

Effects of the COVID-19 Pandemic on the Grocery Retail Supply Chains

Cassie Harriman, Marcos Diaz-Infante, Tara Loayza, Stephanie Lee, Kyle Detwiler and Mohamed Awwad

Industrial and Manufacturing Engineering Department
California Polytechnic State University
San Luis Obispo, CA 93407, USA

cnharrim@calpoly.edu, madiazin@calpoly.edu, taloayza@calpoly.edu, slee301@calpoly.edu,
kdetwile@calpoly.edu, mawwad@calpoly.edu

Abstract

With the characterization of the COVID-19 outbreak as a pandemic by the World Health Organization (WHO) on March 11, 2020, numerous countries fell into panic across the world trying to devise a plan of containing the virus and protecting their citizens. Due to the lack of government procedures, each country has taken different steps on how to approach the pandemic. With a mixture of social distancing measures, emphasis on proper hygiene, and warnings of how the virus can spread, the United States responded to the pandemic with the closure of non-essential businesses paired with stay-at-home orders across different states. Essential businesses that continue to operate, such as grocery stores, have been faced with increasingly large consumer demand while having to continually adapt to government health precautions and restrictions as they change daily. The goal of this paper is to identify the specific measures that grocery stores have taken to keep their businesses afloat and to establish a framework for other grocery stores and essential businesses to follow in the event of a future pandemic. This analysis includes an evaluation of consumer demand, resource availability, logistics, and the economic effect on these essential businesses.

Keywords

COVID-19, Social Distancing, Essential Businesses, Framework, Grocery Retail Industry.

1. Introduction

American supply chain networks for grocery stores vary drastically. Some are quite simple, while others are incredibly intricate. For fresh products, such as raw produce, the route is often short and clear to map out, traveling from farmer or producer straight to grocery stores, unless packaging is required in between. We see intricate networks emerge for processed products, such as a box of mac and cheese. Dairy is a commonly used example to show the intricacy of grocery supply chains. Milk is simply bottled, pasteurized, then shipped to a retailer or distributor to reach grocery stores. However, this same milk can be turned into cheese in a mozzarella factory, and that mozzarella can be used to make shredded cheese packages, which can then be used in making frozen pizzas. This entangled network of links between producers, suppliers, and distributors only becomes further complicated when imports and exports come into the picture. Despite the complexity of this supply chain, over the years, retailers have come to embrace Lean principles and employ just-in-time techniques to maximize efficiency. Unfortunately, it is these same Lean principles that have saved retailers and suppliers time and money from waste over the years that are suffering from the shock of the coronavirus disease (COVID-19) pandemic.

COVID-19 has pushed our modern world into an unprecedented pandemic, with over 4.8 million confirmed cases in 216 countries worldwide. Countries are shutting down to prevent the spread of the virus, resulting in the loss of jobs and the lives of millions of people. In regards to the retail food industry in the U.S., grocery stores are struggling to adapt to these unforeseen fluctuations in supply and demand. All stores that operated during the pandemic have

implemented specific restrictions to comply with the Centers for Disease Control and Prevention (CDC) standards. Still, no two grocery stores' operations are exactly alike due to differences in size, market, and region.

2. Research

The impact of the virus is not universal across the country. Each corporation has implemented different measures. Nationally, we see social distancing practices, travel restrictions, personal protective equipment (PPE), and closures of non-essential businesses, according to the National Safety Council. Authority was passed to allow state governments to implement further restrictions, which we saw tightest in states with large conglomerates of cases, such as New York, Illinois, and California. Strict stay-at-home orders limited gathering sizes, and state park closures are common across many states with varying degrees of extremity. Local governments at the county level were also allowed to take additional action if deemed necessary. These actions came in the form of extended stay-at-home orders, specific plans of reopening, public transit rules, and the level of enforcement of all preceding restrictions. Lastly, we arrive at the business level. Every business handled added restrictions differently depending on resources available, technological capacity, and workforce.

To gain thorough insight of the implementations being made to remain operational in this pandemic, we will delve into investigating both large and small grocery stores. Large grocery stores (LGS) are characterized as having a widespread presence in multiple regions across the nation. In contrast, small grocery stores (SRS) are characterized as only existing in one, unique geographical region in the U.S.

