HortScience 56(6):659–666. 2021. https://doi.org/10.21273/HORTSCI15766-21

Evaluating the Business and Owner Characteristics Influencing the Adoption of Online Advertising Strategies in the U.S. Green Industry

Ariana P. Torres
Department of Horticulture & Landscape Architecture and Agricultural Economics, Purdue University, 625 Agriculture Mall Drive, West Lafayette, IN 47907

Alicia L. Rihn
Department of Agriculture and Resource Economics, 321C Morgan Hall, 2621 Morgan Circle Drive, Knoxville, TN 37996-4500

Susan S. Barton
Department of Plant & Soil Sciences, University of Delaware, 146 Townsend Hall, Newark, DE 19716

Bridget K. Behe
Department of Horticulture, Michigan State University, 1066 Bogue Street, East Lansing, MI 48824

Hayk Khachatryan
University of Florida, Food and Resource Economics Department and Mid-Florida Research and Education Center, 2725 S. Binion Road, Apopka, FL 32703

Additional index words. horticulture, Internet, online marketing, social media, website

Abstract. **Online advertising is becoming a mainstay business practice to reach firms' customer bases. Yet, the adoption and use of online advertising in the green industry are topics that have not been adequately researched. Using a national survey of green industry firms conducted in 2019, this research uses a double-hurdle model to investigate factors that impact firms' adoption of, and amount spent on, online advertising. Our results show that one-third of the companies invested in online advertising. Of those investing in online advertising, the average percentage of online advertising as a share of all advertising expenditures was 46%. Small businesses were less likely to invest in online advertising compared with larger businesses; however, once they invested in online advertising, the percentage of investment was 25% higher among small firms when compared with their larger counterparts. Increasing years in operation as well as trade show participation was related to a 3% decrease in likelihood to use online advertising. Business owners who perceived hiring competent employees as a barrier to business growth invested 19% less of their advertising budget in online channels, which may indicate a lack of human resources to advertise online. We also compared the industry results with data from a 2014 survey and found the amount invested in online advertising increased ≈3% to 5% between studies. The percentage in wholesale sales influenced the amount spent on online advertising in 2014 but not in 2019. Being a small firm in 2014 increased the amount spent on online advertising, but the effect was 14% lower in 2019. In 2014, firms located in the Pacific, Southcentral, and Southeast U.S. regions invested more in online advertising compared with other regions, but in 2019, the only geographic difference was that firms in the Great Plains spent less on online advertising. Despite their lower adoption rates, the increased expenditures on online advertising implies that smaller firms that implement online advertising receive value through that channel and are willing to allocate more resources to leverage its reach. Firms contemplating adopting and investing in online advertising should consider their resource availability and marketing goals related to reaching different customer groups through online advertising.**

The U.S. environmental horticulture industry, or green industry, is composed of production and wholesale nurseries and wholesale/retail distribution centers, as well as marketing intermediaries (Hall et al., 2020). Although the green industry historically was one of the fastest growing sectors of the U.S. economy, Hall (2010) and Barton and Behe (2017) reported some segments have become stagnant or have declined. Increasing marketing and advertising expenditures is a key strategy business owners can take to remain viable and profitable (Li et al., 2019). To illustrate, Palma et al. (2012) reported that investing in promotion and advertising increased sales among green industry businesses. Thus, investigating advertising expenditures and especially online advertising trends has become critical for this industry. To date, few studies have investigated the drivers of and expenditures in online advertising among green industry firms.

The present study used the definition of online marketing (i.e., electronic marketing or e-marketing) of Hooker et al. (2001) as the "*strategic process of creating, distributing, promoting, and pricing goods and services to a target market over the Internet or through digital tools.*" We defined online advertising as the allocation of resources to Internet-based advertising for promoting products and services through the Internet (Sridhar et al., 2016). Online advertising includes investments for websites, social media, e-newsletters, or paid advertisements. Because the major task of marketing is to inform consumers about the company's products and services, who they are, and what they offer, online advertising plays an important role in marketing. To use online advertising, business owners first need to integrate the use of computers and the Internet into their business strategies, followed by the adoption of online marketing tools such as advertisement through search engines (i.e., Google) and social media tools (i.e., Facebook) (Burt and Sparks, 2003).

Online marketing has become an essential tool for businesses to reach new customers and engage with current ones. A recent study showed that 81% of American adults used the Internet; more than half of them were using two or more social media sites (Duggan et al., 2015). The fact that most Americans spend more than 70% of their day on online platforms (Matheena and Riswan, 2018) provides important opportunities to green industry businesses to advertise their products and services more effectively through online advertising. This is especially true as Charm et al. (2020) reported consumer intent to shop online is expected to increase up to 35% after COVID-19. Behe et al. (2013) showed women were more likely to search online for both gardening and nongardening information, but men were more likely to make online garden-related purchases. They also found that online searches for nongardening information increased the likelihood of an online purchase by 16%. Online platforms clearly provide a window of opportunity for businesses to connect with consumers and boost sales.

Social media marketing is a strategic and methodical process to establish the company's influence, reputation, and brand within communities of potential customers, readers, or supporters. Social media marketing includes marketing campaigns that engage with a wider range of consumers online (Matheena

and Riswan, 2018), and comprises a set of Internet-based tools for sharing and discussing information among people (Neti, 2011). Kietzmann et al. (2011) listed seven functional building blocks of social media: identity, conversation, sharing, presence, relationships, reputation, and groups. Identity provides the users information, whereas conversations are the forms of communication using social media platforms. Sharing refers to the exchange of content, whereas presence highlights user timing and availability in social media. Relationships refer to the connection between companies and users, which tend to influence the reputation of the business. Last, businesses can make use of social media to create groups or communities of current and potential customers to build relationships and trust. Relationships with customers have previously been explained as linear, relational, and exchange partnerships. The rise of social media has shifted the balance of power (Quinton, 2013) from one-way individual communications to multifaceted interactions among consumers, advocates, and the business itself. Businesses once held most of the power in face-to-face advertising, but social media puts more power in the hands of end consumers, who can express opinions and perceptions. The switch from a relational orientation (one-on-one communication) to an interactional orientation (multifaceted relationships based on sharing within and between digitally enabled communities) has changed the way businesses think about online marketing (Thompson and Coskuner-Balli, 2007).

Social media enables businesses to share their expertise and knowledge, tap into the wisdom of their customers, facilitate customers helping customers, and engage prospects (Neti, 2011). Some companies use social media marketing as a pure communication tool to push content to customers, the community, or employees, whereas more progressive companies take advantage of the integrative, interactive, and collaborative potential of social media technology. These progressive businesses can acquire and use customer feedback, develop market segmentation strategies, encourage two-way communication, and get involved in the development of relationships (Felix et al., 2017).

