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Grocery Shopping in the Digital Era

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Introduction

Changes in grocery shopping behavior are occurring at an unprecedented pace. Shoppers are now able to purchase groceries online via the Web and in retailer-specific apps, yet questions remain about what products shoppers still obtain in physical retail stores versus which they may order online and pick up or order online and have delivered to their homes. According to Nielsen's *The Future of Grocery* report (2015), about one-fourth of surveyed consumers around the world currently shop for groceries online, and 55% of them say they would buy groceries online in the future. A more recent report suggests that about 8 out of 10 Americans do not shop for groceries online (Jones and Kashanchi, 2019). Still, there is limited knowledge on the current status of online grocery shopping in the biggest (in terms of revenue) grocery market in the world—the United States, where 70% of all shoppers were predicted to be making some online food purchases by 2025 (Nielsen, 2015; Arnold, 2019). While this study predates the global COVID-19 pandemic and governments urging residents to remain in their homes and "socially distance," online grocery procurement is receiving more attention than ever before.

The aim of this study was to understand the proportion of U.S. residents that purchase some of their groceries online and quantify those that are actively (in the past year) engaged in online grocery shopping. More importantly, and often absent from media about online food shopping, this study provides information about the categories of groceries purchased online, using food categories defined by the U.S. Department of Agriculture (2010). Agricultural industries and food retailers alike need to understand what types of foods—including those that require refrigeration, such as meat and dairy—are being demanded through various retail channels. The changing food retail landscape prompts a revisit of the question of the "final mile" of delivery in the context of online grocery procurement; the mechanism for obtaining groceries—whether curbside pick-up, in-store pick-up, or home delivery—is commonly discussed but generally excluded from studies of food purchasing behavior. Overall, this article seeks to outline the opportunities and challenges presented by online grocery shopping in the United States, especially for agricultural industries that may wish to position themselves to access or serve this growing market.

We found that there are opportunities for enticing new consumers from different age groups, education levels, and income levels to at least experiment with online grocery shopping. Although younger and more educated consumers were more likely to report previous online grocery shopping, there are opportunities to increase the segment of online grocery shoppers within these subpopulations and in other subgroups. The perception that fresh produce cannot thrive in online grocery markets can be contested irrespective of the current challenges that are faced in ensuring efficiency in their delivery to consumers. It is anticipated that retailers such as Walmart, Amazon, Target, Kroger, and Jet may offer consumers additional services like enhanced delivery options that can help harness the potential of online grocery markets. In addition to known grocery retailers, the potential for others in agricultural and food supply chains to service consumers via online retailing and delivery certainly exists. Online ordering of produce, meats, and other agricultural products is already growing; in some cases, delivery options exist for even perishable and refrigerated products.

Survey of U.S. Residents

U.S. residents were surveyed on their use of online grocery shopping from April 2–17, 2019. Qualtrics was used to host the survey and a consumer panel manager and research company, Kantar, provided a database of U.S. respondents. The survey was targeted to be representative of the U.S. population (U.S. Census, 2016), in terms of gender, age, region, and education. Given the rapid rise in online shopping for products of all kinds, respondents were asked explicitly to focus on the food and beverage component of their grocery shopping

Box 1. Definition of Groceries and Grocery Categories

Groceries are sometimes defined as food, beverage, and nonfood items that are typically purchased from a supermarket or grocery store for regular use/household consumption. However, in the following questions, we want you to focus on the ***food and beverage component of groceries***, which includes items on the USDA's food/beverage category list, such as

Milk and Dairy: whole, reduced fat, lowfat, nonfat, flavored milk, milk shakes, milk substitutes, cheese, yogurt

Protein Foods: beef, pork, lamb, liver and organ meats, chicken, turkey, duck, fish, shellfish, eggs, poultry, seafood, eggs, cured meats/poultry, bacon, sausages, beans, peas, legumes, nuts and seeds, processed soy products

Mixed Dishes: meat, poultry, seafood, rice, pasta, pizza, macaroni and cheese, soups, sandwiches, burritos and tacos, nachos

