SURVEY RESPONSE RATES IN THE FOREST PRODUCTS LITERATURE FROM 2000 TO 2015[1]

*Matthew Bumgardner**

Research Forest Products Technologist
Northern Research Station
USDA Forest Service
Delaware, OH
E-mail: mbumgardner@fs.fed.us

Iris Montague

Research Forester
Northern Research Station and Forest Products Laboratory
USDA Forest Service
Starkville, MS
E-mail: imontague@fs.fed.us

Janice Wiedenbeck†

Research Forest Products Technologist
Northern Research Station
USDA Forest Service
Princeton, WV
E-mail: jwiedenbeck@fs.fed.us

(Received February 2016)

Abstract. A literature analysis was conducted to synthesize typical response rates from forest-products-industry-based survey studies published from 2000 to mid-2015. One hundred and ninety-five surveys published in several forest products and forestry journals and proceedings (mostly North American based) were analyzed. Overall, the typical response rate was found to be about 26.0% (median) to 31.6% (mean). The median survey size in terms of number surveyed was 543.0, and the median for responses received was 131.5. Several factors were found to influence response rates and numbers surveyed. The results indicated that response rates were highest for surveys conducted at the regional or international level, that were interview based, and that were geared toward consumers. The majority of the surveys conducted were mail based (79.0%) and were directed at manufacturers (51.8%) followed by loggers (15.4%) and engineers (14.4%). There was no indication that the year of publication had an effect on observed response rates. Most studies reported testing for nonresponse bias (64.4%), with early vs late respondent comparisons being the most common method used. These results can be used as a benchmark for what have been typical response rates for survey-based research in the forest products industry.

Keywords: Response rate, mail survey, Internet survey, interview survey, nonresponse bias tests.

INTRODUCTION

Surveys, often involving use of mailed questionnaires, are an important means of acquiring data for research. The importance of these instruments for data collection in behavioral sciences is widely recognized (Baruch 1999). Although mail surveys have many advantages, the major disadvantages are generally believed to be their low response rates and potential for nonresponse bias (Kanuk and Berenson 1975; Barclay et al 2002; Sinclair et al 2012). To fully understand the population studied, researchers must ensure that the data collected are representative. However, it is difficult to obtain a 100% response

* Corresponding author
† SWST member
[1]This article was written and prepared by the US Government employees on official time, and it is therefore in the public domain and not subject to copyright.

rate when conducting a survey, and the proverbial question with survey-based research has been: "What is a reasonable response rate?" There is no agreed-upon norm as to how high the response rate for a given study needs to be (Baruch 1999).

Numerous studies have been conducted to examine response rates. Some primarily have examined factors that affect response rates (Kallis and Giglierano 1992; Sheehan 2001; Powers and Bendall Valentine 2009; Anseel et al 2010). Others have examined how to increase response rates (Erdogan and Baker 2002; Martins et al 2012). And several have examined response rate trends (Baruch 1999; Shaw et al 2002; Price et al 2004; Curtin et al 2005; Baruch and Holtom 2008). Also, there have been studies that examined the response rates reported among various academic disciplines and business sectors (Baruch 1999; Harzing 2000; Price et al 2004). Although these and numerous other studies have been conducted to examine response rates among various business, industry, and academic fields, there is no known broad-based research on response rates specific to the forest products industry.

This study examines the response rates reported for survey-based research conducted in the forest products industry and published from 2000 to 2015. The general methods used to test for nonresponse bias also are assessed. Although this research does not aim to suggest what an appropriate response rate is or analyze ways to increase response rates, it does provide a synthesis of what has been typical for journal publication since 2000. Factors including regional coverage, survey method, subject area, and year of publication were considered.