Although online advertising provides firms the opportunity to reach audiences faster and with less effort and money, and small businesses realize they gain value from using social media and other online tools, most have established only a passive presence, which is often stated due to a lack of resources (Cole et al., 2017). Research in 2013 found that Internet marketing and e-mail marketing are the most used e-marketing tools by small businesses and that the adoption of these tools has had a positive impact on the success of these firms (Eid and El-Gohary, 2013). In a survey of small service businesses, company website, social media, and e-mail marketing were the top three digital or social media strategies used by those businesses (Cole et al., 2017).

The Internet has facilitated the growth of online advertising over the past decade, and online advertising has moved from being a peripheral to a central advertising medium because of its unique targeting capabilities (Doctorow et al., 2009). Yet, many green industry firms struggle to integrate online advertising into their traditional advertising strategies (Danaher and Dagger, 2013). Torres et al. (2019) found that fewer than 50% of green industry businesses used any form of online advertising in 2014. Because the scope and specificity of digital marketing changes rapidly, tools that were new a few years ago quickly become obsolete (DeSwann Arons et al., 2014). Therein lies the value of following trends in the nursery and landscape industry every 5 years with a survey addressing current practices and concerns.

Based on results from the 2014 Nursery Industry Survey, Torres et al. (2019) found that business owners who perceived marketing as an important factor affecting the geographic range of their firms were more likely to invest in online advertising. The same study found when businesses had fewer customers (those who sold wholesale or via contracts), they were less likely to engage in online advertising. Although smaller firms were less likely to adopt online marketing strategies, other researchers (Yao et al., 2019) found that smaller firms were more likely to benefit from online advertising.

The aim of this article was to investigate the contemporary business and managerial characteristics that influence the decision to adopt online strategies among green industry firms. Using a double-hurdle model, we investigated whether firms invested in online advertising and how much investment they made in the 2019 survey. Findings addressed different factors affecting the willingness of green industry firms to participate in online advertising and how those factors influenced the amount invested in online advertisements. This study builds on the findings of Torres et al. (2019) to identify changes within the industry to aid firms when determining future business and marketing strategies, especially the investment in online advertising. In the context of sequential surveys, researchers can track changes in the online marketing practices of green industry firms. Thus, we compared firm characteristics and online advertising between the 2014 and 2019 National Green Industry sequential surveys. Results highlight industry trends related to firm characteristics, marketing strategies, and online advertising.

Data and Methodology

We draw from Sridhar et al. (2016), who defined online advertising as the allocation of resources to Internet-based advertising for promoting products and services through the Internet. Similar to Torres et al. (2019), we propose online advertising comprises a diverse set of tools and methodologies used for promoting products and services through the Internet, such as paid online marketing, use of social media for consumer engagement, newsletters sent via e-mail, and search engine marketing among others. Thus, online advertising includes a wider range of marketing elements than traditional business marketing due to the additional channels and marketing mechanisms available on the Internet (Techopedia, 2018).

Data description

We used data from the 2019 National Green Industry Survey that gathered information on business practices and operating results for the calendar year 2018 or fiscal year 2018–19. The 2019 survey represented the seventh national survey conducted by the Green Industry Research Consortium (Hall et al., 2020) and was used to model the decisions to 1) invest in online advertising and 2) the amount invested in online advertising. The 2019 survey targeted green industry businesses for the second time with questions added regarding digital marketing practices. The survey included detailed questions about social media use and advertising expenditures for digital marketing practices. The questionnaire and survey protocol were approved by the University of Florida's Institutional Review Board for compliance with ethical standards for human subjects research. The survey targeted 43,877 firms, including 14,995 grower or grower/dealer firms who were randomly selected to receive the questionnaire mailed via the U.S. Postal Service, and all 28,882 firms with e-mail addresses received the survey via e-mail (Internet) invite. Valid responses were received from 2657 firms, including 945 responses from the e-mail survey and 1712 from the mail survey. A total of 958 e-mail addresses and 299 mail surveys were considered as undeliverable, and 377 firms opted-out in the e-mail survey. Methods used to draw the sample and survey protocol procedures are described in detail in Hall et al. (2020).

From the 2657 responses in the 2019 survey, we drew a subsample of 1352 commercial growers who reported the amount of advertising expenditures via online and other channels. Businesses who did not report the amount of advertising expenditures as a percentage of annual sales were excluded from the analysis. Commercial operations were defined as those that reported >$10,000 in sales in the 2019 survey. Businesses that reported annual sales <$10,000, representing operations that were not participating in the business full-time, were excluded from the sample. When looking into the type of

Received for publication 8 Feb. 2021. Accepted for publication 23 Mar. 2021.
Published online 5 May 2021.
We thank the Horticultural Research Institute, which supplied funding that was essential for data collection. We also thank the members of the S-1065 Regional Project for the data.
A.P.T. and A.L.R. are Assistant Professors.
S.S.B. is a Professor and Extension Specialist.
B.K.B. is a Professor.
H.K. is an Assistant Professor.
A.P.T. is the corresponding author. E-mail: torres2@purdue.edu.

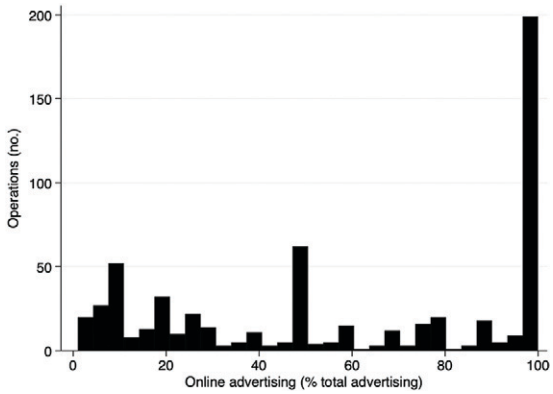

Fig. 1. Number of U.S. green industry operations participating in a 2019 national survey and their investment in online advertising investment as a proportion of total advertising expenditures.

advertising expenditures, we found that of the 1352 growers, 449 (33%) reported investing in online advertising, and 903 (67%) of the operations did not. Figure 1 illustrates the distribution of the percentage of online advertising among those investing in online advertising. Of those investing in online advertising, the average percentage of online advertising as a share of all advertising expenditures was 56%, whereas the median was 50%. In comparison, Torres et al. (2019) reported that 40% of growers invested in online advertising in 2014, and their average percentage of online advertising as a share of all advertising was 46%, whereas the median was 40%. Online advertising expenditures included expenditures on Internet, social media, and e-newsletter advertising. Of the 1352 businesses, 931 (69%) were growers selling wholesale and 421 (31%) were growers selling wholesale/retail. The 2019 survey had a larger proportion of businesses selling wholesale, when compared with the 2014 industry survey (25%). Similar to Torres et al. (2019), growers were further categorized as wholesale (if the business sold most of the plant material to wholesalers) and wholesale/retail (if the business sold plant material through both wholesale and retail means).