2.1 Large Grocery Stores

As the virus began to spread, so did panic, leading to many consumers stocking up on essentials in the forms of hoarding and panic-buying. Suppliers are unable to produce their products because of worker illness due to COVID-19. John Tyson, chairman of Tyson, asserted that “the food supply chain is breaking” because facilities are closing down after workers have contracted COVID-19 (Lucas 2020). Meat is unable to be processed since the facilities cannot operate. Thus, hundreds of stores are not able to receive the products they rely on. Stores have been limiting customers on certain items because of this issue. Additionally, the supply chain cannot bounce back as quickly as it is disrupted. Sunil Chopra, Professor of Operations Management at Northwestern University, affirmed that after “short-term shock [to the supply chain] for two or three days...it takes a long time for the supply chain to work its way back to a stage where everything is normal” (Uhler 2020). With facilities closing, which makes producing essential products difficult, and unexpected breaks in the supply chain that cannot be fixed quickly, grocery stores must operate without a reliable supply chain network. Across the board, we are seeing grocers, delivery services, and e-commerce companies being forced to adapt at an alarming rate to keep up with consumer demand. This ability to change, gave large grocers a strategic advantage over some of the smaller competition. Three main factors allowed large grocers to adapt to changing environment forced by COVID-19 quickly:

- Available capital
- Technology
- Workforce

Each one of these factors strongly contributed to big grocers being able to create changes that met requirements at all levels of government. These advantages will be explained through two case studies involving Kroger and Albertsons. In 2019, Kroger and Albertsons combined for nearly \$181 billion in sales, with over 5,000 stores between the two. Each one faced different challenges from varying state and county regulations but managed to achieve near uniformity across all stores when implementing change to ensure shopper and worker safety.

2.1.1 Kroger

As of 2019, Kroger is the largest supermarket in the United States by revenue and the third-largest retailer (Banton 2019). This large corporation quickly implemented critical operational practices in their grocery stores to protect their workers and their customers. Kroger adjusted their store hours and incorporated a policy of offering exclusive early hours for seniors (60+) and other higher-risk individuals. With these policies, Kroger saw immediate benefits, such as allowing their employees more time to rest, clean, and replenish inventory. Kroger was able to increase Pickup hours to serve more online customers, promote physical distancing, and reduce the size of crowds in stores (“Kroger’s Blueprint for Businesses” 2020). Pickup is Kroger’s easy low-contact experience where customers can order items online, and employees bring the items to the customer’s vehicle, at specially marked parking spots. Kroger has also

incorporated other low-contact shopping options, such as shopping in-store with reusable bags and checking out on the phone, and straight at-home delivery (The Kroger Co 2020).

For customers that prefer the traditional method of shopping, Kroger has installed plexiglass at all of their cash registers and encouraged all of their employees to wear approved facial coverings and gloves. Employees are trained to continually sanitize registers, credit card terminals, food service counters, conveyor belts, shelves, transportation equipment, and other surfaces. These sanitation practices will help control the exposure and spread of COVID-19 in the stores. In-store audio messages reminding workers and customers of maintaining six feet apart and detailing proper hygiene guidelines, published by the CDC, are played in stores every 15 minutes. Kroger was able to transform their QueVision Technology, which typically uses infrared sensors and predictive analytics to monitor customer flow and speed to indicate how many registers should be open to speed up customer's checkout, to manage the capacity in stores. Kroger implemented a policy of only 50% capacity to reduce the amount of exposure of one individual with another. QueVision Technology will allow employees to know when a store has reached its 50% capacity, so employees can begin directing shoppers to form a line outside and wait until customers have exited the store (Wells, 2020). With the cooperation of their large workforce and the use of technology, Kroger can implement and manage their policies efficiently and effectively during this dire pandemic.

Like many grocery stores, Kroger was not prepared for the drastic changes in the supply and demand during the COVID-19 pandemic. Still, because of Kroger's comfortable total revenue of about \$122 million, the giant corporation was able to adapt quickly in their supply chain ("Yahoo Finance: Kroger" 2020). Kroger reacted speedily and began searching for potential new suppliers to meet the increase in demand. The corporation implemented quick vetting processes to maintain the high value of the product but also consider the location and capabilities of the supplier. Kroger understood the importance of diversifying their suppliers and reaching out to minority supplier organizations that have information on contacting certified vendor partners. Kroger facilities began to shift from an all automated process of production and forecasting to a part manual decision making process. Facilities began to prepare prioritized SKUs based on current consumer data. By rationalizing SKUs, the facilities can reduce changeovers and increase efficiency. By prioritizing SKUs, managers at facilities can work with specific partners to minimize complexity and maximize production. Kroger has also developed contingency plans to optimize throughput. For example, simplifying assortment and identifying manufacturing processes that minimize line changes, and adopting generic packaging with a Universal Product Code (UPC) to facilitate scanning at the register. Kroger has stressed the importance of over-communicating to suppliers and employees through these difficult times. Kroger and their facilities would be unable to be this flexible in their supply chain if it weren't for their strong relationships with suppliers, high-end data technology, efficient communication between departments, and their large workforce.

