How to Win in Online Grocery

Online grocery offers a significant opportunity which may favor the incumbents, rather than the world-renowned online leader, Amazon.

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Grocery represents roughly half of all retail sales in the United States. Yet, despite this demand, the penetration rate of online sales for food and beverage last year stood at a mere 6.3 percent (though this represents significant growth versus the year before¹). Recent “shelter-in-place” orders have spiked demand, but have also exacerbated the profitability issues which plague online grocery. This first installment of a two-part study—launched before the coronavirus outbreak exploded in the United States—explores how grocery stores compete profitably against the world-renowned online leader, Amazon. Competing with Amazon’s variety may be a losing game, but traditional grocers can leverage their existing footprint to serve online shoppers faster than Amazon. And by leveraging micro-fulfillment automation, they can do so at a lower cost than current crowdsourced models.

Grocery ranks among the most difficult shopping habits to break. Obviously, the COVID-19 outbreak has forced massive change in consumer behavior.

Our second installment will explore this phenomenon, and the probable long-term impact. No one can confidently predict when life in the US will return to normal, or even what “normal” will look like. But we can confidently say that the essence of strategy entails a clear competitive positioning supported by the right operational capabilities. While the immediate priority is to protect employees and serve worried customers, grocery retailers must also look ahead to develop a clear vision for an omnichannel future.

¹Brick Meets Clicks Press Release September 12, 2019
In 1994, Jeff Bezos launched Amazon with a focus on books, though he had broader aspirations from day one. The Time magazine "Person of the Year" issue in 1999 described a visit to Amazon's newest distribution center in Coffeyville, Kentucky. Although the 850,000 square foot facility was 90 percent empty, Bezos confidently predicted it would be at capacity within a few years, as Amazon expanded to sell “everything but firearms and certain live animals”.

Amazon patented its "one click" shopping feature in 1999, but the delivery time would be considered slow by today’s standards—and even more so compared with the ability to stop in one of the hundreds of thousands of brick-and-mortar grocery stores across the country. AmazonPrime's promise of one-day delivery announced in April of 2019 resulted from a decades-long focus on decreasing the time from "on-mind" to "in-hand," to close the gap with the traditional store-based model of convenience.

After his initial success, Bezos was often asked to predict future trends in online retail. He replied that it was challenging to assess what might change in 10 years, but that it was actually quite easy to pinpoint what wouldn’t change:

“\textit{In our retail business, we know that customers want low prices, and I know that’s going to be true 10 years from now. They want fast delivery; they want vast selection. It’s impossible to imagine a future 10 years from now where a customer comes up and says, ‘Jeff I love Amazon; I just wish the prices were a little higher,’ [or] ‘I love Amazon; I just wish you’d deliver a little more slowly.’ Impossible.}”

– Jeff Bezos

Online Grocery History

Although the majority of retail embraced (sometimes reluctantly) eCommerce as a direct influence of Amazon, applying Bezos’ philosophy to grocery has proved daunting. We can look to the example of early online grocery innovators such as Webvan and Kozmo.com. Webvan built highly automated, 330,000 square foot distribution centers in major metropolitan areas, which cost $30 million dollars apiece. They shipped the orders from these automated facilities using a dedicated fleet of 18-wheelers, which then transferred the groceries to smaller delivery vans at multiple cross-docks spread throughout metro areas, in order to reach homes within the surrounding suburbs.

Kozmo.com, on the other hand, pursued a lower-tech model of small distribution centers in the largest urban areas, ranging from New York City to London. Given the population density and heavy traffic, Kozmo couriers used a range of delivery methods: vans, scooters, bikes, and even delivering items on foot.

Both companies went from Wall Street darlings to bankrupt in a matter of a few short years. The headlines clearly chronicled the over-hyped frenzy: a Wall Street Journal headline in November of 1999 announced “Webvan’s Splashy Debut May Shake up Staid Grocery Industry” while a Fortune headline a mere 20 months later decried, “The Tragedy of Webvan”.

