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AUTHORS

Dmitri G. Markovitch

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Dmitri G. Markovitch (USA)

Comparing online and mail survey methods in a sample of chief marketing officers

Abstract

The promise of electronic surveys is frequently summarized in two benefits: fast response and low cost. However, extant research has focused almost exclusively on individuals. The current paper compares and contrasts the effectiveness and efficiency of Web-based and regular mail survey methods of data collection, targeting very "high-information-value" and difficult to reach business audiences, such as Chief Marketing Officers (CMOs). We find that online surveys perform as well as traditional surveys in terms of the response rate, response completeness, and non-response bias. Multiple contacts are the key to increasing the response rate. We discuss the implications of their findings and suggest directions for future research.

Keywords: survey research, data collection online, Internet, e-mail, business executives.

Introduction

The expansive reach of the Internet has created exciting new opportunities for marketing researchers. In fact, the Marketing Science Institute has made it their top research priority. In particular, research comparing marketing knowledge in online and offline environments is considered especially valuable.

Survey research is, perhaps, the most common method of primary data collection that stands to gain further ground with widespread Internet adoption. Its many applications include auto dealers collecting customer service feedback, McGraw-Hill soliciting input from educators on time-sensitive material, the Boston Consulting Group collecting data on Internet business practices, and academic researchers asking executives about their business operations. The availability of the Internet and its technological versatility has the potential to redefine standard practices in survey research. Besides possible cost and time savings over traditional approaches, modern Web-based survey technologies enable true interactivity and advanced audio and video stimulus presentation capabilities in a fully self-administered medium.

Sensing the great potential, research on the characteristics and modalities of electronic surveys has blossomed over the past decade. The bulk of this research, however, has focused on studying survey responses of individual consumers (e.g., Michaelidou and Dibb, 2006; Roster et al., 2007) and special populations, such as students (e.g., Kaplowitz et al., 2004; Knapp and Kirk, 2003), academics (e.g., Cobanoglu et al., 2001), and members of an association (e.g., Hayslett and Wildemuth, 2004; McDonald and Adam, 2003).

Most of these studies demonstrate two clear advantages of electronic surveys. First, they are faster. It typically takes 2 to 6 days for respondents to complete an online questionnaire, and 11 to 21 days to return mail questionnaires (e.g., Ilieva et al., 2002; Hayslett and Wildemuth, 2004). Second, online surveys have much lower costs (e.g., McDonald and Adam, 2003). The cost savings are further amplified when data entry costs and reduced data entry errors are considered.

In other areas, electronic surveys and paper surveys perform comparably. Potential non-response bias is no worse in online surveys (e.g., Hayslett and Wildemuth, 2004; Michaelidou and Dibb, 2006; Roster et al., 2007). Also, response rates to electronic surveys are positively affected by prenotification and repeated contacts, just as in paper surveys (e.g., Cook et al., 2000; Kaplowitz et al., 2004).

Unfortunately for researchers, online surveys seem to compare unfavorably with paper surveys with respect to response rates (e.g., see Manfreda et al., 2008 for an overview; Roster et al., 2007). However, in selective samples and populations, such as students at a single university (Kaplowitz et al., 2004; Wygant & Lindorf 1999), or hospitality professors (Cobanoglu et al., 2001), response can be similar or higher. Another area, where electronic surveys potentially perform worse, is in the use of incentives. In their meta-analysis of mostly e-mail surveys, Cook et al. (2000) found that incentives were associated with lower response rates. Yet, this result may be due to researchers offering incentives mostly with difficult surveys. Furthermore, some studies using a more recent Web-based technology find a positive association between the use of certain incentives and improved online survey response rates (e.g., Cobanoglu and Cobanoglu, 2003).

