeking

Various attention-seeking strategies have been designed to help the survey instrument pass through the recipient's "attention filter" (Diamantopoulos, Schlegelmilch, & Webb, 1991). Of these, telephone pre-notification has been found to consistently increase response rates (Schlegelmilch & Diamantopoulos, 1991); but there have been mixed results for pre-notification by letter (Albaum & Strandkov, 1989; Duhan & Wilson, 1990) and by postcard (Murphy, Dalenberg, & Daley, 1990; Murphy, Daley, & Dalenberg, 1991). Similarly, personalization strategies have also generated mixed findings (Kanso, 2000; Martin et al., 1989). None of these strategies appear to have resulted in any statistically significant differences in data quality (as measured by item omissions, see Duhan & Wilson, 1990; Jobber, Allen, & Oakland, 1985; Murphy et al., 1991; Wunder & Wynn, 1988).

Postcard pre-notification appears to be more cost effective than either telephone pre-notification (McLaren & Shelley, 2000) or a no pre-notification control (Murphy et al., 1991). Using a letter to pre-notify has, generally, been more costly than no pre-notification (Albaum & Strandkov, 1989), but has been cost effective compared to a commitment card (Duhan & Wilson, 1990). The use of telephone pre-notification has not been found to be cost effective compared to a no pre-notification control (Mitchell & Nugent, 1991).

Questionnaire Completion

There have also been strategies formulated to promote questionnaire completion. In general, university sponsorship has been found to increase response rates without affecting item omissions, whether compared to a "no sponsorship" group (Greer & Lohtia, 1994); a commercial operator (Schneider & Johnson, 1995); or a research oriented firm (Faria & Dickinson, 1992). Assurances of anonymity have generally proved successful

in terms of response rates (Kanso, 2000; Tyagi, 1989), but do not seem to have increased data quality (Albaum, 1987). Mail surveys with colored print on colored paper have been found to increase response rates (LaGarce & Kuhn, 1995), but this has not extended to the use of colored paper alone (Buttle & Thomas, 1997). Using double-sided rather than single-sided, or short rather than long questionnaires (Jobber, 1989), appears to have had limited impact on response rates. Producing the survey instrument in a booklet format does not appear to affect the number of questionnaire items left unanswered (Jobber, Birro, & Sanderson, 1988).

Questionnaire Return

Follow-up techniques designed to encourage the return of completed questionnaires have usually proved successful. The combination of mail and telephone reminders in Dillman's (1978) Total Design Method (TDM) appears pre-eminent (Paxson, 1992). However, many surveys have employed a modified "reduced reminder" form of the TDM, consistent with Westhead and Cowling's (1998) finding that the statistical significance of any follow-up comes from the first reminder only. The effectiveness of single follow-ups in significantly increasing response rates is also supported outside of the TDM, whether it be via a letter with questionnaire (Jobber & Sanderson, 1983), a letter only (Martin et al., 1989), or a postcard (Kanso, 2000). Although prior research suggests that Dillman's (1978) TDM is cost effective (Paxson, 1992), we found no studies that addressed data quality.

Incentives

Prepaid monetary incentives, both nominal (Angur & Natarajan, 1995) and substantial (James & Bolstein, 1992), appear to increase response rates. By way of contrast, the promise (rather than pre-payment) of a monetary incentive to participants has generally not been effective, even when the offered amount is substantial (James & Bolstein, 1992). However, when the promised payment is to others (a charity, for example), small value incentives seem to be helpful (Faria & Dickinson, 1992). The chance to win a substantial monetary prize appears to have a mixed impact on response rates (Angur & Natarajan, 1995; Paolillo & Lorenzi, 1984).

Where there was a promised monetary incentive of \$10, Goetz, Tyler and Cook (1984) reported a significant reduction in item omissions and a significant increase in the length of text answers. James and Bolstein (1990) found that small pre-paid incentives significantly increased the length of text answers, but did not affect item omissions. Pre-paid monetary incentives have proved cost effective in some studies (James & Bolstein, 1992), but this has not generally been the case (Brennan, 1992). The cost ineffectiveness of monetary incentives has been especially prevalent where the incentive was promised rather than pre-paid (Dommeyer, 1988).