Empirical model specification

In this section, we discuss the method used in estimating 1) the factors influencing investing in online advertising, and 2) the factors influencing the amount invested in online advertising. All analyses were conducted using Stata (release 16; StataCorp, College Station, TX). A double-hurdle model with robust standard errors was used to separate these decisions into two stages and estimate online advertising investing and the investment-associated amount. The double-hurdle model, an extension on the standard Tobit model, relaxes the Tobit assumption that the factors affecting the decision to invest in online advertising (stage 1) have the same effect on the amount invested (stage 2). In other words, the double-hurdle model estimates what drives green industry business owners to first determine whether they want to invest in online advertising (the participation decision), and then the amount of optimal investment in online advertising (the quantity decision). Aramyan et al. (2007) and Detre et al. (2011) used a similar model to decouple technology investment among agricultural firms.

The model is given by Eq. [1], which illustrates the 2-step process from the first to the second stage, where a business owner "hurdles" to the second stage if she or he invested in online advertising (given $y_1 = 1$):

$$f(y_2|x) = \begin{cases} \Pr[y_1 = 0|x] & \text{if } y_2 = 0 \\ Pr[y_1 = 1|x] \ \ f(y_2|y_1 = 1,\ x) & \text{if } y_2 = 1 \end{cases} \quad [1]$$

We followed Duan et al. (1983) and Cameron and Trivedi (2009) to define the first decision as a probit regression by Eq. [2] and the second decision as a least-square regression by Eq. [3]. In the following equations, Eq. [2] is a normally distributed probability regression, where y_1 is equal to 1 if the business invested in online advertising, and y_1 is equal to zero otherwise; and x is the vector of the business owner characteristics and business characteristics discussed below. Eq. [3]

Table 1. Categories and descriptions of the variables used to investigate the drivers of investing in online advertising among U.S. green industry growers.

Variable	Description
Online advertising (%)	Percentage of online advertising via Internet or social media as percentage of advertising expenditures
Online advertising	1 = business did online advertising in 2018
Sales in contracts (%)	Percentage of sales through contracts
Wholesale sales (%)	Percentage of sales via wholesale
Market diversification index	Diversification index (measured with the Herfindahl Index) for number of sales methods denoting the number of methods used to sell products, including trade shows, telephone, in-person, mail, and Internet
Market distribution index	Diversification index (measured with the Herfindahl Index) for distribution sales methods, denoting the percentage sales through each method
Tradeshows (no.)	Number of tradeshows attended in 2018
Employees (no.)	Number of employees
Small	1 = if annual gross sales were more than $10,000 and less than $250,000 (reference group)
Medium	1 = if annual gross sales were between $250,000 and <$1,000,000
Large	1 = if annual gross sales were $1,000,000 or more
Time operating (years)	Years of operation
Time operating (years^2)	Square years of operation
Social media	1 = if business used social media for marketing
Online information	1 = if business used the Internet or social media as a method to obtain useful information
Appalachian	1 = if business is located in the Appalachian region
Great Plains	1 = if business is located in the Great Plains region
Midwest	1 = if business is located in the Midwest region
Mountain	1 = if business is located in the Mountain region
Northeast	1 = if business is located in the Northeast region
Pacific	1 = if business is located in the Pacific region
Southcentral	1 = if business is located in the Southcentral region
Southeast	1 = if business is located in the Southeast region
Container (%)	Percentage sales from containerized products
Burlapped (%)	Percentage sales from balled/burlapped
Field-grown (%)	Percentage sales from field-grown bag
Bare root (%)	Percentage sales from bare root
Ballpotted (%)	Percentage sales from ballpotted products
In ground (%)	Percentage sales from in-ground products
Other form	Percentage sales from other forms
Barrier hire	1 = if hiring competent labor is an important factor affecting business growth
Barrier demand	1 = if market demand is an important factor affecting business growth
Barrier competition	1 = if competition is an important factor affecting business growth
Market geography	1 = if marketing is an important factor affecting the geographic range of business
Plants offering geography	1 = if plant offerings is an important factor affecting the geographic range of business
Transportation geography	1 = if transportation is an important factor affecting the geographic range of business

Table 2. U.S. respondents in the 2019 National Green Industry Survey of green industry growers (N = 1352) categorized by market outlets as wholesale (N = 931) or wholesale/retail (N = 421). Values represent the percentage of businesses with each of the attributes.

	Grower				
	Full sample	Wholesale		Wholesale/Retail	
	N = 1352	N = 931		N = 421	
Online advertising	0.33	0.28	B	0.45	A
Online advertising (%)	18.57	16.45	B[z]	23.25	A
Social media[y]	0.36	0.24	B	0.63	A
Sales in contracts (%)	10.37	12.18	A	6.37	B
Wholesale sales (%)	54.55	62.87	A	36.16	B
Time operating (years)	28.39	27.77		29.76	
Time operating (years^2)	1312.58	1220.97	B	1512.89	A
Market diversification index	0.25	0.26	A	0.22	B
Market distribution index	–0.15	–0.15		–0.16	
Small[y]	0.60	0.58	B	0.64	A
Medium[y]	0.20	0.19		0.20	
Large[y]	0.20	0.22	A	0.16	B
Employees (no.)	14.81	16.52	A	11.03	B
Tradeshows (no.)	1.06	1.15		0.85	
Appalachian[y]	0.12	0.11		0.13	
Great Plains[y]	0.01	0.01	B	0.03	A
Midwest[y]	0.15	0.12	B	0.21	A
Mountain[y]	0.03	0.03		0.03	
Northeast[y]	0.19	0.16	B	0.24	A
Pacific[y]	0.15	0.17	A	0.12	B
Southcentral[y]	0.07	0.07		0.08	
Southeast[y]	0.28	0.33	A	0.17	B
Container (%)	68.43	62.25	B	81.64	A
Burlapped (%)	10.06	11.67	A	6.64	B
Field-grown (%)	1.03	0.86		1.41	
Bare root (%)	7.52	8.82	A	4.72	B
Ballpotted (%)	0.79	0.95		0.43	
In ground (%)	2.12	2.51		1.29	
Other form (%)	8.04	10.42	A	2.89	B
Barrier hire[y]	0.45	0.44		0.47	
Barrier demand[y]	0.66	0.64	B	0.69	A
Barrier competition[y]	0.37	0.36	B	0.41	A
Market geography[y]	0.29	0.26	B	0.35	A
Plants offering geography[y]	0.44	0.43		0.48	
Transportation geography[y]	0.44	0.46	A	0.39	B

[z]Upper case letters show statistically significant differences across columns at $P < 0.05$ using Tukey's significant difference test.