2.1.2 Albertsons

Albertsons operates in 34 states under some of the most significant names in the business, like Vons, Safeway, and Acme (FoodIndustry.com, 2019). As a company, Albertsons was able to move swiftly across all locations to implement critical changes. These changes started with reorganizing the store to increase the width of aisles. Arrows were placed on the floor of the store to make lanes for shopping carts and give one-way direction access to increase overall spacing. This led to a snake-like flow through the store, one person behind the other with almost perfect spacing. In addition to the directional aisles, stores required the use of carts to act as a buffer between shoppers. Carts were cleaned regularly outside with disinfectant before being passed on to the next customer (Cook, 2020). These restrictions are achievable with a large workforce. Re-arranging a store is no overnight task and is only obtainable by manually shifting goods to see what fits. Three people running a "mom and pop" shop wouldn't have the ability to call upon ready workers to alter a store in short notice. Technology changes for all grocers constitute a significant step forward in how customers will shop in the future. Albertsons was able to quickly scale the online ordering and curbside delivery, so shoppers never had to leave their car and even their home if goods are delivered. Albertsons reported by year-end on February 29 a 39% growth in digital sales that supported their 255% increase in net income from \$131.1 million to \$466.4 million (Melton, 2020). Grocers were already starting to digitize the market; COVID-19 simply accelerated this movement. The aforementioned changes helped keep the shoppers safe but didn't directly help the workers stay safe. To address this, sneeze guards made from Plexiglass or acrylic screens surrounded cashiers and other interactive stations. Personal bags were required to remain outside in some locations, so the only contact a worker has with a customer is through a grocery item (Cook 2020).

Each of these changes is not small and requires a large amount of capital to accomplish. In March, Albertsons drew \$2 billion from its \$4 billion asset-based revolving credit facility (Melton, 2020). Fortunately, executives knew that the reserve was available with uncertainty ahead. Implementing changes that were not part of the business plan is expensive, and making those changes at a quicker rate than preferred brings unforeseen costs and challenges as well. Sneeze guards start at a \$100 price point (Amazon, 2020). If four registers in every one of Albertsons 2,260 stores were given one sneeze guard, that change alone is nearly one million dollars. Increasing the workforce and training is very expensive and a luxury that not many grocers had. Change requires time and money, and because of the assets Albertsons had, they were able to quickly create a safe and productive environment for their customers and workers alike.

Albertsons controls a very robust supply chain. Their efforts are ongoing as they work closely with the distribution centers to ensure everything that is needed in a certain place is indeed there. At a time like this, customers just need to limit their quantities of high demand items to ensure everyone can get something. These items include toilet paper, canned goods, hand sanitizer, and paper towels. The same items are on the shelf, but shoppers may need to try another brand if the variety isn't available. Albertsons has also modeled their store hours around deliveries, which they receive daily in efforts to stock the shelves as quickly as possible. The problem lies within the manufacturers. The stress that's being put on them from all their vendors is extreme. Demand has nearly doubled and trying to alter an operation to account for that takes a great deal of time and money. Facilities are set up to meet a certain demand and can't rapidly be scaled up. Once the public stops panic shopping, more and more goods will remain in stock on the shelf (Day, 2020).

2.2 Small Grocery Stores

Many small, "mom and pop" grocery shops were forced to close during the pandemic due to the inability to meet the CDC's basic guidelines. The CDC prompted all essential businesses to promote social distancing techniques of a distance of six feet between all persons (CDC, 2020). Many private, local grocery stores do not have the financial and structural stability to remain operational in a pandemic due to costs of implementing social distancing tactics while also supplying a safe workplace for their essential workers by providing testing, emergency leave, etc. Due to this reason, our research is focusing on SGS consisting of multiple storefront locations but only existing in one region. These stores do not have the stability and financial backbone that an LGS such as Kroger may have, but do have more capital than a small "mom and pop" shop, as mentioned prior.

2.2.1 Gelson's Market

Gelson's Markets currently have 27 store locations open to the public, solely existing in the Southern California region (McDougall, 2020). Gelson's company goal is to provide the freshest selection of produce and goods conveniently to customers. While Gelson's prioritizes quality and value, its mission is to provide a unique shopping experience to its customers, offering exemplary meat and seafood and the ripest produce in an ultra-modern way.

