

Categorization of U.S. Publics Regarding Automation Use in the Green Industry

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Introduction

The Green Industry in the United States, which involves the production and selling of shrubs, trees, and vines, as well as perennial and annual plants, produces an estimated valued total output of \$348 billion annually (Hall et al., 2020). However, this industry is extremely labor intensive (Astill et al., 2020). Many producers rely on seasonal workers (Astill et al., 2020) but report difficulties in securing and retaining good employees, which is often attributed to inefficient processes (HindSite Software, 2019). Automation technology may offer a solution to this issue by improving productivity and worker health, which would support job satisfaction as well (Grift et al., 2008). Beyond addressing labor shortages through worker satisfaction, automation and mechanization in the Green Industry can help to maintain daily productivity while expanding operations through enhanced efficiencies (Astill et al., 2020; Grift et al 2008). While prior research has found producers possess positive attitudes toward the use of automation in agriculture (Schroeder et al., 2024; Warner et al., 2022), there is limited research regarding consumer perceptions of automation in the Green Industry. There is a need to identify the relevant groups of publics when communicating about automation use in the Green Industry to craft tailored public relations, marketing, and outreach materials.

Theoretical Framework

The Five Publics Model Based on Knowledge and Involvement proposed by Hallahan (2000) served as the conceptual framework for this research. This model expands upon Grunig's (1983) Situational Theory of Publics, which proposes audience segmentation by categorizing people into publics based on behavioral characteristics rather than demographics. Dewey (1927) originally defined a public as a group of individuals who are faced with a similar issue and work collectively to address it; however, Grunig (1983) suggested that instead of there being one set public, multiple publics form organically based on how a problem or issue impacts them. Hallahan (2000) built off this theory to develop a model that considers five groups of publics categorized based on individuals' knowledge and involvement with the issue of interest. Knowledge encompasses an individual's perceptions of something based on their experiences as well as their education relevant to the issue (Hoch & Ha, 1986), while issue involvement generally refers to how personally relevant something is to an individual (Petty & Cacioppo, 1986). The proposed publics are as follows: aware (high knowledge/low involvement), active (high knowledge/high involvement), aroused (low knowledge/high involvement), inactive (low knowledge/low involvement), and nonpublic (no knowledge/no involvement). Each of these publics requires different communication and outreach approaches to be effective (Hallahan, 2000). Therefore, the purpose of this research was to identify the distribution of U.S. publics as they relate to automation use in the Green Industry.

Methods

To fulfill the purpose of this study, an online survey was distributed to a nationally representative Qualtrics panel of 1,020 respondents ($n = 1020$). Filter questions were included to make sure all sample respondents were responsible for landscaping and plant purchasing decisions in their houses and had purchased a plant from a greenhouse or nursery in the past 12 months to ensure respondents would not belong to the nonpublic group (Hallahan, 2000). To increase the generalizability of the findings, quota sampling was used to match the sample demographics to the population demographics (Baker et al., 2013; Twyman, 2008). The two survey questions measuring knowledge and issue involvement were used to segment respondents according to Hallahan's (2020) categories of publics. Knowledge was measured using a 5-item, 5-point Likert-type scale that asked respondents to rate the amount of automation ($1 =$ none at all; $5 =$ a

great deal) typically used to produce Green Industry products, like petunias (moderate to high), fresh tomatoes (moderate to high), and apples (low to moderate). A panel with expertise in horticultural production reviewed the question to identify acceptable correct responses for each crop. The items were recoded into a dichotomous variable, where correct responses were coded as a 1 and incorrect responses, including the option of “Don’t Know,” were coded as a 0. The reliability fell below the acceptable threshold of .70 (KR20 = .67; Field, 2023) and was not improved by removing an item; however, this measurement is still in development and automation use in agriculture is a newer concept to consumers. Therefore, it was deemed acceptable for the intent of this research (Nunnally, 1978), and knowledge was transformed into a count variable by adding the number of correct answers for each respondent. Issue involvement was measured with a 3-item, 5-point Likert-type scale that ranged from 1 = strongly disagree to 5 = strongly agree. Items asked questions about how respondents believed automation in general would impact them personally. The average of the three items was calculated to create the index (Cronbach’s $\alpha = .81$). Knowledge and issue involvement indexes were recoded into dichotomous variables for high and low responses based on their means prior to assigning the categories of publics. These high/low categories for knowledge and issue involvement were then used to group the publics according to Hallahan (2020).

Findings

Respondents answered an average 1.70 ($SD = 1.55$) knowledge questions correctly, with a range of 0 – 5 correct responses. Based on this mean, 71.0% ($n = 724$) of the sample were categorized as having low knowledge. Additionally, the average for issue involvement was 3.34 ($SD = 1.01$). A little less than half of the respondents (46.7%; $n = 476$) were categorized as having high involvement while 53.3% ($n = 544$) were categorized as low involvement. Figure 1 illustrates the distribution of U.S. publics related to automation in the Green Industry.

	Low Involvement (Range: 1.00 - 3.34)	High Involvement (Range: 3.35 - 5.00)
High Knowledge (Range: 3.00 – 5.00)	<u>Aware Public</u> 15.9% ($n = 162$)	<u>Active Public</u> 13.1% ($n = 134$)
Low Knowledge (Range: 0.00 – 2.00)	<u>Inactive Public</u> 37.5% ($n = 382$)	<u>Aroused Public</u> 33.5% ($n = 342$)

Figure 1. Categorization of Green Industry Automation Publics Based on Hallahan (2000)

Conclusions, Implications, & Recommendations

Respondents’ knowledge of current automation use was low, and they had neutral perceptions of issue involvement. The majority of respondents were categorized as aroused or inactive publics due to 71% of the sample falling into the category of “low knowledge.” Only 13.1% of the sample were an active public who would be expected to seek information related to the topic (Hallahan, 2000). Agricultural communicators should consider these findings when developing materials related to automation use in the Green Industry and keep in mind the U.S. population has low knowledge and involvement. Therefore, communication and outreach should focus on increasing the relevancy of Green Industry automation technology to consumers, such as decreased product prices or lower environmental inputs, to increase perceptions of issue involvement. Future research should work to develop a more robust knowledge scale that can precisely measure consumers’ knowledge. Additionally, reporting demographic data by group of publics would yield critical insights needed for tailored communication in the future.

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