That said, it is noteworthy that there is substantial variability in findings across studies comparing online and offline survey methods. For every cluster of

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studies that shows either method as superior with respect to the response rate, biases, data quality, response completeness and cost, there is at least one published empirical study that finds the opposite. It stands to reason that some of the observed differences are sample- or population-specific. Case in point, Manfreda et al. (2008) report that only 4 out of 45 studies in their meta-analysis examined online and offline survey methods in the general population. The other 41 studies surveyed more idiosyncratic population groups. Therefore, generalizability of those results to other populations of interest remains to be established.

Although the aforementioned studies provide valuable insights, there remain important lacunae in our understanding of how well online surveys perform when applied to customary targets of business researchers. In particular, there is dearth of empirical research that addresses online survey response patterns among business executives. We are aware of only two unique published studies that compare the performance characteristics of online and offline surveys among mid-level and senior logistics managers (Griffis et al., 2003) and business customers of a large manufacturer (Deutskens et al., 2006). Both studies find that online surveys outperform mail surveys with respect to the response rate, speed and cost, and match them with respect to non-response bias, response completeness, and content. Neither study reports using pre-notifications or incentives. However, Cobanoglu and Cobanoglu (2003) report a positive effect of a token gift, and a negative effect of a raffle in their survey of a sample drawn from the American Management Association membership directory. Unfortunately,

they do not evaluate the incentive’s performance in a control sub – sample surveyed by traditional methods.

On balance, past research provides little guidance with respect to likely online survey performance in probability samples of top-level executives. Therefore, the general objective of this study is to compare the performance of Web-based surveys with traditional paper surveys in a large random sample of chief marketing officers (CMOs). Specifically, we seek to address the following four questions in this study:

- ◆ How do Web-based surveys perform in comparison with traditional paper surveys in a large sample of senior marketing executives? We evaluate performance on multiple measures: response rate, response patterns, response completeness, non-response bias, speed of response, and cost.
- ◆ How do e-mail prenotifications and e-mail reminders affect response rates?
- ◆ How does providing a Web site address with an option to complete the survey online affect the response rate of a traditional mail survey?
- ◆ How do follow-up mail questionnaires affect the response rates of subjects who were initially contacted with a request to complete a survey online?

1. Method

Our study was conducted as part of a broader study investigating marketing’s impact on firm performance (That research is fully described in Markovitch (2009)). We asked the CMO of each firm for specific data rather than perceptual measures. As a result, we expected lower response rates with both online and offline methods.

Table 1. Sample composition (number of firms)

	Product	Service
Industrial	Pumping equipment (103). Telephone equipment (71). Plastic bottles (38). Computer software (149).	Data processing (59). Management consulting (79). Heavy equipment rental (89).
Consumer	Household furniture (97). Ice cream & frozen desserts (61). Women’s dresses (70).	Amusement parks (57). Resort hotels (77). Security brokerage (75).

Note: These industries include firms that serve both industrial and consumer markets. We classify industries into industrial or consumer based on the orientation of the majority of firms in those industries.

1.1. Sample. Table 1 shows our sample composition. We used Dun & Bradstreet’s Million Dollar Directory as our sampling frame. We selected a random sample of 1,025 U.S.-based firms from 13 industries. We called each firm in our sample to confirm or identify

the CMO and that person’s mail address and email address, when available. The person providing this information was always a receptionist or secretary rather than the key informant. In 16% of the firms, the CMO was the firm’s president or owner.

Table 2. Survey design

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Sample size	621	87	85	77	79	76
Prenotification mode	Letter	Letter	Letter	E-mail	Letter	E-mail
1st survey mode:	Mail	Mail	Mail	Mail	Online	Online
1) Web link*	Yes	Yes	No	Yes	Yes	Yes
2) Incentive**	Yes	No	Yes	Yes	No	No
Reminder*** mode	Card	Card	Card	Card (34) E-mail (33)	Card (40) E-mail (38)	Card (37) E-mail (35)
2nd survey mode:	Mail	Mail	Mail	Mail	Online	Online
1) Web link	Yes	Yes	No	Yes	Yes	Yes
2) Incentive	Yes	No	Yes	Yes	Yes	Yes
3rd survey mode:	N/A	N/A	N/A	N/A	Mail	Mail
1) Incentive	N/A	N/A	N/A	N/A	Yes	Yes

Notes: * Mail survey respondents received our Web site’s URL in the cover letter, and online respondents received a hyperlink by e-mail. ** In the 1st wave, the incentive was \$1 and in the 2nd and 3rd waves – a raffle. Non-respondents to the 1st survey in Groups 4, 5 and 6 were randomly assigned to card and e-mail reminder groups. *** The e-mail reminders contained a hyperlink to the online questionnaire.