[y]Variable is expressed as in decimal points as the mean percentage of businesses with that attribute.

used a continuous value of the percentage of online advertising (y_2) as a proportion of all advertising expenditures. The variable y_2 is observed only if $y_1 = 1$. Eq. [3] used an ordinary least squares regression for the percentage of online advertising invested, given that the business invested in online advertising, where x is the vector of explanatory variables used in Eq. [2] and v is the error term.

$$\Pr(y_1 = 1|x) = \phi\ (x'\beta) \qquad [2]$$

$$(y_2|y_1 = 1,\ x) = x'\beta + v \qquad [3]$$

Table 1 describes the set of explanatory variables x used in Eq. [2] and [3] and Table 2 provides the descriptive statistics of all the variables used in the models, which includes the percentage of online advertising, business characteristics, product offerings, geographic characteristics, and business owners' perceptions. Business characteristics included business size (by annual sales), number of employees, years of operation, marketing expenditures, and marketing strategies. Product offerings included container, balled and burlapped, field-grown bag, bare root, in-ground container, and other plant forms. Businesses were segregated into eight U.S. geographical regions: Appalachian, Great Plains, Midwest, Mountain, Northeast, Pacific, Southcentral, and Southeast.

We were interested in understanding how managerial decisions regarding market diversification may affect online advertising adoption. The managerial ability of the business owners to diversify across markets was measured by the Herfindahl index. We followed Gollop and Monahan (1991) to divide the sales diversification strategies of green industry businesses into two components: number of sales methods used (first bracket) and distribution of sales per method (second bracket):

$$diversification = 1 - \frac{1}{methods} + \sum_i \left[\frac{1}{methods^2} - share_i^2\right] \qquad [4]$$

The first bracket in Eq. [4] accounted for the number of sales methods used by the businesses, including trade shows, telephone, in-person, mail, and Internet, and reflects the number of different methods of sales (market diversification index) used by those businesses. The market diversification index increased as the number of different methods of sales used increased. For example, a business using five methods would have a value of 0.8 for the first bracket, whereas an operation selling only in-person (one sales method) would have a value of zero. A higher number of selling methods used by businesses indicates a higher degree of market diversification.

The second bracket in Eq. [4] reflects the diversification in distribution of sales methods (market distribution index) by businesses, which accounts for the proportion of sales through each of the different sales methods. For example, a business that reported selling two products and an equal proportion (50/50) of in-person and trade show sales would have a distribution component of -0.25, or $\frac{1}{2^2} -(0.5^2+0.5^2) = -0.25$. On the other hand, a business selling 90% of its products in-person and only 10% via trade shows would have a diversification component of $\frac{1}{2^2} -(0.9^2+0.1^2) = -0.57$. In other words, a larger negative value of the diversification component would indicate more unequal distribution of sales.

Comparison of firm characteristics and online advertising between 2014 and 2019 surveys

Given that the 2014 (Torres et al., 2019) and the 2019 (Hall et al., 2020) surveys used similar questions, we performed a comparison of the results across survey years to capture industry trends related to firm characteristics and online advertising. Table 3 illustrates results from the double-hurdle model assessing the drivers of investment in online advertising and the drivers of the amount invested in online advertising. Tables 4 and 5 illustrate the mean differences among business practices and characteristics between the two sequential surveys.

Empirical Results

Summary statistics

Table 2 illustrates the mean differences for all the variables used in the model, by type of market channel used: growers that sell mainly wholesale (WG) or wholesale and retail (WR). On average, firms sold 54.55% of their sales wholesale, with WG reporting twice the percentage of WR. The average green industry business reported 28 years of operation. Market diversification was greater for WG compared with WR, whereas market distribution was similar. Sixty of the businesses in our sample were small (annual sales <$125,000), and the proportion of small businesses was higher among WR firms ($P < 0.05$). The average number of employees in each of the responding businesses was 15. The number of employees for WG was higher (17 employees) than for WR (11 employees) ($P < 0.05$). WG reported, on average, 12% of their sales were via contracts but WR reported half that amount. The amount of sales by contract was twice as high among WG businesses compared with WR ($P < 0.05$). On average, green industry businesses

Table 3. Double-hurdle model results of the drivers of investment in online advertising and the drivers of the amount invested in online advertising among U.S. green industry growers.

	Factors influencing investment on online advertising[z]			Factors influencing the amount invested on online advertising[y]		
	Coef.	SE		Coef.	SE	
Sales in contracts (%)	–0.004	0.002	**	–0.076	0.118	
Wholesale sales (%)	–0.002	0.001	*	0.038	0.062	
Market diversification index	0.745	0.246	***	–21.186	13.390	
Market distribution index	–0.054	0.288		–18.789	14.768	
Tradeshows (no.)	0.015	0.008	*	–2.973	1.065	***
Employees (no.)	0.002	0.001		0.089	0.060	
Small	–0.247	0.147	*	25.383	9.662	***
Medium	–0.263	0.151	*	–0.994	10.766	
Time operating (years)	–0.008	0.005		–0.790	0.260	***
Time operating (years^2)	0.000	0.000		0.008	0.002	***
Social media	0.873	0.095	***	–7.984	5.968	
Online information	0.442	0.091	***	0.520	5.927	
Appalachian	–0.058	0.164		12.098	10.087	
Great Plains	–0.174	0.303		–11.658	37.307	***
Midwest	–0.204	0.144		2.681	9.036	
Mountain	–0.455	0.281	*	1.001	20.785	
Pacific	–0.217	0.149		14.921	9.413	
Southcentral	–0.226	0.200		12.819	10.772	
Southeast	0.196	0.134		8.540	8.975	
Container (%)	–0.001	0.001		–0.122	0.077	
Burlapped (%)	0.001	0.002		–0.195	0.122	
Field-grown (%)	0.000	0.005		–0.246	0.257	
Bare root (%)	0.002	0.002		–0.057	0.101	
Ballpotted (%)	0.017	0.006	***	0.008	0.157	
In ground (%)	0.002	0.004		–0.045	0.228	
Barrier hire	0.221	0.103	**	–18.936	5.412	***
Barrier demand	–0.028	0.115		4.176	6.829	
Barrier competition	0.159	0.095	*	–2.434	5.408	
Market geography	0.321	0.101	***	1.026	5.259	
Plants offering geography	–0.055	0.101		–5.451	5.995	
Transportation geography	0.053	0.105		2.390	5.904	
Intercept	–0.921	0.250	***	68.390	18.065	***
Observations					1,056	
Chi-square P value					0.000	
Sigma					38.902	***

[z]Coefficients of the first-stage regression convey the rate of change in the log odds (or the odds ratio) for one unit increase in the independent variable, holding all other independent variables constant.