Their tragedies were not unique: Amazon suffered many years of grocery failures prior to the acquisition of Whole Foods in June of 2017 which truly did shakeup the “staid grocery industry.” While the Whole Foods acquisition was a clear sign that Amazon was getting serious about grocery, previous experimentation caused little fear among grocery incumbents. AmazonFresh launched in Seattle in 2007, and offered a premium service with a full assortment of groceries for next-day home delivery (reminiscent of Webvan). After six years of trial-and-error in its home market, Amazon finally expanded the service to a second (uniquely high-tech) market in 2013: San Francisco. AmazonFresh expanded to the Midwest and Eastern US in 2016 with some continued struggles leading to retrenchments, before the Whole Foods acquisition.

After the acquisition Amazon combined Whole Foods with AmazonFresh and PrimeNow, given their common focus on grocery items. Launched in December of 2014 as an experiment in Manhattan, PrimeNow seemed shockingly similar to the failed Kozmo model. But, Amazon’s scale, as well as smart phones and crowdsourced couriers, helped to lower the variable cost. Unlike the slow expansion of AmazonFresh, PrimeNow had expanded from Manhattan to cover over 50 markets in a mere 18 months. After the integration with Whole Foods, PrimeNow expanded further, using the 479 Whole Foods stores in 42 states as a new platform for fast delivery of grocery items.

Through the integration of these business models, Amazon now offers a grocery value proposition that is distinct from the original Amazon strategy of an unmatchable, expansive variety, as shown in the Graphic A (page 5). Amazon’s latest rollout of its first Go Grocery store adds another set of tradeoffs. The new Go Grocery store carries only 5,000 items. While far more items than the original Go Grocery stores, this pales in comparison the 50,000 items one would find in a typical grocery store.

As the Graphic A (page 5) shows, Amazon’s relentless pursuit of speed has forced a tradeoff contracting its positioning on both expansive variety and low cost. The shift reflects an inherent challenge: retailers need to be close to the end customer to achieve fast delivery. Even for Amazon, it remains impractical to build a fulfillment center in excess of a million square feet to accommodate the full Prime assortment in a major metropolitan area. In fact, AmazonPrime’s shift from a “two-day” to “next-day” promise forced a staggering contraction in its assortment: dropping from 40 million to 10 million eligible items. Even its large fulfillment centers (now totaling over 100 in the US) cannot hold 40 million items.

Shorter lead-times mean fewer items—even for Amazon.

Amazon offering trade-offs

GRAPHIC A

VARIETY
Items/SKU offered

600 million

10 million

500 thousand

50 thousand

1 week

2 days

1 day

2 hours

1 hour

Immediately

COSTS
Delivery fee

Free

$2

$4

$6

$8

$10

SPEED
Order to deliver

AMAZON.COM

AMAZON PRIME

AMAZON FRESH

AMAZON GO

PRIME NOW

WHOLE FOODS


The Future of Online Grocery

While this fundamental tradeoff presents a challenge for Amazon, it offers an opportunity for the rest of the grocery industry. Amazon’s network includes nearly 200, variously-sized fulfillment centers, all of which are optimally located to deliver variety at low cost throughout the country. But this number pales in comparison to the nearly 40,000 grocery stores\(^1\) that are even more conveniently located throughout the suburbs of every major city and mid-sized town.

Grocery stores are able to serve as fulfillment nodes, shortening the “last mile” to distribute groceries to shoppers’ homes faster than even Amazon could achieve. Well-run stores offer a pool of inventory that can serve nearby consumers who prefer to shop online, in addition to those who prefer to shop in-store. Unfortunately, the inefficient and accordingly high-cost of a personal, crowdsourced shopper offsets the savings from a shorter “last mile” from the grocery store to the consumer as shown in the exhibit below.