As an SGS, Gelson's immediately reacted to the spread of COVID-19 to protect both shoppers and employees. Since they are located in the Southern California region, the large density of cases totaling over 91,000 confirmed positive cases as of June 5, 2020, has driven the SGS to implement many new social distancing and safe practices. Of these, Gelson's immediately closed any stores where employees had worked and tested positive for COVID-19. Upon closing, Gelson's promised that all employees who had shifts canceled due to store closures, self-quarantining, or sick leave would be paid for missed shifts (McDougall 2020). The supermarket also implemented many social distancing practices. Face coverings were required in all stores pertaining to all shoppers, vendors, and employees alike. The SGS is continuing to use its normal operational hours with the exception of offering an early hour for immunocompromised shoppers ranging from seniors to people with disabilities, women who are pregnant, and group-home caregivers (Shelby Report 2020). With that being said, Gelson's announced for customers to expect lines to enter the store, as they would be limiting the number of shoppers allowed in the store at any given time to maintain the six feet rule. Online shopping is now also an available option by either picking up groceries in-store or having them delivered through instacart.

Further, all product sampling, returns, and use of reusable bags have been suspended in stores to decrease the amount of human contact. Therefore, there will be no charge for plastic or paper bags at checkout. All seating areas and self-service food areas are closed, but some continue to offer take-away service. Antibacterial wipes were already offered

to shoppers before the pandemic to wipe down baskets and shopping carts, but are now being heavily distributed upon entering the store. There are also hourly reminders to promote frequent handwashing and the proper use of gloves on ready-to-eat foods by all employees. The SGS also enacted six feet distance markings around the stores where lines form, as well as plexiglass shields between cashiers and shoppers. Because Gelson's is recognized as a premier supermarket chain, the SGS has had to rely on select suppliers for sourcing their goods highly. However, during the shortage of high-demand items in the pandemic, Gelson's has been forced to seek out alternative suppliers for items such as bleach and hand sanitizer, while also placing a purchasing limit on these items (McDougall 2020).

2.2.2. Fareway Stores

Fareway Stores operate in Iowa, Illinois, Minnesota, Missouri, Nebraska, and South Dakota. Typically, Fareway receives a steady supply of grocery and household products, with an emphasis on selling cage-free eggs from local farms. As the products in aisles dwindled rapidly, suppliers were not able to keep up with demand. In response to this, Fareway limited the amount shoppers can buy of certain products that are already in high demand, such as hand sanitizer, paper towels, and general cleaning supplies (Mullen and Wellendorf 2020). Similar to other grocers, the SGS cut the hours of operation to provide for additional cleaning, sanitation measures, and restocking inventory. The first hour of business was reserved for shoppers over 65 years old, expectant mothers, shoppers with a severe chronic medical condition, and anyone with an underlying medical condition that increases the susceptibility to serious illness from COVID-19.

2.2.3. Draeger's Market

Draeger's Market is a small, family-owned grocery store chain local to California's Bay Area. COVID-19 has been on its radar since January, which led to early action. They assembled a "COVID-19" task force that meets every morning at 6:30 a.m., where the entire team store directors, assistant managers, the HR representative, IT supervisor, and maintenance manager joins on a call to discuss updates and harness everyone's knowledge and ideas to make their stores as safe as possible. They began to put policies in place, ensuring that there would be enough sanitation products for their employees, sanitizing carts, and closing self-serve areas, such as salad and soup bars. Draeger's has also been communicating with other grocery store businesses in the area to share and adopt best practices. This is how they first heard of the idea to install plexiglass barriers at cash registers, and implemented this practice within a few days. Draeger's has an employee at the door at all times to tell customers what is going on and why, which also aids in enforcing policies such as not allowing customers to bring in reusable bags (Draeger, 2020). Like other stores, Draeger's has reserved 7 a.m. to 8 a.m. for those who are most vulnerable in the community, including senior citizens and those who are immuno-compromised.

Draeger's works with a main grocery supplier, previously a co-op called Unified Grocers, which has since been bought by SuperValu and then by UNFI (Hirsch, 2018). Recent grocery supplier merges have resulted in fewer options for grocery stores to purchase from, and in Draeger's case, only one. Orders have been canceled due to high demand and lack of capacity on trucks and lack of truck drivers (Draeger, 2020). Produce supply, on the other hand, has not been an issue for Draeger's, as they are now able to purchase produce from restaurant suppliers due to mandated restaurant closures.

3. Best Practices

In the event of a second wave of COVID-19 or another respiratory pandemic, a list of Best Practices has been compiled based on the case studies conducted of the above LGS and SGS. In choosing each Best Practice, we focused on commonly implemented techniques across grocery stores of all sizes that comply with the CDC and WHO's recommendations. The highly stressed recommendations made by these organizations include maintaining a distance of at least six feet from other people, frequently washing hands for at least 20 seconds, wearing face coverings in public, and minimizing human contact with other people.