[y]Coefficients of the second-stage regression convey the rate of change in the amount invested in online advertising for one unit increase in the independent variable, holding all other independent variables constant.

*, **, ***Significant at $P < 0.1$, 0.05, or 0.01, respectively.

attended one trade show in 2019, and the number of these events was higher for wholesale growers than for those selling through wholesale/retail outlets ($P < 0.05$).

Most of operations in the sample were in the Southeast (28%) and Northeast (19%), followed by Pacific (15%), Midwest (15%), Appalachian (12%), Southcentral (7%), Mountain (3%), and Great Plains regions (1%) of the United States. There was a higher percentage of growers selling through WR channels in the Great Plains, Midwest, and Northeast regions, whereas most of the wholesale grower operations were in the Southeast and Pacific regions ($P < 0.05$). Firms in the Great Plains, Midwest, and Northeast are geographically closer to large population centers potentially making retail enterprises more feasible.

Businesses reported a higher percentage of sales of container plants (68%), followed by balled and burlapped (10%), and other forms of plant material (8%). Container plants comprised more than three-fourths of sales for WR firms but 62% for WG firms. Nearly twice the percentage of burlapped material was sold by WG compared with WR. Although there were small differences across the business types, similar percentages of plant material sales were observed across WR growers for field-grown, ballpotted, and other forms of plant material sold.

The two top barriers for business growth cited by business respondents were market demand (66% of firms) and ability to hire competent labor (45% of firms). These barriers were more important for WR than WG ($P < 0.05$), most likely because they are located closer to their consumer base and see/feel the demand effects more prominently. Almost half of the WG reported transportation and plant offerings as major factors affecting the geographic range of their businesses but less than 40% of WR expressed this same concern.

Overall, one-third of the firms engaged in online advertising, but 17% more WR engaged in online advertising compared with WG. The average company invested 18.57% of all advertising expenditures in online strategies including Internet and social media advertising. The investment in online advertising was higher among WR businesses compared with WG ($P < 0.05$), which is consistent with Torres et al. (2019). Approximately 36% of businesses used social media as a marketing strategy to connect with customers and promote products and services. The use of social media as a marketing strategy was nearly three times higher among WR than WG ($P < 0.05$), which makes intuitive sense if a business is striving to connect directly with an end-user consumer base. Approximately 49% of businesses obtained useful information from online sources, including social media and other online and electronic sources, and the use of these tools was higher for businesses selling through wholesale/retail channels ($P < 0.05$).

Regression results

This section presents the results of the two questions related to the investment in online advertising among green industry businesses: whether the firm invested in online advertising or not, and then how much was spent. The estimated results of the double-hurdle model that addresses the two research questions can be found in Table 3.

What drives green industry businesses to invest in online advertising? The first stage of the double-hurdle model investigated the factors driving a green industry business to

Table 4. Comparison of the results of the 2014 (N = 1215) and 2019 (N = 1352) National Green Industry Surveys of green industry growers in the United States categorized by market outlets as wholesale or retail. Values represent the percentage of businesses with each of the attributes.

	Grower wholesaler				Grower retailer			
	2014		2019		2014		2019	
	N = 448		N = 931		N = 767		N = 421	
Percentage online advertising	11.72	B[z]	16.45	A	20.57		23.25	
Online advertising[y]	0.30		0.28		0.46		0.45	
Percentage sales in contracts	17.04	A	12.18	B	9.72	A	6.37	B
Percentage wholesale	98.44	A	62.87	B	44.08	A	36.16	B
Market diversification index	0.35	A	0.26	B	0.30	A	0.22	B
Market distribution index	–0.24	A	–0.15	B	–0.22	A	–0.16	B
Number of tradeshows	1.32		1.15		0.88		0.85	
Number of employees	42.83	A	16.52	B	13.30		11.03	
Small[y]	0.46	B	0.58	A	0.62		0.64	
Medium[y]	0.25	A	0.19	B	0.20		0.20	
Large[y]	0.29	A	0.22	B	0.18		0.16	
Years operating	28.68		27.77		29.17		29.76	
Years operating^2	1231.02		1220.97		1382.09		1512.89	
Appalachian[y]	0.15	A	0.11	B	0.15		0.13	
Great plains[y]	0.00		0.01		0.03		0.03	
Midwest[y]	0.12		0.12		0.16	B	0.21	A
Mountain[y]	0.03		0.03		0.03		0.03	
Northeast[y]	0.17		0.16		0.28		0.24	
Pacific[y]	0.08	B	0.17	A	0.08		0.12	
Southcentral[y]	0.09		0.07		0.08		0.08	
Southeast[y]	0.34		0.33		0.17		0.17	
Barrier hire[y]	0.39		0.44		0.34	B	0.47	A
Barrier demand[y]	0.85	A	0.64	B	0.86	A	0.69	B
Barrier competition[y]	0.56	A	0.36	B	0.51	A	0.41	B
Market geography[y]	0.38	A	0.26	B	0.41	A	0.35	B
Plants offering geography[y]	0.54	A	0.43	B	0.59	A	0.48	B
Transportation geography[y]	0.65	A	0.46	B	0.60	A	0.39	B

[z]Upper case letters show statistically significant differences across columns of wholesalers or retailers at $P < 0.05$ using Tukey's significant difference test.

[y]Variable is expressed as in decimal points as the mean percentage of businesses with that attribute.

invest in online advertising. The results indicated that the sales method was a major factor influencing the adoption of online advertising. Table 3 illustrates that increasing the percentage of sales via contracts ($P < 0.05$) and of wholesale sales ($P < 0.10$) decreased the probability of investing in online advertising among green industry businesses. It seemed that growers selling a larger volume of plants to wholesalers and via contracts perceived that online advertising may not be an effective strategy to reach their customer base. Researchers anticipate that growers selling via wholesale or contracts have a smaller number of customers but have a larger volume of sales and likely have personal connections with their customers, which aids in facilitating those sales.