METHODS

Data Collection

The population of interest was survey-based studies in the forest products industry published from 2000 to mid-2015 (up to the time of data collection). The starting point in the wood industry supply chain for inclusion in the population were surveys of loggers; landowner-based surveys were excluded (unless surveys of industrial landowners). Surveys conducted as intercepts (in malls, stores, etc.) and in classroom settings were excluded because response rates were not relevant in these settings. The sample frame was several mostly North-America-based peer-reviewed journals, which were canvassed for survey-based articles. The journals, although not an exhaustive list of possible outlets, were selected to represent several outlets for wood-based studies and included the *Forest Products Journal* (and all other Forest Products Society publications including the *Journal of Forest Products Business Research* and the *Journal of Forest Engineering*), *Wood and Fiber Science*, *BioResources*, *Forest Policy and Economics*, the *Canadian Journal of Forest Research*, the *Forestry Chronicle*, and all journals associated with the Society of American Foresters (including *Forest Science*, the *Journal of Forestry*, the *Northern Journal of Applied Forestry*, the *Southern Journal of Applied Forestry*, and the *Western Journal of Applied Forestry*). Specific journals were selected because data collection required a "canvassing" of articles. Keyword searches ("survey," "questionnaire," "response rate," "mail," and "respondent" were all used) did not always capture survey-based articles because of the variety of terms that can be used in describing this type of study. Lastly, the US Forest Service *Treesearch* database was used to find other survey-based articles, which included some proceedings papers. After the initial list was assembled, a check for duplicates was conducted because multiple articles sometimes were based on the same survey. After adjusting for duplicates, the final sample included 195 surveys (from 185 published articles because some studies included more than one survey). The list of articles is available from the authors upon request.

The response rates and associated information (ie number surveyed and number of responses received) were not always reported consistently among studies. Other research (Wiseman and Billington 1984; Shaw et al 2002; Skalland 2011) also has shown a lack of conformity to

a standard definition of response rate calculation. In this study, the most common method for calculating response rate (when a method was mentioned at all) was to subtract the nonusable responses (including bad addresses, out of business companies, respondents not really part of the population of interest, etc.) from the total number surveyed and then to divide the number of usable responses received by this adjusted number and express the result as a percentage (hereafter called the base formula). However, many studies simply reported the response rate, number surveyed, and number received with no mention of any adjustments. In addition, several studies reported only partial information (one or two of the three aforementioned statistics). The base formula was used to calculate missing data where possible; a response rate (or enough information to calculate one, $n = 16$) had to be reported for a survey-based article to be included in the sample. The response rate reported in the article, or the calculated response rate as previously described, was used as the data point.

A few studies ($n = 9$) used some alternative to the base formula when calculating response rates. The most common among these ($n = 4$) was to report a response rate that included nonusable responses as responses against the total number surveyed. This practice resulted in a higher response rate than would be reported using the more common base formula previously discussed. However, when these nine studies were recalculated using the base formula, the mean and median response rates for the overall sample were nearly identical to those using the reported response rates. Reported response rates were therefore used for all studies in the sample so that a consistent procedure could be followed.

Data Analysis

The data were analyzed in several ways. First, the data distributions for the variables Response Rate, Number Surveyed, and Responses Received were analyzed and measures of central tendency were generated. Potential correlations among these three variables were then analyzed to determine if they were related, eg did the Response Rate increase when the Number Surveyed increased? Lastly, analysis of variance (ANOVA) was conducted for a number of factors of interest, as subsequently described. An alpha level of 0.10 was used for all tests.

Three factors, including the Region, Method, and Subject Area of the surveys, were investigated in the ANOVA analysis using SAS Enterprise Guide 6.1 (SAS Institute, Cary, NC). In each case, Response Rate and Number Surveyed were used separately as dependent variables (for a total of six analyses). For Region, the independent levels were State (defined as surveys covering one or two states), Regional (either defined by the study, eg the northeastern United States, or surveys involving three or more states), North America (nationwide surveys in the United States and/or Canada), and International (surveys conducted outside North America). For Method, the independent levels were Mail, Internet (including any on-line or e-mail-based surveys), and Interviews (including in-person and telephone surveys, with telephone surveys composing more than 76% of the interviews). Surveys using fax [$n = 2$] were excluded from the Method analysis. Two studies used joint methods; both were classified as Interviews because they involved calling respondents on the telephone. For a few studies [$n = 5$], it was not clear what method was followed, eg questionnaires were "sent" but not specified if by mail, e-mail, etc. These were excluded from the Method analysis. For Subject Area, the independent levels were Loggers, Manufacturers, Consumers, Distribution (including distributors, retailers, and trade surveys), and Engineers (including engineers, architects, and builders). Similarly, a t test was used to test if the average Response Rate and Number Surveyed had changed with time (Year) by splitting the studies into a first period (2000-2007) and second period (2008-2015) of publication. The split was made between 2007 and 2008 to form two equal (8 yr) time periods.