1.2. Survey design. Our survey design is shown in Table 2. We used a blocked design to compare the main effects of online and traditional survey methods. For example, we use Groups 3 and 6 to compare response rates to online and mail surveys. We use Groups 1 and 4 and Groups 5 and 6 to evaluate the response to different prenotifications; Groups 2 and 5 and Groups 4 and 6 to evaluate different questionnaires; and sub-samples of Groups 4-6 to evaluate different reminders.

Since previous research had led us to expect a lower response rate in our online treatment conditions, we allocated 90 firms to each of our online groups (4, 5 and 6) and to our control groups for the incentive and Web link (2 and 3). The remaining majority of firms were allocated to the group that we expected to yield the highest response rate. Firms were assigned randomly to each of the groups. The final sample sizes of groups 2-6 are less than 90 because we dropped firms when addresses became obsolete or CMOs changed during the study.

1.2.1. Prenotification. We mailed a letter to all CMOs in Groups 1, 2, 3 and 5 notifying them of the upcoming study. Groups 4 and 6 received the same letter by e-mail. All prenotifications used a personalized salutation, referred to each firm’s industry, and contained a brief description of the research.

1.2.2. Questionnaire. We mailed questionnaires to Groups 1-4. The questionnaire consisted of 28 multi-item questions. About one quarter of the items contained perceptual measures and the rest sought factual information, e.g., customer acquisition rates and ROI. Questionnaires were accompanied by a personalized cover letter, half-page executive summary, and postage-paid return envelope.

For Groups 5 and 6, we sent an email with a Web link to our survey. The text of the email message

was the same as the cover letter sent with the paper questionnaire. The online questionnaire was developed to be as similar to the paper version as possible. Access to the online questionnaire required subjects to log in with a unique user ID and password. This eliminated the possibility of random visitors participating. Although this feature also removed the possibility of anonymous responses, we believed it was important to assure the integrity of the online survey data. Subjects had the option of completing the questionnaire in multiple visits. We counted the questionnaire as submitted only when subjects clicked on “Submit” at the end of the survey. Our Web site also contained a summary of our study.

1.2.3. Reminder. Subjects in Groups 4, 5 and 6 were randomly assigned to two treatment conditions: postcard or email reminder. Both types of reminders had the same content, with the exception that the email reminder also contained a link to the online questionnaire. Although this link makes the email reminder different from the mail reminder, it reflects the functionality available to researchers using email reminders. Groups 1, 2, and 3 received a postcard reminder.

1.2.4. Follow-up questionnaires. Groups 1-4 received the follow-up questionnaire by regular mail. Groups 5 and 6 received the follow-up questionnaire by email and the third questionnaire by regular mail. We sent the third questionnaire to evaluate the incremental response rate from this second mode of contact. We believe that the response to the third paper questionnaire in Groups 1-4 would not have justified the additional cost.

1.2.5. Incentive. To encourage participation, we offered to share our findings with each responding firm. Groups 1, 3 and 4 received a \$1 incentive

with the first questionnaire. Group 2 was our control group for evaluating the monetary incentive. We chose not to send an incentive to Groups 5 and 6 with the first questionnaire because previous research found that incentives lowered response rates in email surveys (Cook et al., 2000). In the second and third waves, Groups 1, 3, 4, 5, and 6 were offered a chance to participate in a raffle with one prize of \$300 and three prizes of \$100.