Increasing the number of sales methods, measured by the market diversification index ($P < 0.01$), significantly increased the probability of green industry businesses investing in online advertising. An explanation may be that businesses that reach their customers through a variety of sales methods may perceive that online marketing can help them build relationships, advertise products/services, and increase sales. Ball and Duval (2001) found having an online presence (i.e., using online advertising) had a positive impact on the sales of farming operations. We expected that in an effort to diversify market outlets, business owners found online advertising useful to reach a wider geographic range and larger number of customers (as discussed by Cole et al., 2017).

Table 5. Mean percentage of products grown in six containers/forms, by business type using adjusted responses (totals in 2014 and 2019 were not constrained to total 100%, but have been adjusted to total 100%).

	Grower wholesaler				Grower retailer			
	2014		2019		2014		2019	
	N = 448		N = 931		N = 767		N = 421	
Container	69.27	A	71.16	B	73.47		84.93	
Burlapped	16.78	A	13.43	B	9.96	A	6.91	B
Field-grown	0.37		1.09		0.54	B	1.46	A
Bare root	3.28	B	10.16	A	5.08		4.91	
Ballpotted	0.60		1.19		0.79		0.45	
Other form	9.70		2.97		10.16	A	1.34	B
Sum total responses	100.00		100.00		100.00		100.00	

Upper case letters show statistically significant differences across columns at $P < 0.05$.

The result that small- and medium-sized businesses were less likely to invest in online advertising ($P < 0.10$) than larger businesses was somewhat expected. Torres et al. (2019) reported a similar result from the 2014 green industry data, and it appears that over time larger farm businesses had a greater probability of adopting online marketing tactics. Resource limitations, especially capital, personnel, and expertise, may be limiting the ability of smaller businesses to engage in online advertising. Other researchers have found that ornamental horticulture business owners perceive lack of time, limited returns, and the cost of online advertising as key barriers to using social media marketing.

As expected, using social media for the business ($P < 0.01$) and using the Internet to access business information ($P < 0.01$) increased the likelihood of investing in online advertising. It is likely that becoming familiar with online sources of information lowers the barriers to invest in online advertising. WG selling ballpotted plants were more likely to invest in online advertising. Perhaps these plants are easier to ship than other formats (except bare root) but fewer WG sell ballpotted plants, so their distribution region may be greater, meaning they could depend more on online advertising. Businesses in the Mountain region were less likely to invest in online advertising when compared with those in the Northeast ($P < 0.10$). Business owners who perceived that hiring competent labor ($P < 0.10$) and competition ($P < 0.01$) were major barriers for business growth were more likely to invest in online advertising. Last, business owners who perceived that marketing was an important factor affecting the geographic range of business growth were more likely to invest in online advertising ($P < 0.01$). It is likely that business owners who are aware of the power of marketing can appreciate and draw on the value of online advertising to attract customers from other areas.

How much did the business invest in online advertising? Small businesses were less likely to invest in online advertising compared with larger businesses. However, once they invested in online advertising, the percentage of investment was 25% higher among small firms when compared with their larger counterparts ($P < 0.01$). This result implies that small businesses were less likely to invest in online advertising, which may be because of limited knowledge, skills, resources, and time availability; but when they do invest, they tended to dedicate a larger percentage of advertising resources to online methods when compared with larger businesses. Social media can be a very cost-effective advertising mechanism (Ainin et al., 2015) if the firm has the skill set and commitment to communicate online. An explanation may be that smaller operations are less likely to invest in online advertising as a group, but those innovative businesses that do, tend to invest a lot in social media, e-newsletters, and websites.

Similar to Torres et al. (2019), increasing the number of trade shows a firm attended

decreased their investment in online advertising by 3% ($P < 0.01$). Trade shows may be a way for WG to establish and maintain more personal face-to-face relationships with current and potential buyers. Developing these direct relationships may detract from engaging in online marketing as a strategy. Or, perhaps those WG may believe face-to-face contact is a more effective means for them to find and interact with potential buyers. In addition, participating in trade shows requires an investment of resources (Gilliam, 2015), which may limit resources available for other marketing channels. Increasing the number of years a business is in operation decreased the amount invested in online advertising ($P < 0.01$). Younger firms may find online advertising to be a communication mode with which they are more familiar personally, and they may bring a level of comfort and experience to a new business for communicating with their customers via online methods.

Green industry growers located in the Great Plains region invested a lower percentage (12%) of their advertisement budget in online media when compared with firms located in the Northeast region ($P < 0.01$). Larger population centers and greater distances to markets may be encouraging businesses located in the Northeast region to engage with customers and build brand awareness via online advertising. Last, business owners who perceived hiring competent employees as a barrier to business growth invested 19% less of their advertising budget in online marketing ($P < 0.01$). Together these findings show the characteristics that drive and deter green industry growers to invest in online advertising are different from those that ultimately increase the investment amount in online advertising.

Comparison of firm characteristics and online advertising between 2014 and 2019 surveys. Given that the 2014 (Torres et al., 2019) and the 2019 (Hall et al., 2020) surveys used similar questions, a comparison of the results across the survey years can be used to capture industry trends related to firm characteristics and online advertising. WG operations increased the amount of online advertising from 2014 to 2019, whereas there was no significant change between those doing retail ($P < 0.05$). Market diversification and market distribution decreased for both doing WR operations ($P < 0.05$). Table 4 illustrates the comparison on the main business practices and characteristics between the two surveys.

The distribution of small, medium, and large firms changed little from 2014 to 2019. There was an increase in the number of smaller operations for growers selling wholesale, which was mainly driven by businesses getting larger ($P < 0.05$). Regarding years in operation, firms only operated an average of 1 more year in 2019. The geographic distribution of firms changed little over the years, except for 5% fewer firms in the Northeast region, 8% more in the Pacific region, and 6% fewer in the Southeast region. It is important to note, that some of these firm characteristic variances may be related to differences in the samples between the two data collection cycles but with the sufficiently large sample size, they should be comparable.