The equal variance assumption for ANOVA was tested using the three procedures available in SAS Enterprise Guide, including Levene's test,

Table 1. Summary statistics for Response Rate, Number Surveyed, and Responses Received for survey-based studies.

Variable	*n*	Mean	Standard deviation	Median	Skewness	No. of total outliers[a]	No. of extreme outliers[b]
Response rate (%)	195	31.6	20.0	26.0	1.2	8	0
Number surveyed	193	1036.8	1811.7	543.0	5.6	13	8
Responses received	194	197.4	215.8	131.5	3.7	12	5

[a] Defined as 1.5 times the interquartile range plus the upper quartile (Ott 1993).
[b] Defined as 3.0 times the interquartile range plus the upper quartile (Ott 1993).

Brown and Forsythe's test, and Bartlett's test. If any of these tests was significant, it was concluded that the equal variance assumption was violated and Welch's ANOVA procedure was used. If the ANOVA test was significant, multiple comparisons were conducted using Tukey's honest significant difference procedure. The normality assumption for the response variable was assessed by determining the skewness and kurtosis values for each distribution, using a skewness value of 3.0 and a kurtosis value of 10.0 as being suggestive of nonnormal data (Kline 2011). If these criteria were exceeded, the most extreme values (ie outliers) were removed until the skewness and kurtosis values fell below the thresholds. Within this protocol, no observations were removed from the Response Rate analyses. For the Number Surveyed analyses, three observations were removed from the North America data in the Region analysis, one observation was removed from the Mail data in the Method analysis, and two and one observations were removed from the Manufacturers and Engineers data of the Subject Area analysis, respectively. Similarly, for the Year analysis, one observation was removed from the first period and two observations were removed from the second period.

RESULTS

Summary Statistics

The summary statistics for Response Rate, Number Surveyed, and Responses Received are shown in Table 1. Outliers were common in each distribution, especially for the Number Surveyed and Responses Received. This finding was further reflected in the skewness values, which were greater than 3.0 for both of these variables. Skewness was less of a factor for Response Rate. Overall, it was clear that the median was the most appropriate measure of central tendency for Number Surveyed and Responses Received given the skewness and presence of extreme outliers; the median was 543.0 for Number Surveyed and 131.5 for Responses Received. For Response Rate, the median (26.0%) was lower than the mean (31.6%), which reflected the mild skewness in the Response Rate distribution.

Each distribution had relatively large ranges between the smallest and largest observations. For Response Rate, the range was 98.6 (1.4% for a minimum value and 100.0% for a maximum value). For Number Surveyed, the range was 15,986 (14 for a minimum value and 16,000 for a maximum value). For Responses Received, the range was 1908 (4 for a minimum value and 1912 for a maximum value).

Correlation Analysis

The results of the correlation analysis are shown in Table 2. Because of the outliers/data skewness, Spearman's rank coefficients were used. Responses Received was highly correlated with Number Surveyed ($r_s = 0.82$, $P < 0.01$), suggesting that, logically, more responses were received when the number surveyed was

Table 2. Correlations (Spearman's rank order coefficients) among Response Rate, Number Surveyed, and Responses Received.

Variable	Response rate	Number surveyed	Responses received
Response Rate	1.00	—	—
Number Surveyed	−0.57[a]	1.00	—
Responses Received	−0.08	0.82[a]	1.00

[a] Significant at $\alpha = 0.10$ ($P < 0.01$).