Many grocery stores adopted the crowdsourced shopping model in partnership with Instacart, which was founded in 2012. These early partnerships offered an initial low-risk experiment for many grocers to serve their most technologically sophisticated customers and fend off Amazon. But allowing a third-party company to own the customer relationship presented a long-term strategic risk. Accordingly, the last few years saw a range of changes in the crowdsourced ecosystem. In 2017, Target bought Shipt to gain strategic control and accelerate rollout. Amazon quickly shifted Whole Foods stores from Instacart to PrimeNow. And, Instacart now offers a “white label” service that allows the grocer to maintain control of its customer relationships.

While the crowdsourced services have become more efficient, store-based picking continues to be inherently disadvantaged compared to a dedicated, automated distribution center. Fortunately, a new breed of start-up introduced the concept of a “Micro-fulfillment Center” in 2018 with Takeoff Technologies opening the first US pilot operation inside of a remodeled grocery store in Miami. Four additional sites for leading US grocery chains including Ahold Delhaize, Albertsons, and Wakefern employ proven robotic technology to reduce the labor cost of picking by an order of magnitude.

The micro-fulfillment technology breaks the old paradigm between low-cost, automated distribution center and the high-cost manual picking from a store.

Centralized, automated fulfillment versus crowd-sourced shoppers saves picking labor but increases “last mile” shipping. The micro fulfillment center built into 10,000 square feet at the back of a grocery store provides low cost picking and low cost delivery.

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\(^1\)“How many grocery stores are there in the United States?” Food Industry, last modified April 1, 2019, https://www.foodindustry.com/articles/how-many-grocery-stores-are-there-in-the-united-states/.
Our survey, prior to the shelter-in-place advisories, found that for 51 percent of the households, the primary shopper goes to the grocery store once per week, consistent with the segmentation of grocery shopping into three trip types: the Monthly Stock-up, Weekly Fill-in, and the Quick Trip. Despite steady increases in online shopping overall, 48 percent of households never shop for groceries online. At the intersection of those two dimensions 28 percent of households still visit their grocery store weekly and never shop online—reflecting the same behavior as the 50+ years since full-service grocery stores became the norm. The take-away: habits are difficult to break.
Current Grocery Shopping Patterns by Primary Household Shopper

How often do you go to a grocery store each month?

All Respondents:
- Never
- No more than once a month
- Once per week
- Multiple times per week
- Almost daily

Age 18 to 34:
- Never
- No more than once a month
- Once per week
- Multiple times per week
- Almost daily

Over $100K Household Income:
- Never
- No more than once a month
- Once per week
- Multiple times per week
- Almost daily

Households of 3+:
- Never
- No more than once a month
- Once per week
- Multiple times per week
- Almost daily

How often do you buy groceries online each month?

Almost daily
- Once per week
- Never
- No more than once a month
- Multiple times per week
- Almost daily
Further segmentation along age, income and household size shows some important shifts in consumer behavior. For millennials, ages 18 to 34, only 27 percent never shop online—even though 48 percent still visit a grocery store weekly just like their parents (and grandparents). Accordingly, the most common pattern—representing 18 percent of these households—is a weekly store trip coupled with a monthly online order. Looking at household income and size, we find that weekly store shopping remains the norm, but that the percentage of those who never shop online drops from 48 percent to 43 percent among households earning over $100,000 per year, and drops to 33 percent for households comprising three or more people. All three segments represent households that are likely prime targets for creating new habits.

To understand how to break old habits and create new ones, we conducted a conjoint survey to quantify the relative importance of four key tradeoffs within the leading online offerings: service, speed, variety, and price. Analysis of respondent answers to the scenarios uncovered the relative importance, as well as the “utility” of the options under each attribute as shown in the exhibit below. (See “Methodology” at the end of this report for further explanation of the choice-based conjoint survey design.)
As is typical in most consumer conjoint surveys, price rates the highest. In this case, it contributed 44 percent to the respondent’s decision. Less obvious, variety ranks second at 21 percent, slightly above the service model at 19 percent. Speed, the variable that has been the focus of start-ups such as Instacart, Shipt, and PrimeNow, matters the least at 16 percent.