The percentage of plants grown in various container types or forms is shown in Table 5. Responses from 2014 and 2019 were not constrained to total 100% (and sum to greater than 100% in 2014 and less than 100% in 2019). Thus, we adjusted percentages from both years to total 100% for comparisons and the adjusted percentages are shown. Container-grown products still constituted the majority of plant forms. Comparing the proportions of plants grown in containers, results show that containers accounted for nearly 70% of production in 2014 compared with 71.16% in 2019, increasing <2% for WG. Comparatively, container production for WR was 73.5% in 2014 and grew to 84.9% in 2019, but the change was not statistically significant. Second in proportion of containers/forms was burlapped plants. For WG, burlapped material decreased from 16.78% in 2014 to 13.43% in 2019. A similar but more dramatic decline was observed for WR, with burlapped material declining from 9.96% in 2014 to 6.91% in 2019. Results showed an increase in bare root material for WG from 3.28% in 2014 increasing to 10.16% in 2019. However, the percentage of bare root remained relatively stable changing slightly from 5.08% in 2014 to 4.91% in 2019. The increase in bare root production may lie in a potential increase in online/remote orders that were sent via common carrier (e.g., UPS, USPS, FedEx) or in sales to planting initiatives of public (e.g., roadside improvement) or private (tree-planting drives) sectors.

Except for the ability to hire competent employees, all the factors related to operating a business were rated as less important in 2019 when compared with 2014 for both types of operations (WG and WR) ($P < 0.05$). The barrier of not being able to hire competent employees was 13% more important for retailers in 2019 than in 2014 ($P < 0.05$). When considering factors that limited firm geographic expansion, the factors of market, plant offerings, and transportation were less important by 10% to 20% between 2014 and 2019. These results point to the improved competitiveness (or perceived competitiveness) that firms believed they had when compared with their competitors.

Main changes in the double-hurdle results are related to market distribution, business size, location, and market access. The market distribution index no longer influenced the firm's willingness to invest in online advertising. However, being a medium-sized firm negatively influenced online advertising, which is inconsistent with the 2014 results. Use of social media was not included in the 2014 survey, but had a significant and strongly positive effect on online advertising in 2019. Geographic location did not play a role in online advertising in 2014 but it did in 2019. Firms in the Mountain region were 45.5% less likely to advertise online in 2019 than in 2014.

Drivers for the amount invested in online advertising also changed slightly from 2014 to 2019. For example, the percentage in wholesale sales influenced the amount spent on online advertising in 2014 but not in 2019. The number of trade shows a firm attended was inversely correlated to the amount spent on online advertising in 2014 and slightly less so in 2019. Being a small firm in 2014 increased the amount spent on online advertising, but the effect was 14% less in 2019. Years in operation did not influence online advertising expenditures in 2014 but had a negative effect in 2019. Older firms spent less on online advertising. In the 2014 survey, firms located in the Pacific, Southcentral, and Southeast regions invested more in online advertising compared with other regions, but in 2019 the only geographic difference was that firms in the Great Plains region spent less on online advertising.

Conclusions and Implications

Online advertising is becoming increasingly popular among firms in multiple industries due to the efficiency of reaching core consumer groups and supplying relevant information to those groups. As online sales continue to grow and the green industry continues to modernize, implementing online advertising can help businesses to increase visibility, increase customer reach, and grow sales more efficiently than ever before. To date, research addressing online advertising in the green industry is scarce, but very important to aid in directing future marketing strategy decisions. This article addressed different factors affecting the willingness of green industry firms to participate in online advertising and how those factors influenced the amount invested in online advertisements. Overall, results demonstrate that the use and amount spent on online advertising varies across green industry firms and relates to the firm type, size, product offerings, perceived barriers, and market channels. Firms with retail components were more inclined to use online advertising (including social media) and online information sources than their wholesale-only counterparts, likely because of different customer bases and how they interact and communicate with those bases. Interestingly, as firm size decreased, firms were less likely to invest in online advertising; however, once smaller firms invested in online advertising, they committed a larger portion of their expenditures to that advertising method than larger firms, potentially realizing some cost-effectiveness (Ainin et al., 2015).

Several differences were observed related to online advertising participation and expenditures between the 2014 and 2019 datasets (Hall et al., 2020; Torres et al., 2019). Based on the findings, there are several relevant implications for green industry firms. First, dependent on the firm's market, the use of online advertising and the amount spent on those efforts varies. Businesses doing retail

sales appear to better use online advertising methods, including social media, to communicate with their primary customers (i.e., end consumers). This aligns with a large proportion of end consumers being online throughout their day (Duggan et al., 2015). Furthermore, providing information online via online advertising is a convenient means for end consumers to browse and use that information as needed. Conversely, wholesale firms may benefit more from a combination of different marketing channels, including pairing in-person promotions (e.g., trade shows) with other methods.

Second, as firms encounter barriers related to labor and competition, their likelihood of participating in online advertising increases. This may relate to the need to efficiently differentiate their firms from their competitors with limited labor inputs. The content of online advertising can reach a broader market (geographically and otherwise) in a targeted manner more effectively than traditional marketing avenues (Cole et al., 2017).

Last, firm size influenced the adoption of and expenditures on online marketing with small and medium firms resisting adoption more so than large firms. These results may be related to larger firms typically having more resources and labor available to implement and manage online advertising channels; however, small firms that adopt online advertising spend more on their online advertising (in terms of the percentage of the firm's advertising budget) than large firms. Despite their lower adoption rates, the increased expenditures on online advertising implies that smaller firms that implement online advertising receive value through that channel and are willing to allocate more resources to leverage its reach. Firms contemplating adopting and investing in online advertising should consider their resource availability and the potential outputs coming from reaching different customer groups related to using online advertising.

Although the results of this study provide insights into the adoption and investment of green industry firms in online advertising, there are several limitations that should be acknowledged. We compared the 2014 and 2019 survey results and, although the samples are representative, they are different samples that can affect the trends observed. In addition, the analysis relies on the participants accurately reporting their business operations' statistics and expenses related to online advertising. The comparison between the two years indicates sample robustness; however, the collection of real-time data from firms would serve to further test the results.

Literature Cited

Ainin, S., F. Parveen, S. Moghavvemi, and N.I. Jaafar. 2015. Factors influencing the use of social media by SMEs and performance outcomes. Ind. Manage. Data Syst. 115(3): 570–588, doi: 10.1108/IMDS-07-2014-0205.

Aramyan, L.H., A.G.O. Lansink, and J.A. Verstegen. 2007. Factors underlying the investment decision in energy-saving systems in Dutch horticulture. Agr. Syst. 94:520–527, doi: 10.1016/j.agsy.2007.01.005.

Ball, T. and Y.L. Duval. 2001. Direct marketing of farm products via the Internet: A survey of smallfarms.com members. 14 Dec. 2018. <https://www.informatique-agricole.org/download/efita-conference/Congres_EFITA_2001/Ball_96.pdf>.