Table 3. Analysis of variance (ANOVA) results for Response Rate by Region.

Region	*n*	Mean	Standard deviation	*F*	*P*	Significant comparisons
North America	77	26.4	16.2	3.64[a]	0.02	Yes[b]
State	39	31.4	15.3			
Regional	51	35.4	22.7			
International	26	40.5	26.4			

[a] Based on Welch's ANOVA for unequal variances.
[b] North America different from Regional and International (Tukey's honestly significant difference test).

high. However, Response Rate was negatively and moderately correlated with Number Surveyed ($r_s = -0.57$, $P < 0.01$), suggesting that a high response rate is not necessarily correlated with a large survey size and could even be an impediment to a high response rate. Response Rate was not significantly correlated with Responses Received.

ANOVA—Response Rate

The three independent variables described in the Data Analysis subsection, including Region, Method, and Subject Area, were analyzed with ANOVA using Response Rate as the dependent variable to determine if these factors had an effect on Response Rate. As shown in Table 3, the ANOVA for Region was significant ($P = 0.02$), with response rates being lowest for surveys of North America. Regional and International response rates were higher. For Method, the ANOVA was significant ($P < 0.01$), with Interview response rates being higher than Mail and Internet response rates (Table 4). For Subject Area, the ANOVA was significant ($P = 0.07$), with response rates being highest for Consumer surveys and lowest for surveys of Manufacturers (Table 5).

Tables 3-5 also show information regarding the number of survey-based studies by category. For example, Table 3 shows the most common survey Region was North American (39.5%), followed by Regional (26.2%), State (20.0%), and International (13.3%). Of the sampled studies, 1% did not clearly indicate Region. Table 4 shows that Mail surveys accounted for 79.0% of the total, followed by the Internet and Interviews (each at 8.7%). Other (including unknown) Methods accounted for 3.6% (not shown in Table 4). For Subject Area (Table 5), Manufacturers accounted for 52.0% of the sample, followed by Loggers (15.3%), Engineers (14.3%), Distribution (9.2%), and Consumers (4.1%). Other Subject Areas accounted for 5.1% of the total.

Lastly, the Year effect was analyzed to discern if response rates had changed with time. As shown in Table 6, the *t* test was not significant ($P = 0.27$), suggesting that response rates in the first part of the study period (2000-2007) were the same as those in the second half of the study period (2008-2015) and have not increased or decreased with time.

ANOVA—Number Surveyed

The same independent variables also were assessed with Number Surveyed as the dependent variable. The research interest here was to ascertain if survey study sizes were influenced by region, method, or subject area. As shown in Table 7, the ANOVA was significant for Number Surveyed

Table 4. Analysis of variance (ANOVA) results for Response Rate by Method.

Method	*n*	Mean	Standard deviation	*F*	*P*	Significant comparisons
Mail	154	29.1	15.5	9.32[a]	<0.01	Yes[b]
Internet	17	28.4	27.0			
Interviews	17	57.0	25.8			

[a] Based on Welch's ANOVA for unequal variances.
[b] Interviews different from Mail and Internet (Tukey's honestly significant difference test).

Table 5. Analysis of variance results for Response Rate by Subject Area.

Subject	*n*	Mean	Standard deviation	*F*	*P*	Significant comparisons
Manufacturers	101	29.2	19.2	2.19	0.07	Yes[a]
Engineers	28	30.5	20.4			
Distribution	18	30.6	20.2			
Loggers	30	34.9	17.6			
Consumers	8	48.9	25.5			

[a] Consumers different from Manufacturers (Tukey's honestly significant difference test).

by Region ($P = 0.02$), with North American surveys being the largest and International surveys being the smallest. For Method, the ANOVA was significant ($P < 0.01$), with Internet surveys being larger than Interview and Mail surveys (Table 8). For Subject Area, the ANOVA was significant ($P = 0.01$), with Engineer surveys being the highest and Distribution and Manufacturer surveys being the smallest (Table 9).