In terms of non-monetary incentives, gifts of low value appear to have increased response rates (Hansen, Tinney, & Rudelius, 1983). However, the offer (or promise) of results does not appear to increase response rates (McCline, Bhat, & Baj, 2000; Morris & Jones, 1999). The chance to win a substantial non-monetary prize (London & Dommeyer, 1990), or the promise of survey results (Dommeyer, 1985), does not appear to have affected item omissions. We are not aware of any study that has assessed the cost effectiveness of non-monetary incentives.

In summary, our review of the literature reveals that while a number of studies have examined response-inducing strategies for mail surveys, none has simultaneously

assessed the impact of these strategies on response rates, data quality, and cost effectiveness. This study tests the effectiveness of one response-inducing strategy selected from each of the four areas discussed above: telephone pre-notification (*attention*); printing the survey instrument on colored paper (*completion*); a follow-up mailing (*return*); and payment of a monetary incentive (*incentive*). Despite its apparent lack of success, we tested the use of colored paper because it is being advocated for SME studies (Kotey & Meredith, 1997) and has not been assessed in the SME setting. As noted in the next section, we also adopted a number of other response inducements because of consistent support for their inclusion in the prior literature. These were not varied in our experimental design primarily due to resource constraints.

Survey Methodology

The sample for this study was randomly drawn from businesses listed in the Perth, Western Australia, telephone directory, and excluded any government-based enterprises or publicly owned firms. The survey took place in late 2000 and early 2001.

Pre-notification was conducted by telephone to obtain the name of the principal owner-operator for the business (allowing personalization of the covering letter); confirm the business's mailing address; and make the principal owner-operator aware of the study. It was hoped that personalized addressing would avoid any "gatekeepers" (London & Dommeyer, 1990) and get the message through the owner-operator's "attention filter" (Diamantopoulos et al., 1991). The promised monetary incentive was set at \$25 (Australian) in recognition of the amount of effort required to complete the questionnaire (Diamantopoulos et al., 1991). Those offered the monetary incentive could choose to remain anonymous by nominating a third party (for example, a charity) to receive the payment.

The survey instrument was entitled "*Attitudes and Expectations of the Self-employed*," and highlighted the two supporting universities' crests on the questionnaire. Comprising 240 items in eight sections, the questionnaire followed Dillman (1978) by being printed in a booklet format without questions on the front or back cover. Questionnaires were printed on white, green, and blue paper for firms where a monetary incentive was offered, and white, sand, green, yellow, blue, and pink paper for the larger group of firms who were not offered a monetary incentive. An expected completion time of 30 minutes was prominently noted on the front of the questionnaire and in the covering letter. The deadline for the survey return was also given in both the covering letter and the questionnaire. The survey methodology used a modified form of the TDM with only one reminder letter (including questionnaire).

Results

In this section we present the results of testing the impact on data quality, response rates, and cost effectiveness of using telephone pre-notification (*attention*); colored paper (*completion*); a follow-up mail (*return*); and a monetary incentive (*incentive*). As no statistically significant differences were found for any of the strategies for any of the questionnaire items, we conclude that the experimental conditions did not introduce any bias.

Printing on colored paper was not effective in increasing response rates. Only one comparison of response rates between white and colored paper had a Chi-square proba-

bility of less than 0.05. No further analyses were conducted on this strategy since this was not statistically significant after the Bonferroni (1936) correction for repeated measures.

This study analyzed data quality in two ways: firstly, by adopting the commonly used item omission check and, secondly, by an overall instrument assessment. For the overall instrument assessment, we classified all returned questionnaires into three groups, each of which could be defined as “usable” depending on the information needs of the researcher. The first group, which we labeled *adequate*, included all questionnaires that were at least 90% complete. To be included in the group labeled *quality*, a questionnaire had to have valid answers to those items considered critical for our overall research objective. The final group was labeled *complete* and only included questionnaires without omissions.

To compare item omissions across our four treatment groups (monetary incentive only, pre-notification only, both treatments, and no treatment) we used the broadest definition of usable questionnaire (*adequate*). Table 1 reveals that the both treatments group had significantly reduced item omissions compared to either the pre-notification only group or the no treatment group, but not compared to the strategy of only offering a monetary incentive. We also found that offering a monetary incentive only was statistically superior to either a pre-notification only or no treatment, but that pre-notification only was not statistically superior to no treatment.