The “utility score” for the options under each attribute, which are scaled to sum to zero, provides needed insight in assessing a given scenario. Accordingly, a grocer charging a service fee of $4.95 would have the most negative impact of any decision, while offering a 5% discount would have a large positive impact. Of course, setting profitable prices depends on the cost-to-serve of the different service models as noted in the previous section. But clearly, a grocer charging a fee must deliver value along multiple other dimensions to offset the negative impact.

Although a narrow, curated selection scores significantly lower than a full-store selection, an expanded selection offers little incremental value, challenging Bezo’s assertion that consumers will always want more variety.

Unsurprisingly, delivery has a large utility score; however, it entails a large incremental cost of $9 to $18, depending on the travel distance. In contrast, staffing for curbside pick-up at scale costs less than $2 per order, which may justify accepting a lower utility score. Since nearly half of our respondents never shopped online prior to the COVID-19 outbreak, using pricing as an incentive to reinforce a new online shopping habit could be a worthwhile investment. Otherwise, Amazon will continue to “train” customers to prefer higher-cost delivery, and will do so to their advantage.

Speed, the least important attribute, shows the expected pattern of “faster is better”—however, there is very little advantage to “1 to 2 hours” versus “same day” (same day is defined as order before noon for receipt the same day). Once again, grocers need to factor in the cost and potential sources of competitive advantage. Rather than attempting to match Amazon Prime’s expansive variety and next day delivery, grocers should exploit the opportunity to provide faster service at lower cost to a broader group of consumers than PrimeNow.

This is welcome news for grocers seeking to leverage their stores. Attempting to match Amazon’s variety presents a daunting challenge for a traditional grocer, and it may not be worth the effort.
To explore the potential of new offerings, we used a market simulation of the primary offerings today. That analysis below shows that 40 percent of our respondents would prefer to go to the grocery store in person, rather than use any of today’s three primary offerings. This figure is lower than actual shopping behavior because some of these primary options may not be readily available for some respondents, such as those living in a more rural area. From our analysis, the traditional curbside offering of the full store selection at store prices should capture a higher share than Amazon’s expansive, but next-day offering. The PrimeNow model (which also includes crowdsourced shoppers like Instacart) captures 11 percent. However, a new offering of a curated selection at a 5 percent discount could entice 6 percent from the “none,” category which shows the power of price to change consumer behaviors. Such a discount would also steal share from the Traditional Curbside and Amazon Prime. Interestingly, given its distinct combination of attributes the PrimeNow share would be largely unchanged.
Looking to the Future

This study offers rigorous analysis of preferences among the primary household shoppers across America, prior to the outbreak. It documents long-held grocery shopping habits, and provides critical insight regarding the levers for breaking those habits to form new ones.

The second installment of this research study will revisit shoppers to explore how perceptions have changed as more consumers experience various forms of online shopping. These insights are particularly critical for grocers as they seek to untangle panic shopping from fundamental shifts. Amazon already served the vast majority of US households before the COVID-19 outbreak, and may well have tarnished its image during the crisis due to delayed shipments and negative news coverage. On the other hand, many consumers have newly experienced curbside pickup and delivery from their traditional grocery stores due to shelter-in-place orders. In the next installment we will seek to separate the ephemeral from the foundational.
Methodology

This research white paper features responses from 1,078 consumers, largely representative of the age and household income distribution of the United States with a slight under-representation of 18 to 24 year-olds and households with annual incomes below $25,000. The research screened respondents to ensure that they were at least 18 years of age, and that they were the primary grocery shopper for their household.

A choice-based conjoint research design captured online grocery shopping preferences by presenting a set of three choices along with the option to simply go to the grocery store and shop the traditional way. Each set of three choices reflected different combinations of four attributes: service, variety, speed, and price. The survey prompted the respondent to read the following descriptions carefully to understand the meaning of the different options under each of the four attributes.