Additionally, as shown in Table 6, the number surveyed was analyzed by Year to assess if survey sizes have changed with time. The *t* test was not significant ($P = 0.78$), indicating that more recent survey studies have not been different in size from those earlier in the study period.

Checking for Nonresponse Bias

A final consideration was to assess how nonresponse was assessed in the survey studies in the sample. Overall, 64.4% of the studies reported checking for nonresponse bias. Of these studies, 55.3% used an early vs late respondent comparison procedure (Armstrong and Overton 1977), 14.6% used follow-up communication with nonrespondents, 13.0% compared their samples with known population parameters, 8.1% used a combination of early vs late comparisons and follow-up communication, 6.5% used a combination of early vs late comparisons and parameter comparisons, and the remaining 2.4% used some other method. Interestingly, the prevalence of nonresponse bias assessments appeared to be associated with the survey method used; mail surveys had nonresponse bias checks 68.6% of the time, Internet surveys had checks for nonresponse bias 50.0% of the time, and interview-based surveys had checks for nonresponse bias 35.3% of the time.

SUMMARY AND DISCUSSION

The results suggested that the median response rate for published surveys in the forest products industry from 2000 to 2015 was 26.0%, whereas the mean was 31.6%. The median survey size in terms of number surveyed was 543.0, and the median for responses received was 131.5. Numerous studies have reported different response rates along various gradients (eg industry, academia, and international), and some have shown similar results to those reported in this study. For example, Harzing (2000) reported a response rate of 20.6% for the paper products industry when examining response rate differences across countries. Baruch (1999) cited an average response rate of 36.1% for academic studies involving top management and organizational representatives (mostly in North America). Anseel et al

Table 6. Results of *t* tests for Response Rate and Number Surveyed by Year.

Dependent variable and year	*n*	Mean	Standard deviation	*t*	*P*
Response Rate					
2000-2007	104	33.1	18.2	1.12	0.27
2008-2015	91	29.8	21.8		
Number Surveyed					
2000-2007	102	863.4	958.2	0.28	0.78
2008-2015	88	825.3	887.7		

Table 7. Analysis of variance (ANOVA) results for Number Surveyed by Region.

Region	*n*	Mean	Standard deviation	*F*	*P*	Significant comparisons
International	26	519.0	677.9	3.42[a]	0.02	Yes[b]
State	39	674.2	566.4			
Regional	49	884.7	1162.9			
North America	74	1024.1	952.9			

[a] Based on Welch's ANOVA for unequal variances.
[b] North America different from International (Tukey's honestly significant difference test).

(2010) reported the average response rate for consumer respondents was 44.1% (which is similar to the consumer studies in the current research) and the average for top executives was 37.0%. Sheehan (2001) reported an average response rate of 36.8% for e-mail surveys from 1986 to 2000; the average Internet response rate in this study was 30.0%. Lastly, Baruch and Holtom (2008) found an average response rate of 52.7% for individuals (eg consumers) and 35.0% for organizational representatives (eg executives and managers) across 17 managerial and behavioral science journals in 2005.

Several factors were found to influence Response Rate and the Number Surveyed. Response rates were highest for surveys conducted at a regional level and lowest at the North American level in between was state-level surveys (international surveys had the highest average response rate but regional size varied). This pattern was interesting and could suggest that surveys conducted at the United States and/or Canadian national level lack the personal interest or other participation incentives (familiarity with survey administrators, intensity of regional issues, etc.) that regional surveys realize. Response rates also were somewhat higher for interview-based surveys than mail or Internet surveys, which is similar to Sinclair et al (2012). This probably indicates more willingness to participate when face-to-face (or at least voice-to-voice) contact is made, perhaps in part because of the "peer-pressure" associated with direct contact. Mail and Internet surveys had very similar response rates. Lastly, response rates for consumer surveys were higher on average than for surveys of manufacturers. One factor probably contributing to this finding is that consumer surveys can be contracted with firms that maintain consumer panels, which can enable use of incentives for participation. Response rates for the other subject areas (ie other than consumers) were somewhat similar (Table 5), suggesting this might not be a major factor in survey response.