1.2.6. Web link. Groups 1, 2, and 4 received a cover letter with the questionnaire that contained the Web address of our online survey along with the necessary log-in information. This information

gave these executives the option to complete the questionnaire on paper or online. Group 3 served as our control group for this variable.

1.3. Mailing schedule. The first questionnaire was mailed 7 days after the prenotifications were mailed. Reminders and the second and third questionnaires were sent 18 days after each preceding contact. Based on response patterns in previous research, we deemed this separation sufficient to enable us to estimate response rates from each contact. Email contacts were sent three days after regular mail contacts so that all subjects received each communication at approximately the same time.

Table 3. Number of responses and response rates

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Total
Sample size	621	87	85	77	79	76	1025
Responses after the 1 st wave:							88
1) Mail	55.2 [*]	6	6.7	9.1	N/A	N/A	77
2) Online	5	0	N/A	1	1	4	11
Responses after the reminder:							22
1) Mail	4	0	2	3	1 ^{**}	2 ²	12
2) Online	3	0	N/A	2	1	4	10
Response rate:	10.8%	6.9%	10.2%	19.6%	3.8%	13.2%	10.7%
Responses after the 2 nd wave:							45
1) Mail	28	1	2	1	N/A	N/A	32
2) Online	0	0	N/A	1	6	6	13
Response rate:	15.3%	8.0%	12.6%	22.2%	11.4%	21.0%	15.1%
Responses after the 3 rd wave:	N/A	N/A	N/A	N/A	8	4	12
Overall response rate:	15.3%	8.0%	12.6%	22.2%	21.5%	26.3%	16.3%
1) Response rate by mail	14.0%	8.0%	12.6%	17.0%	11.4%	7.9%	
2) Response rate online	1.3%	0.0%	N/A	5.2%	10.1%	18.4%	

Notes: * The fractions are due to eight anonymous responses that were impossible to allocate to a specific group. We assigned these surveys to groups in proportion to response rates of identifiable surveys. Different allocation rules or omission of these surveys do not materially change the results of our analyses. ** Three subjects in the online survey conditions requested a paper version of the questionnaire.

2. Results

2.1. Response rate. A summary of response rates is presented in Table 3. The overall response rate is within the range of other surveys of senior executives (e.g., Achrol and Stern, 1988; Gatignon and Robertson, 1989; Heide and John, 1988; Sujan, 1986).

Group 3 is exposed to the traditional mail survey method and Group 6 is exposed to the online survey method. Thus, these groups provide the best overall comparison of online and offline methods. At the end of the second wave, the online group has a response rate of 21.0% while the offline group has a response rate of 12.6%. The result is significant only at $p = 0.15$. However, the magnitude of this difference, is meaningful. This finding is consistent with the other surveys of business executives (Deutskens et al., 2006; Griffis et al., 2003), in

which online methods produce response rates that are comparable to or better than traditional mail surveys.

The highest response rate at the end of the second wave is in Group 4. This response rate may have benefited from the email prenotification and email reminder to a sub-group. A close second in response rate at the end of the second wave is in Group 6. All contacts with this group were made online through the second stage.

2.1.1. Prenotification: letter or email. A comparison of Groups 5 and 6 after the reminder shows a significantly higher response rate (3.8% vs. 13.2%, $p < .05$) with email prenotification. A comparison of Group 1 and the card reminder sub-sample of Group 4 had a directionally higher response rate (10.8% vs. 12.9%) for email prenotification. One reason for these higher response rates may be that emails are

more likely to reach the key informant rather than be filtered out by a secretary or assistant.

2.1.2. Questionnaire: paper or online. At the end of the second stage, the overall response rate to paper questionnaires is 14.9% and the overall response rate to online questionnaires is 16.1%. In contrast with previous research, we find no statistically significant difference in response rates between online and paper questionnaires. To isolate the online effect for the questionnaire stage only, we compare Groups 2 and 5 and then compare Groups 4 and 6. The latter comparison is biased against the online Group 6 because these executives did not receive an incentive with the first questionnaire. While none of these differences are statistically significant, they suggest two things. First, that response rates to paper questionnaires may be higher at the end of the first wave. Second, that response rates to online questionnaires are comparable by the end of the second wave.