Grains: rice, pasta, noodles, cooked grains, yeast bread, rolls and buns, bagels, muffins, tortillas, pancakes, waffles, ready-to-eat cereal, oatmeal, grits

Snack and Sweets: potato chips, tortilla-corn-other chips, crackers, cereal bars, nutrition bars, cakes and pies, cookies and brownies, doughnuts, sweet rolls, pastries, candy, ice cream, pudding, gelatins

Fruits: apples, bananas, grapes, peaches and nectarines, berries, citrus fruit, melons, dried fruits, other fruits and fruit salads

Vegetables: tomatoes, carrots, other red and orange vegetables, dark green vegetables, lettuce and lettuce salads, string beans, onions, corn, starchy vegetables, potatoes, French fries, mashed potatoes

Non-Alcoholic Beverages: citrus-apple-vegetable-other-fruit juice, diet soft drinks, fruit drinks, sport and energy drinks, nutritional beverages, smoothies and grain drinks, coffee, tea

Alcoholic Beverages: beer, wine, liquor and cocktails

Water: bottled water, flavored or carbonated water, enhanced or fortified water

Fats and Oils: butter and animal fats, margarine, mayonnaise, salad dressings, vegetable oils

Condiments and Sauces: tomato/soy condiments, mustard and other condiments, olives-pickles-pickled vegetables, pasta sauces, dips and gravies

Sugar: sugar, sugar substitutes, honey, jams, syrups, toppings

Infant Formula and Baby Food: baby food, cereals, fruit, vegetable, meat and dinners, yogurt, snacks and sweets, baby juice, baby water, formula, human milk

and provided definitions of groceries by categories as shown in Box 1.

Respondents provided information about their household demographics and use of online grocery shopping services. Only residents who make some portion of their grocery purchases online were asked about specific online purchases, retailers, and delivery methods, while only those who had shopped online in the past year were asked about online grocery shopping frequency.

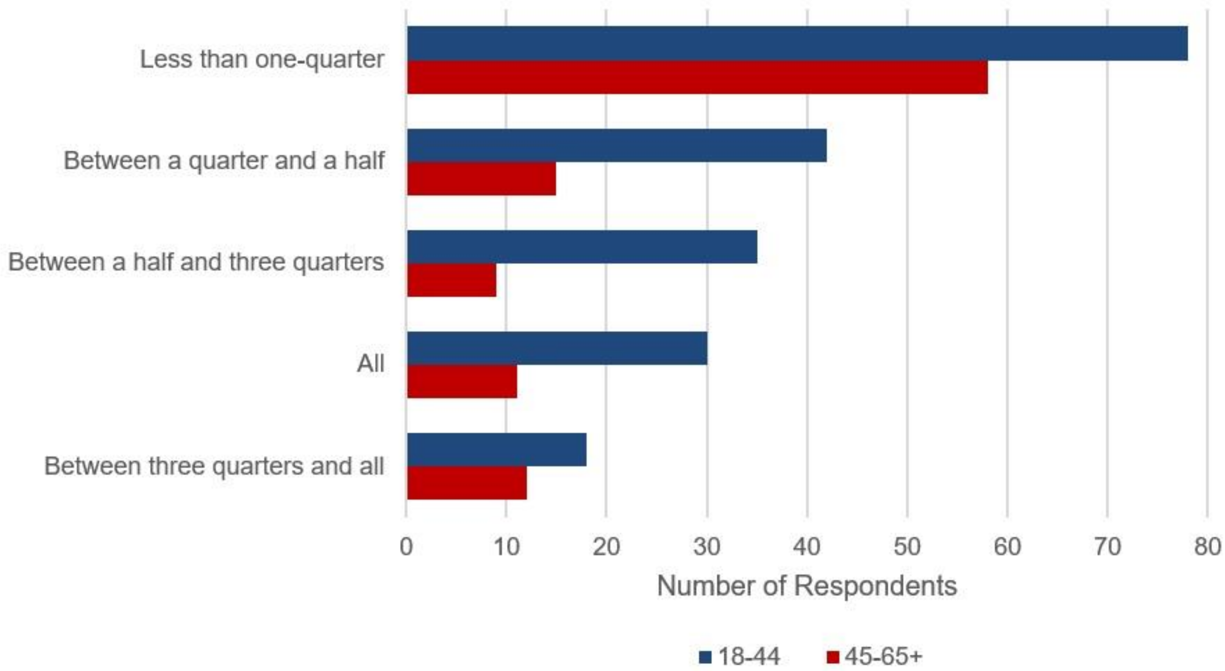
As shown in Table 1, a total of 985 respondents completed the survey; 55% of respondents were female and 52% had a household income above $50,000. Table 1 provides census (population) target values alongside sample summary statistics for ease of comparison. The majority of respondents (60%) had some college education, and respondents came from all regions of the United States. Respondents who reported doing any portion of their groceries online were grouped into “Yes” regarding online shopping and those who did not were grouped into “No.” Among all respondents, 31% reported having done some portion of their grocery shopping online. About 77% of those respondents who reported previous online grocery shopping (31% of all the respondents of 985) had shopped online for groceries within the past year. Many recipients of the Supplemental Nutrition Assistance Program (SNAP) had previously shopped online for groceries.