Perhaps not surprisingly, for the Number Surveyed, Internet-based surveys were much larger on average than mail and interview surveys. Mail surveys also were larger than Interview surveys, but the difference was not significant in the multiple comparison test. These findings probably reflect cost, as they generally follow an increasing gradient from Internet surveying to mail surveying to setting up direct meetings for interviews. Mail surveys easily were the most common approach, accounting for 79.0% of the sample. Also, it was not surprising that the Number Surveyed increased with the regional size of the survey coverage area, increasing in a somewhat linear fashion from state to region to North America (international studies, although lowest in number surveyed, varied in regional size). Perhaps international and state surveys were the smallest because international surveys are

Table 8. Analysis of variance (ANOVA) results for Number Surveyed by Method.

Method	*n*	Mean	Standard deviation	*F*	*P*	Significant comparisons
Interviews	17	281.4	338.5	16.45[a]	<0.01	Yes[b]
Mail	151	893.0	919.5			
Internet	17	2281.2	3798.2			

[a] Based on Welch's ANOVA for unequal variances.
[b] Internet different from Mail and Interviews (Tukey's honestly significant difference test).

Table 9. Analysis of variance (ANOVA) results for Number Surveyed by Subject Area.

Subject	*n*	Mean	Standard deviation	*F*	*P*	Significant comparisons
Distribution	18	456.4	346.2	4.38[a]	0.01	Yes[b]
Manufacturers	98	787.0	847.6			
Consumers	8	878.9	1055.7			
Loggers	30	962.1	929.4			
Engineers	26	1337.4	1325.4			

[a] Based on Welch's ANOVA for unequal variances.
[b] Engineers different from Distribution and Manufacturers (Tukey's honestly significant difference test).

relatively expensive (if conducted by researchers in North America) and state surveys have a more limited total population.

It was less clear why the average Number Surveyed was so much higher for surveys of engineers than distributors and manufacturers. This finding might reflect the number of such entities in the population, the availability of directories for different sectors, or perhaps the topics of current research interest during the 2000-2015 time frame (eg certification, green building). Although surveys of manufacturers were not as large, on average, as other sectors, they were the most common type of survey, accounting for 51.8% of the sampled studies.

Responses Received was highly correlated with Number Surveyed suggesting that more responses are received when the number surveyed is high. However, it was more interesting that the Response Rate was negatively correlated with Number Surveyed, suggesting that a high response rate is not correlated with a large survey size and could even be an impediment to a high response rate. Perhaps this reflects that large contact lists are more likely to contain nontargeted entities that are not inclined to respond to surveys for which they do not have a direct interest in participating, even to indicate their ineligible status. Although response rate calculation methods that estimate the effect of ineligible contacts have been discussed (Wiseman and Billington 1984), application apparently has been rare in the forest products literature (eg Fell et al 2002).

Response rates in the first part of the study period were not statistically different from those in the second half of the study period, and thus do not appear to have increased or decreased with time. This is consistent with Baruch and Holtom (2008), who found stable response rates in the marketing literature from 1995 to 2005. Price et al (2004) even showed an increase in average response rates from 1990 to 2002 in the medical field. However, several other studies have shown a decline over a period of years (Baruch 1999; Shaw et al 2002; Curtin et al 2005). Although this study only included studies that were conducted in the 21st century, many of the studies that showed declines considered longer time frames that included the 20th century. It is possible that advancements in technology and communication in the 21st have contributed to the steady response rate trend observed here.