The table also shows the impact our strategies had on response rates across the three categories of usable questionnaire discussed above, namely, *adequate*, *quality*, and *complete*. It can be seen that response rates for the both treatments group (for the first mailing only and for both mailings combined) were significantly higher than for the no treatment group for all three categories of usable questionnaire. However, the both treatments group did not have a significantly higher response rate when compared to the monetary incentive only group for *adequate*, *quality*, or *complete* questionnaires. In comparison to the pre-notified only group, the both treatments group exhibited a significantly higher response rate in only one situation: *adequate* questionnaires after a second mailing.

Tests of our follow-up mailing strategy gave results in line with prior research, namely, that the second mailing of a questionnaire can significantly increase response rates. Table 1 reveals that our follow-up mailing generated statistically significant increases in response rates for both *adequate* and *quality* questionnaires across all experimental treatments. However, for *complete* questionnaires, the second mailing failed to have a significant impact except for the monetary incentive only group.

Table 1 also shows the cost per usable questionnaire for the first mailing and for both the first and second mailings combined. These costs have been calculated both with and without labor (because for many research studies labor is a sunk cost and, therefore, could be excluded when conducting a cost/benefit analysis).

For a single mailing where labor costs are relevant, our results suggest that the choice of the most appropriate response inducing strategy will depend on the quality requirements for the returned questionnaires. The no treatment condition had the lowest cost (\$35.88) per *adequate* questionnaire. For *quality* questionnaires there was little separating the monetary incentive only group (\$60.25), the pre-notification only group (\$59.76), and the no treatment group (\$59.79). For *complete* questionnaires the monetary incentive only group (\$82.74) was marginally more cost effective than the pre-notified only group (\$85.35).

The use of a follow-up mailing caused the average costs to change which, in turn, altered our results. After a second mailing and including labor costs, pre-notification only became the most cost effective strategy for all three measures of “usable” ques-

Table 1

Summary of Findings

Condition		Both treatments	Monetary incentive only	Pre-notified only	No treatment
<i>Date quality . . .</i>					
Item omissions		1.912 ^{ab}	1.610 ^{ab}	3.667	3.378
Response rates (sample n)		(465)	(545)	(716)	(808)
Adequate questionnaires	1 st mailing only	18.3% ^d	13.8% ^d	14.3% ^d	8.1%
	Both mailings	27.1% ^{c,d,e}	22.4% ^{c,d}	20.1% ^{c,d}	12.4% ^c
Quality questionnaires	1 st mailing only	12.9% ^d	9.9% ^d	9.5% ^d	4.8%
	Both mailings	19.4% ^{c,d}	17.4% ^{c,d}	14.8% ^{c,d}	7.8% ^c
Complete questionnaires	1 st mailing only	9.2% ^d	7.2% ^d	6.7% ^d	2.4%
	Both mailings	12.0% ^d	10.8% ^{c,d}	9.5% ^d	3.6%
Cost per questionnaire (WITH LABOR) ^f		AUD	AUD	AUD	AUD
Adequate questionnaires	1 st mailing only	\$55.95	\$43.03	\$39.78	\$35.88
	Both mailings	\$52.71	\$46.17	\$38.43	\$44.25
Quality questionnaires	1 st mailing only	\$79.27	\$59.76	\$60.25	\$59.79
	Both mailings	\$73.80	\$59.29	\$52.21	\$70.24
Complete questionnaires	1 st mailing only	\$110.60	\$82.74	\$85.35	\$122.74
	Both mailings	\$118.61	\$95.47	\$81.38	\$152.59
Cost per questionnaire (WITHOUT LABOR) ^f		AUD	AUD	AUD	AUD
Adequate questionnaires	1 st mailing only	\$33.29	\$37.00	\$13.50	\$26.18
	Both mailings	\$35.27	\$39.37	\$17.03	\$32.41
Quality questionnaires	1 st mailing only	\$47.17	\$51.39	\$20.46	\$43.64
	Both mailings	\$49.38	\$50.56	\$23.13	\$51.44
Complete questionnaires	1 st mailing only	\$65.81	\$71.15	\$28.98	\$89.58
	Both mailings	\$79.36	\$81.41	\$36.06	\$111.76

- a. Significantly lower than no treatment at $p < 0.05$ using the Chi-square test for two independent samples.
- b. Significantly lower than pre-notified only at $p < 0.05$ using the Chi-square test for two independent samples.
- c. Significantly higher than the 1st mailing response rate at $p < 0.05$ using the z-test for proportions.
- d. Significantly higher than the no treatment response rate at $p < 0.05$ using the Chi-square test for two independent samples.
- e. Significantly higher than the pre-notified only response rate at $p < 0.05$ using the Chi-square test for two independent samples.
- f. All values are expressed in Australian dollars. Over the period of the study one Australian dollar ranged from US\$.51 to US\$.56, and averaged US\$.53.

tionnaire: \$38.43, \$52.21, and \$81.38 for *adequate*, *quality*, and *complete* questionnaires, respectively.