To isolate the effect of the second survey wave, we evaluate the incremental response rates. The average incremental response with online questionnaires is significantly higher than the incremental response to paper questionnaires (8.5% vs. 4.3%, $p < .05$). Also, the average incremental response to paper questionnaires with an incentive and Web address (Groups 1 and 4) is 4.9%. Thus, the average response for the matched online groups is still 3.6% higher ($p < 0.1$). These results highlight the importance of using follow-up questionnaires in online surveys.

2.1.3. Reminder: postcard or email. To evaluate the reminder mode effect, we compare the incremental responses to cards and emails in the sub-samples of Groups 4, 5 and 6. Email reminders led to directionally higher response rates (8.5% vs. 3.6%) but the difference is not quite significant ($p = .13$).

2.1.4. Effect of incentives. Online surveys are not able to take advantage of a typical \$1 incentive. However, comparable response rates in the mail and online groups by the end of the second wave indicate that researchers can save the cost of sending token monetary gifts to the entire sample.

2.1.5. Effect of web link. To evaluate the effect of including a Web site address in our offline cover letters, we compare Groups 1 and 3. Group 1 has a 15.3% response rate while Group 3 has a 12.6% response rate. The positive effect of 2.7% is not statistically significant.

2.2. Response patterns. On average, we received online questionnaires in 2.7 days and mail questionnaires in 12.2 days ($p < 0.01$). In our offline groups, most responses were obtained after the first survey. In both online groups, more responses were

received from the second survey than the first survey. This finding suggests that response rates to online surveys improve more with multiple contacts. Surprisingly, response rates to the third questionnaire sent by regular mail to Groups 5 and 6 were higher than the response rates to the second questionnaire sent to Groups 1-4. This finding suggests a possible benefit from mixing contact modes.

2.3. Response completeness. On average, offline respondents completed 90.1% of items and online respondents completed 88.6%. We also evaluated response completeness for sensitive questions about firms' financial performance. Such business unit-level information is generally not reported even by public companies. Several respondents told us that this information was extremely confidential. On average, offline respondents completed 68.6% of these sensitive questions and online respondents completed 66.7%. Neither difference in response completeness is significant.

2.4. Non-response bias. To evaluate non-response bias, we compare non-respondents and respondents on two firm-level characteristics: annual sales and number of employees. We also make separate comparisons of non-respondents and respondents in online and offline conditions. Finally, we compare online and offline respondents. None of these differences are statistically significant.

Our second test for non-response bias is to evaluate early and late responses to the online questionnaires only. We compare online respondents to the first questionnaire with online respondents to the second and third questionnaires. Previous research has found that late respondents are similar to non-respondents (Armstrong & Overton 1977). We did not find significant differences between these groups on any of the 28 items in our questionnaire.

2.5. Cost of survey methods. After two stages, the variable cost of online surveys was about one-sixth the variable cost of mail surveys (\$1.47 vs. \$8.65). We did incur a fixed cost of \$2000 for building our Web site and additional pages would have cost about \$200-250 each. Thus, the total cost of a two-wave mail survey is lower with a sample size of less than 300. However, the fixed cost of \$2000 can be amortized over future surveys, since it will be less costly to add questionnaires to our current Web site. Online surveys also required substantially less of our own time. Online surveys did not require printing and signing cover letters, or manually entering data from the questionnaires.