Most studies in the sample (64.4%) reported testing for nonresponse bias, and most of these (69.9%) used a procedure in which early respondents were compared with late respondents on one or more questions (either alone or in combination with other methods). However, although it is possible to summarize studies based on the general method used, it is more difficult to summarize the actual nonresponse bias testing results because so many different procedures were used within these broad methods. For example, some studies considered just a few questions for nonresponse testing whereas others used several to many questions. In some cases, if one or a few of several nonresponse tests were significant, a caveat was offered and the analysis proceeded. Overall, given that the studies reported here all were published, it can be assumed that nonresponse bias was deemed not to be a major factor. It is unknown how often studies are not published (or even submitted for review) based on nonresponse concerns, which

adds to the difficulty of analyzing the results of nonresponse bias testing. Because the response rate and associated information often is taken into account during the review process when evaluating a manuscript, it is useful to have some type of benchmark. This study provides a synthesis of published response rates for forest products articles in the recent past.

REFERENCES

Anseel F, Lievens F, Schollaert E, Choragwicka B (2010) Response rates in organizational science, 1995–2008: A meta-analytic review and guidelines for survey researchers. J Bus Psychol 25(3):335-349.

Armstrong JS, Overton TS (1977) Estimating nonresponse bias in mail surveys. J Marketing Res 14(3):396-402.

Barclay S, Todd C, Finlay I, Grande G, Wyatt P (2002) Not another questionnaire! Maximizing the response rate, predicting non-response and assessing non-response bias in postal questionnaire studies of GPs. Fam Pract 19(1):105-111.

Baruch Y (1999) Response rate in academic studies—A comparative analysis. Hum Relat 52(4):421-438.

Baruch Y, Holtom BC (2008) Survey response rate levels and trends in organizational research. Hum Relat 61(8): 1139-1160.

Curtin R, Presser S, Singer E (2005) Changes in telephone survey nonresponse over the past quarter century. Public Opin Q 69(1):87-98.

Erdogan BZ, Baker MJ (2002) Increasing mail survey response rates from an industrial population: A cost-effectiveness analysis of four follow-up techniques. Ind Marketing Mgmt 31(1):65-73.

Fell D, Hansen EN, Punches J (2002) Segmenting single-family home builders on a measure of innovativeness. Forest Prod J 52(6):28-34.

Harzing AW (2000) Cross-national industrial mail surveys: Why do response rates differ between countries? Ind Marketing Mgmt 29(3):243-254.

Kallis MJ, Giglierano JJ (1992) Improving mail response rates with express mail. Ind Marketing Mgmt 21(1):1-4.

Kanuk L, Berenson C (1975) Mail surveys and response rates: A literature review. J Marketing Res 12(4):440-453.

Kline RB (2011) Principles and practice of structural equation modeling. 3rd ed. The Guilford Press, New York, NY. 427 pp.

Martins Y, Lederman RI, Lowenstein CL, Joffe S, Neville BA, Hastings BT, Abel GA (2012) Increasing response rates from physicians in oncology research: A structured literature review and data from a recent physician survey. Br J Cancer 106(6):1021-1026.

Ott RL (1993) An introduction to statistical methods and data analysis. 4th ed. Duxbury Press, Belmont, CA. 1051 pp.

Powers TL, Bendall Valentine D (2009) Response quality in consumer satisfaction research. J Consum Mark 26(4):232-240.

Price JH, Murnan J, Dake JA, Dimmig J, Hayes M (2004) Mail survey return rates published in health education journals: An issue of external validity. Am J Health Educ 35(1):19-23.

Shaw M, Bednall D, Hall J (2002) A proposal for a comprehensive response-rate measure (CRRM) for survey research. J Marketing Manage 18(5-6):533-554.

Sheehan KB (2001) E-mail survey response rates: A review. J Comput Mediat Commun 6(2). (http://onlinelibrary.wiley.com/wol1/doi/10.1111/j.1083-6101.2001.tb00117.x/full).

Sinclair M, O'Toole J, Malawaraarachchi M, Leder K (2012) Comparison of response rates and cost-effectiveness for a community-based survey: Postal, internet and telephone modes with generic or personalised recruitment approaches. BMC Med Res Methodol 12:132.

Skalland B (2011) An alternative to the response rate for measuring a survey's realization of the target population. Public Opin Q 75(1):89-98.

Wiseman F, Billington M (1984) Comment on a standard definition of response rates. J Marketing Res 21(3):336-338.