Exclusion of labor costs from the calculation removed all doubt as to the most cost effective response-inducing strategy. Under this condition the pre-notification only strategy was clearly the most cost effective for the first mailing and for both mailings combined.

Conclusions

Our experimental results on the use of colored paper suggest that SME researchers can remove this from their list of potential response-inducing strategies. The promise of a \$25 payment resulted in significantly improved response rates for *adequate*, *quality*, and *complete* questionnaires, as well as reduced item omissions. The pre-notification

strategy increased response rates for our three definitions of usable questionnaire, although not to the same extent as the monetary incentive. This strategy had no significant impact on item omissions.

We also found that a follow-up mailing was effective in significantly increasing response rates for *adequate* and *quality* questionnaires under all four experimental conditions and for *complete* questionnaires in the monetary incentive only group. As expected, our results show that the combination of a second mailing, the offer of a monetary incentive, and the use of pre-notification generated the highest response rates for all three measures of usable questionnaire. However, our assessment of cost effectiveness does not support their use in combination where labor costs are included. After a second mailing the cost per questionnaire for the both treatments group was the highest for *adequate* and *quality* questionnaires and the second highest for *complete* questionnaires.

In terms of the most cost effective strategy, our results are not clear when labor costs are included. If researchers are concerned with the cost effectiveness of *adequate* questionnaires, a single mailing without pre-notification or monetary incentive appears best (\$35.88). Next best is pre-notification only with two mailings (\$38.43). If *quality* responses are needed, one strategy stands out: pre-notification only with two mailings (\$52.21). However, if researchers are interested in the cost effectiveness of obtaining *complete* questionnaires, either pre-notification only with two mailings (\$81.38) or a single mailing with a monetary incentive (\$82.74) appear the most appropriate strategies.

Our most striking finding, however, is the impact that labor costs can have on the efficacy of survey methodology. If labor costs are excluded, the most cost effective strategy is the use of pre-notification only with a single mailing. However, a follow-up mailing can also be used to increase response rates without substantially increasing the cost per returned questionnaire and has the added benefit of providing a clearly identifiable group of late respondents that can be used to test for non-response bias. It is also worth noting that where funding is available to offer a monetary incentive, the monetary incentive only strategy is the most cost effective when labor is included. However, the both treatments strategy is the most cost effective when labor is excluded.

Our study was limited to SMEs in a particular geographical location and, therefore, our findings may not apply to other populations or countries. This is an area future studies could usefully explore. Furthermore, our study was restricted to a \$25 monetary incentive and, therefore, varying the amount of the incentive might also be an issue worthy of further research to determine if there is some "optimal" level of monetary incentive. The only study we discovered that varied incentive payments was James and Bolstein (1992), who found that a US\$5 incentive generated a significantly higher response rate than a US\$1 incentive, but that response rates for greater amounts were not significantly different from the \$5 incentive.

Deciding which strategy is likely to be the best for any given SME study is not straight-forward and will depend on the researcher's individual circumstances. If the researcher has no resource constraints or if the population being sampled is small (therefore, requiring a high response rate), clearly a both treatments strategy (with two mailings) would be best. However, if there are constraints on the researcher's resources (time or funds), then a single mailing strategy based on either a monetary incentive only or pre-notification only, is likely to be the most appropriate (while a monetary incentive only is clearly superior in terms of response rates, pre-notification is decidedly more cost effective, particularly when labor is treated as having no cost). We believe that a no treatments strategy would rarely be appropriate for surveying SMEs, especially given the significantly lower response rates it achieved. Therefore, we conclude that deciding which

response-inducing strategies to use in any given study will involve a trade-off between financial resources, the length of time available to undertake the study, the need for representative (unbiased) data, and the size of the population being sampled.

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