Among those who reported previous online grocery shopping in Table 1, location, education, and age appear to be important in helping to explain differences in online grocery shopping. Specifically, online grocery shopping among households who reported at least an associate degree and those who live in urban areas were more likely to have shopped online than the households with lower education levels and who live in rural and/or suburban areas, respectively. Figure 1 reports U.S. resident use of online grocery shopping for respondents aged 18–44 years old and 45–65+ years old. The figure shows the number of respondents from each of these age groups that have done a proportion of their online grocery shopping online; proportions of shopping done online ranged from "all" to "less than one-quarter." For each proportion of online grocery shopping, the number of respondents aged 18–44 is more than the number of respondents aged 45–65+. But the proportion that has the highest number of respondents is "less than one-quarter." Only about 4% of all respondents reported

Table 1. Demographics of Respondents

Demographics	Census Targets (%)	All Respondents *N* = 985 (%)	Previously Shopped Groceries Online Yes (%) *N* = 308	No (%) *N* = 677
Gender: Male	49	45	35	65
Age (Years)				
18–24	13	8	55	45
25–34	18	19	50	50
35–44	16	17	41	59
45–54	17	18	29	71
55–64	17	18	18	82
65+	19	21	11	89
Income ($)				
0–24,999	22	24	28	72
25,000–49,999	23	25	29	71
50,000–74,999	17	14	30	70
75,000–99,999	12	15	42	58
100,000+	26	23	31	69
Education				
Less than high school	13	3	24	76
High school graduate	28	28	29	71
Some college, no degree	21	24	28	72
Associate degree or bachelor's degree	27	32	33	67
Graduate or professional degree	12	14	39	61
Location (*N* = 978)				
Urban		26	44	56
Suburban		50	26	74
Rural		23	29	71
Region				
Northeast	18	20	24	76
Midwest	38	36	35	64
South	21	23	26	73
West	24	21	35	65
Current SNAP recipient				
Yes		15	37	63
No		85	30	70

Figure 1. Proportion of Grocery Shopping Done Online, Segmented by Age (*N* = 308)



doing all their grocery shopping online. These results show, unsurprisingly, that online grocery shopping is more common among younger consumers but that there are opportunities to entice both younger and older consumers to shop their groceries online. Common reasons for shopping online include challenges of taking young children shopping, convenience, and saving time. Additional factors that may appeal to older consumers, and even those who may be less familiar with the technology used to shop/place orders online, revolve around ease of access, transportation, and possible mobility challenges, along with carrying heavy items home from retail locations.

What Kinds of Groceries Do U.S. Residents Buy Online?