### SERVICE

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery</td>
<td>Delivered to your home or office with advanced notice of arrival time</td>
</tr>
<tr>
<td>Curbside Pickup</td>
<td>Groceries placed in your vehicle while you sit inside</td>
</tr>
<tr>
<td>In-store Pickup</td>
<td>Your pre-ordered items await you at checkout of any incremental needs</td>
</tr>
</tbody>
</table>

### VARIETY

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curated</td>
<td>15,000 of the most popular, restock items but not the full store selection</td>
</tr>
<tr>
<td>Full Store</td>
<td>Every item in the store, typically 45,000 to 50,000 different items</td>
</tr>
<tr>
<td>Expansive</td>
<td>Extensive selection with far more brands, flavors, or sizes as carried in the store</td>
</tr>
</tbody>
</table>

### SPEED

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 hour:</td>
<td>Order ready/delivered at selected location in under an hour</td>
</tr>
<tr>
<td>1 to 2 hours:</td>
<td>Order ready/delivered at selected location within 2 hours of placement</td>
</tr>
<tr>
<td>Same Day:</td>
<td>Order ready/delivered same day if received by noon</td>
</tr>
<tr>
<td>Next Day:</td>
<td>Order ready/delivered at requested time next day if received by midnight</td>
</tr>
</tbody>
</table>

### PRICE

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discounted</td>
<td>Prices reduced by 5 percent versus normal store pricing</td>
</tr>
<tr>
<td>Free</td>
<td>No charge for the service with grocery prices same as in-store</td>
</tr>
<tr>
<td>$4.95</td>
<td>Flat fee regardless of order size with no tipping allowed</td>
</tr>
</tbody>
</table>

See below for examples:

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>CURATED</th>
<th>FULL STORE</th>
<th>EXPANSIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peanut Butter</td>
<td>~40 brands &amp; sizes</td>
<td>~50 brands &amp; sizes</td>
<td>~300 brands &amp; sizes</td>
</tr>
<tr>
<td>Pickles</td>
<td>~30 brands, shapes &amp; sizes</td>
<td>~50 brands, shapes &amp; sizes</td>
<td>~200 brands, shapes &amp; sizes</td>
</tr>
<tr>
<td>Tea in Bags</td>
<td>~100 brands, flavors &amp; count</td>
<td>~250 brands, flavors &amp; count</td>
<td>~650 brands, flavors &amp; count</td>
</tr>
</tbody>
</table>

The choices were constrained to remove infeasible and irrelevant combinations yielding 78 different options. Using statistical analysis the respondent selections yield quantified utility scores offering insight into relative preferences.
Takeoff offers an eGrocery solution that empowers retailers to attain profitable online growth by leveraging automation at a hyperlocal scale. Orders are placed online through established retailers, and Takeoff’s automated technology fulfills the order, using robots in Micro Fulfillment Centers. Takeoff has several operational Micro Fulfillment Centers in place, with many to follow in the upcoming years. Takeoff is growing rapidly, with a total capital of $86M raised to date. Takeoff has proudly announced partnerships with Albertsons/Safeway, Ahold Delhaize, Wakefern/Shoprite, Loblaws, Woolworths, Majid Al Futtaim/Carrefour, Big Y, and Sedano’s, with additional domestic and international partners to be disclosed shortly. To learn more, visit www.takeoff.com.

About the Author
Timothy M. Laseter, a Professor of Practice at the Darden Business School at the University of Virginia, prepared this white paper with research support from Takeoff Technologies. Professor Laseter earned a BS in Industrial Management from the Georgia Institute of Technology plus an MBA and PhD from the Darden School. The latest of Laseter’s four business books, Internet Retail Operations, published by Francis & Taylor in 2011 was coauthored with Elliot Rabinovich of Arizona State University. Laseter also serves as a contributing editor for strategy+business a quarterly journal which has featured nearly 50 of his articles over the past 25 years. Prior to joining the Darden School faculty in 2002, Laseter was a partner at Booz Allen Hamilton where he served clients for 15 years. He also served as a Managing Director at PwC-Strategy& from 2014 to 2019.

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