Barton, S.S. and B.K. Behe. 2017. Retail promotion and advertising in the Green Industry: An overview and exploration of the use of digital advertising. HortTechnology 27:99–107, doi: 10.21273/HORTTECH03578-16.

Behe, B.K., B.L. Campbell, C.R. Hall, H. Khachatryan, J.H. Dennis, and C. Yue. 2013. Smartphone use and online search and purchase behavior of North Americans: Gardening and non-gardening information and products. HortScience 48:200–208, doi: 10.21273/HORTSCI.48.2.209.

Burt, S. and L. Sparks. 2003. E-commerce and the retail process: A review. J. Retailing Consum. Serv. 10:275–286, doi: 10.1016/S0969-6989(02)00062-0.

Cameron, A.C. and P.K. Trivedi. 2009. Microeconometrics: Methods and applications. Cambridge Univ. Press, New York, NY.

Charm, T., B. Coggins, K. Robinson, and J. Wilkie. 2020. The great consumer shift: Ten charts that show how US shopping behavior is changing. 16 Nov. 2020. <https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/the-great-consumer-shift-ten-charts-that-show-how-us-shopping-behavior-is-changing#>.

Cole, H.S., T. DeNardin, and K.E. Clow. 2017. Small service businesses: Advertising attitudes and the use of digital and social media marketing. Serv. Mark. Q. 28(4):203–212, doi: 10.1080/15332969.2017.1394026.

Danaher, P.J. and T.S. Dagger. 2013. Comparing the relative effectiveness of advertising channels: A case study of a multimedia blitz campaign. J. Mark. Res. 50(4):517–534, doi: 10.1509%2Fjmr.12.0241.

DeSwann Arons, M., F. van den Driest, and K. Weed. 2014. The ultimate marketing machine. Harv. Bus. Rev. 92(7):54–63.

Detre, J.D., T.B. Mark, A.K. Mishra, and A. Adhikari. 2011. Linkage between direct marketing and farm income: A double-hurdle approach. Agribusiness 27(1):19–33, doi: 10.1002/agr.20248.

Doctorow, D., R. Hoblit, and A. Sekhar. 2009. Measuring marketing: McKinsey global survey results. 3 Mar. 2019. <https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/measuring-marketing-mckinsey-global survey-results>.

Duan, N., W.G. Manning, C.N. Morris, and J.P. Newhouse. 1983. A comparison of alternative models for the demand of medical care. J. Bus. Econ. Stat. 1:114–126.

Duggan, M., N. Ellison, C. Lampe, A. Lenhart, and M. Madden. 2015. Social media update 2014. Pew Res. Ctr., Washington, D.C.

Eid, R. and H. El-Gohary. 2013. The impact of E-marketing use on small business enterprises' marketing success. Serv. Ind. J. 33(1):31–50, doi: 10.1080/02642069.2011.594878.

Felix, R., P.A. Rauschnabel, and C. Hinsch. 2017. Elements of strategic social media marketing: A holistic framework. J. Bus. Res. 70:118–126, doi: 10.1016/j.jbusres.2016.05.001.

Gilliam, D.A. 2015. Trade show boothscapes. J. Mark. Mgt. 31(17-18):1878–1898, doi: 10.1080/0267257X.2015.1071276.

Gollop, F.M. and J.L. Monahan. 1991. A generalized index of diversification: Trends in U.S. manufacturing. Rev. Econ. Stat. 73:318–330, doi: 10.2307/2109523.

Hall, C.R. 2010. Making cents of green industry economics. HortTechnology 20:832–835, doi: 10.21273/HORTTECH.20.5.832.

Hall, C.R., A.W. Hodges, H. Khachatryan, and M.A. Palma. 2020. Economic contributions of the green industry in the United States in 2018. J. Environ. Hort. 38(3):73–79, doi: 10.24266/0738-2898-38.3.73.

Hooker, N.H., J. Heilig, and S. Ernst. 2001. What is unique about E-agribusiness? The Ohio State Univ. 2 Jan. 2019. <https://pdfs.semanticscholar.org/c21f/9d05364f3117e4c2119c83266d317afa0148.pdf>.

Kietzmann, J., K. Hermkens, L. McCarthy, and B. Silvestre. 2011. Social media? Get serious! Understanding the functional building blocks of social media. Bus. Horiz. 54(3):241–251, doi: 10.1016/j.bushor.2011.01.005.

Li, Y., M.A. Palma, C.R. Hall, H. Khachatryan, and O. Capps, Jr. 2019. Measuring the effects of advertising on green industry sales: A generalized propensity score approach. Appl. Econ. 51:1303–1318, doi: 10.1080/00036846.2018.1527448.

Matheena, M. and K.R. Riswan. 2018. Social media as tool of marketing. Shanlax Intl. J. Mgt. 6(S1):87–92, doi: 10.5281/zenodo.1461284.

Neti, S. 2011. Social media and its role in marketing. Intl. J. Enterprise Computing and Business Systems 1(2). 13 Mar. 2021. <https://www.ijecbs.com/July2011/13.pdf>.

Palma, M.A., C.R. Hall, B. Campbell, H. Khachatryan, B. Behe, and S. Barton. 2012. Measuring the effects of firm promotion expenditures on green industry sales. J. Environ. Hort. 30:83–88, doi: 10.24266/0738-2898.30.2.83.

Quinton, S. 2013. The community brand paradigm: A response to brand management's dilemma in the digital era. J. Mark. Mgt. 29(7/8):912–932, doi: 10.1080/0267257X.2012.729072.

Sridhar, S., F. Germann, C. Kang, and R. Grewal. 2016. Relating online, regional, and national advertising to firm value. J. Mark. 80(4):39–55, doi: 10.1509%2Fjm.14.0231.

Techopedia. 2018. Online marketing. 13 Mar. 2021. <https://www.techopedia.com/definition/26363/online-marketing>.

Thompson, C.J. and G. Coskuner-Balli. 2007. Countervailing market responses to corporate co-optation and the ideological recruitment of consumption communities. J. Consum. Res. 34(2):135–152, doi: 10.1086/519143.

Torres, A.P., S.S. Barton, and B.K. Behe. 2019. Evaluating the business and owner characteristics influencing the adoption of online advertising strategies in the green industry. HortTechnology 29(3):374–381, doi: 10.21273/HORTTECH04274-19.

Yao, B., A. Shanoyan, H.H. Peterson, C. Boyer, and L. Baker. 2019. The use of new-media marketing in the green industry: Analysis of social media use and impact on sales. Agribusiness 35(2):281–297, doi: 10.1002/agr.21581.