3. Discussion

Our survey of CMOs using online and offline methods has led us to conclude that:

- ◆ In contrast with previous research that does not target firm managers, we find no evidence online surveys have lower response rates than mail surveys when two waves of questionnaires are sent. This result is consistent with the other studies of online survey responses of business executives (Deutskens et al., 2006; Griffis et al., 2003).
- ◆ Online surveys are more effective with email prenotifications than with mail prenotifications.
- ◆ Email reminders and regular mail reminders are not different in their effect on response rates.
- ◆ There is no difference in response completeness between online and mail surveys, even for sensitive questions.
- ◆ Potential non-response bias appears to be no different in online surveys than in mail surveys.
- ◆ Online surveys have compensating positive effects on response rates that overcome the negative effect of not being able to offer a token monetary incentive.

- ◆ Online surveys have faster response times and, except for small sample sizes, lower costs than offline surveys.

3.1. Implications. The goal of our study was to compare the performance of online survey methods with traditional mail survey methods in a sample of CMOs. Since these online methods performed equally or better than mail surveys, researchers may want to use them in future studies. If researchers move entirely to online methods, they will benefit from lower costs, faster responses, and the economies of scale that come from adding questionnaires to an existing Web site.

Although we see great benefits in using online survey methods, we do not believe they are right for every situation. In some instances, offline methods may be better. We summarize our evaluation of online and mail surveys in Table 4. Researchers can use this information as a guide when deciding between online and mail survey methods.

Table 4. Advantages of online and mail surveys

Characteristic	Online	Mail
Prenotification mode	+	
Questionnaire mode:		
1) Single stage		+
2) Single stage with reminder	=	=
3) Multi-stage	+	
Reminder mode.	+	
Costs:		
1) Fixed		+
2) Marginal	+	
3) Data entry	+	
4) Incentive	+	
Sample size:		
1) Small		+
2) Large	+	
Limited Internet access among target population		+
Limited access to email addresses		+
Use for one survey		+
Use for multiple surveys	+	

Note: + denotes the preferred method for that characteristic.

Based on our findings, we recommend that survey researchers use the following approach in a typical two-stage survey of marketing executives:

- ◆ Email prenotification. Although it is possible to send a Web link with the prenotification, we recommend not doing so. The prenotification should serve as an introduction rather than a request for immediate help.
- ◆ Email with a Web link to questionnaire. The content of this message should familiarize executives with the research topic and its importance to practitioners and academics. We

would offer respondents the chance to win a raffle prize.

- ◆ Email reminder with a Web link to questionnaire. The content of this message will simply remind the executive about the questionnaire. However, the functionality of email means that a Web link to the questionnaire can be included so that executives can respond without having to find the previous communication.
- ◆ Second-wave email with a Web link to questionnaire. This message should have the

same content as the message in step 2 in case that email was not received or read. We would offer respondents a chance to win a prize in a second raffle.

If the response rate is high enough at this stage, the researcher can stop. If a slight increase is beneficial, a second reminder email might be sufficient. If the researcher is interested in a larger increase in response rate, we recommend sending a paper questionnaire to all remaining non-respondents. We found that this alternative-mode contact added 7.7% to our response rate in the online groups. We recommend that researchers allow sufficient time between contacts for respondents to complete the questionnaire. Otherwise, subsequent contacts might harass respondents rather than remind them.

3.2 Limitations and directions for future research. Our conclusions and recommendations should be considered in light of two potential limitations. First, the focus of our study on main effects limits our ability to evaluate interactions between individual survey elements. However, we

are able to evaluate the total effect of online and offline methods as well as the main effects of each element. Second, it is not clear whether our results will extend to samples other than marketing executives.

Conclusion

We suggest four directions for future research. First, although response rates to online contacts were good, we do not know why respondents were motivated to reply to this type of contact. Second, it is not clear how many contacts are optimal with online surveys. In one group, we found that the incremental response rate increased throughout the stages and was highest for the third questionnaire, which was sent by regular mail. Third, researchers should evaluate interactions for the multiple stages of survey research. Fourth, it would be instructive to re-examine senior executives' participation in online and offline surveys at a future date, say in 3-5 years. Our results may incorporate the novelty effect of online survey approaches. Further development of online media and computer-based threats could conceivably increase senior managers' reluctance to participate in surveys online.

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