To examine the grocery categories purchased online, respondents were asked to estimate how often they purchased each of the groceries on the *What We Eat in America* list (USDA, 2010). Table 3 reports the frequency of purchases, separated into the past week, past month, past year, and never. The grocery categories studied ranged from milk and dairy to fruits and vegetables and infant formula and baby food. Table 2 shows that the most frequently purchased grocery category in the past week segment was snacks and sweets (31%), followed by vegetables (29%) and then milk and dairy, fruits, and condiments and sauces (28%). The categories that topped the list for the "never" segment are baby food and infant formula (69%), alcoholic beverages (51%), and mixed dishes and water (44%). Baby food and infant formula are unsurprising for the "never" purchase segment, as it is clearly a category of products exclusive to those with babies/young children. Additional explanation for consumers' concerns can be found with respect to food safety. Consumers who reported "never" for online procurement of baby food and infant formula more often reported that they were more concerned about food safety in online than in-store grocery markets. Similarly, alcoholic beverages as a category may be entirely excluded from some household's shopping lists and/or have restrictions associated with certain delivery methods (such as mail delivery, depending on the locale) and/or "sign for this package" requirements.

Consumers appear to purchase both fresh produce and non-fresh items online, contrary to what may be perceived by some that fresh and refrigerated products are shied away from the movement to online shopping. For example, milk and dairy (50%), vegetables (51%), and fruits (48%) were frequently purchased for at least the past month by respondents who had previously shopped online for groceries. However, these results indicate there is room to entice even current online grocery shoppers to purchase more fresh produce online. Further, not all locales feature the same availability for delivery of fresh items, reducing access for some items in rural areas, in particular.

Table 2. Kinds of Groceries U.S. Residents Purchase (*N* = 237)

How often would you estimate that your household bought groceries online in the past year?	I have ordered these categories of groceries online in the Past week (%)	Past month (%)	Past year (%)
Milk and dairy	28	22	8
Protein foods	25	26	14
Mixed dishes	23	21	11
Grain	26	24	16
Snacks and sweets	31	33	19
Fruits	28	20	12
Vegetables	29	22	8
Non-alcoholic beverage	25	29	13
Alcoholic beverages	16	22	10
Water	24	21	12
Fats and oils	22	27	15
Condiments	28	25	20
Sugar	24	24	15
Infant formula and baby food	13	12	6

From Which Retailers Are Purchases Made and How Are They Delivered?

Many retailers contract with logistics companies such as UPS, USPS, and FedEx to handle the delivery of their products, including groceries. For example, to compete more directly with Walmart and Amazon, Kroger recently launched a direct home delivery service that would be handled by FedEx and USPS (Meyersohn, 2018). This is in addition to Kroger's adoption of curbside delivery and third-party service operated by Instacart (Meyersohn, 2018). Walmart offers curbside pickup for select groceries and lets consumers reserve their pickup time and location at no extra charge (Walmart, 2019). Amazon and Target have also embraced curbside pickup, and Amazon uses its Whole Foods stores as curbside collection points (Aho, 2019). Regional players such as Instacart, Peapod, FreshDirect, and Boxed dominate the market for third-party food delivery services; their expansion may increase pressure and competition with retail giants such as Walmart and Amazon (Feather, 2019).

Table 3 presents estimates of the frequency of use of online grocery retailers. The top retailers picked from a list by respondents are Walmart, Amazon (AmazonFresh, Amazon Pantry, regular Website, Amazon Prime Now), Kroger, Costco, and Jet. About 31% of respondents have never shopped Walmart, relative to 34% through Amazon (regular Website) and

Table 3. Frequency of Use of Online Grocery Retailers (*N* = 308)

In the past year, how often would you estimated that your household used the online services of the following grocery retailers?	At least once a week (%)	At least once in three months (%)	At least once in a year (%)
AmazonFresh	13	20	12
Amazon Pantry	14	21	10
Regular Amazon Website	23	32	10
Amazon Prime Now	17	21	12
Walmart	29	29	11
Target	14	26	14
Kroger	16	19	7
Costco	13	19	9
Jet	7	15	8

46% through Target. This result provides a basis for projecting the market share of online grocery retailers. To gauge the importance of each delivery method, online grocery shoppers were asked how often they use each delivery method: pick up in retail store, pick up at retailer curbside, delivery by the retailer, delivery by third-party food service, and delivery by mail service. The frequency of using each of the delivery methods was categorized into at least once a week, at least once in three months, at least once in the past year, and never. Table 4 shows that 20%–22% of the respondents have used all the five methods of online grocery delivery that they were asked about. Picking up at retailer store and curbside (22%) were a bit higher than delivery by retailer and third-party food service (21%) and delivery by mail (20%). In addition, 47% of the respondents have never used delivery by third-party foodservice and 34% of the respondents have never used delivery by mail service. One possible consequence of these results is that retailers should offer consumers several delivery options to help them achieve success in online grocery markets. But it appears that these heterogeneous preferences are already observed since retailers such as Kroger, Amazon, and Walmart already offer consumers more than one delivery option (Meyersohn, 2018).

Table 4. Online Grocery Delivery Frequency (*N* = 308)

How often does your household use each of the following online grocery shopping delivery methods?	At least once a week (%)	At least once in three months (%)	At least once in the past year (%)
Pick up in retailer store	22	26	8
Pick up at retailer curbside	22	24	7
Delivery by retailer	21	26	12
Delivery by third-party food service	21	21	11
Delivery by mail service	20	33	12

Market Trends and Implications for Agricultural Industries

Only 31% of the 985 survey respondents reported any form of previous online grocery shopping. Among these respondents, 77% of them can be considered to be actively shopping online for groceries. About 47% of respondents aged 18–44 (compared to 19% of respondents aged 45–65+) had previously shopped online for groceries. Opportunities exist for enticing new consumers from different age categories into online grocery shopping. In addition, the grocery categories purchased by active online grocery shoppers included all of the groceries on the USDA list used in the elicitation, which contradicts the perception that fresh products are less likely to thrive in online grocery markets. However, it is important to recognize that delivery of fresh groceries using the home delivery format is still a challenging proposition for most retailers in almost every location. Questions are still being raised about how to manage the efficiency of delivery routing while maintaining the freshness and quality of these types of groceries. Attending to this challenge would definitely be a competitive advantage for some of these retailers. Further, the most frequently used retailers are Walmart, Amazon, Target, Kroger, and Jet. These online grocery retailers have used different delivery methods to meet shoppers' demands. The delivery options available vary by geography, but it appears that preferences for various ways of obtaining groceries are diverse.

The movement to online grocery shopping has possible implications for agricultural industries as shoppers select products from pictures and get groceries home by varied methods, ranging from parcel delivery to picking up products packaged for them in-store. Growth in online grocery markets may imply increased competition for shoppers, particularly among younger shoppers. Online grocery shoppers tend to be younger and educated. Similarly, shoppers who support local farmers' markets tend to be young and educated (Zepeda and Carroll, 2018). Thus, there may be direct competition between online grocery retailers and farmer or specialty markets for these shoppers. However, those patronizing specialty stores or markets may be seeking experiences in conjunction with grocery products. Shoppers may face trade-offs between desires to help local economies or have experiences while shopping with the convenience and variety offered by online grocery retailers via Web apps. However, it seems like some entrepreneurs have already recognized opportunities for selling locally produced food online and delivering to shoppers' homes. A few online farmers' markets, which typically operate locally (e.g., within a county), have sprung up; this could benefit shoppers and farmers in terms of convenience and competitiveness respectively (Miller, 2018). Still, there may be challenges to achieve the size and scale required for profitability, including in shopping and logistics to customer delivery, which introduces significant challenges.

This study lays a foundation for more exploratory studies on online grocery shopping. For example, from a grocery retailer's perspective, how can new online grocery shoppers be enticed? Why do 69% of the survey respondents hesitate to shop online for groceries? Are there specific grocery categories that can drive growth in online grocery markets more than others? From the perspective of agriculture, how can producers reap the benefits of online grocery shopping? Providing answers to these questions presents research and extension opportunities for agricultural and applied economists.

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