Table 1. Best Practices

Best Practice	Specifications
Social Distancing (6ft)	<ul style="list-style-type: none"> ● Increased spacing within aisles ● Limited occupancy in store ● Required face coverings ● 6ft distance markers where lines form
Frequent Disinfecting	<ul style="list-style-type: none"> ● Disinfecting of high-touch items after each customer <ul style="list-style-type: none"> ○ Pin pads, pens, conveyor belts, shopping carts, and baskets ● Hourly reminders to disinfect workstations ● Hourly reminders to wash hands ● Use of proper handwashing infographics in bathrooms
Minimizing Human Interaction	<ul style="list-style-type: none"> ● Online shopping ● Curbside pickup ● Plexiglass shields ● Designated immunocompromised-shopper hour ● Suspension of returns ● Suspension of reusable bags ● Suspension of self-service food bars and food sampling
Inventory Management	<ul style="list-style-type: none"> ● Limits on high-demand item purchases ● Rationalizing SKUs

4. Conclusion

COVID-19 hit the United States and countries around the world before grocery stores could prohibit panic buying, guarantee steady suppliers, and determine demand. Each grocer, depending on size, can leverage different aspects of the business to overcome a very unique challenge. As all non-essential businesses closed down, grocery stores remained open and ensured safety through various procedures, such as the six feet social distancing rule recommended by the CDC. Stores communicated with alternative suppliers, and vendors to provide products would be available for purchase. After analyzing how stores responded to the pandemic, we determined the best practices to relate to social distancing, frequent disinfecting, minimizing human contact, and inventory management. Now that both large and small grocery stores understand the importance of supply chain responsiveness and safety, we can act quickly and safely if hit with another virus as devastating as COVID-19.

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Biographies

Cassie Harriman is an undergraduate student at California Polytechnic State University, San Luis Obispo, pursuing B.S. in Industrial Engineering. Her main focus of study is in data analytics, continuous improvement, and operations research. She has completed internships with E&J Gallo Winery, Lincoln Electric, and Viasat Inc., varying from fields of supply chain logistics, sales engineering, and data analytics. Harriman is an active member of IISE and SWE. She plans to pursue a blended M.S. in Industrial Engineering from California Polytechnic State University, San Luis Obispo.

Marcos Diaz-Infante is an undergraduate student at California Polytechnic State University, San Luis Obispo, pursuing B.S. in Industrial Engineering. His primary focus is on data analytics and operations research. Marcos has

completed internships with Tanimura & Antle Inc. Marcos is an active member of the Society of Hispanic Professional Engineers (SHPE). He is looking for full-time employment in the defense industry in California.

Tara Loayza is an undergraduate student at California Polytechnic State University, San Luis Obispo, pursuing B.S. in Industrial Engineering. Loayza is interested in manufacturing and system processes. She has completed internships with PetDoors.com and W.L. Gore within project management and quality assurance positions. During her time at Cal Poly, Loayza held the role of a Resident Advisor within the Sierra Madre, dorms for first-year students within the College of Engineering. She is currently pursuing a full-time job as an Industrial Engineer in New York City, New York.

Stephanie Lee is an undergraduate student at California Polytechnic State University, San Luis Obispo pursuing a B.S. in Industrial Engineering with a minor in Psychology. She is interested in applying continuous improvement methodologies to the medical and health care industry. Lee has completed internships at Lumentum and Intuitive Surgical, planning and engaging in Kaizen events as well as developing suppliers. She serves as an Engineering Ambassador at her university, guiding tours of the College of Engineering for visitors and prospective students.

Kyle Detwiler is an undergraduate student at California Polytechnic State University, San Luis Obispo, pursuing B.S. in Industrial Engineering. Kyle's main focus of study is in machine learning, and neural networks and the application these tools can have in an industrial setting. He has completed internships with Cisco Systems and Patagonia in the fields of business analytics, data engineering, and performance tracking. Kyle's been an active member of IISE and EWB and is currently pursuing full-time employment in California.

Mohamed Awwad is an Assistant Professor in the Department of Industrial and Manufacturing Engineering at California Polytechnic State University (Cal Poly), San Luis Obispo, CA. He received his Ph.D. and M.S. degrees in Industrial Engineering from the University of Central Florida, Orlando, FL, USA. Additionally, he holds M.S. and B.S. degrees in Mechanical Engineering from Cairo University, Egypt. Before joining Cal Poly, San Luis Obispo, Dr. Awwad held several teaching and research positions at the State University of New York at Buffalo (SUNY Buffalo), the University of Missouri, Florida Polytechnic University, and the University of Central Florida. His research and teaching interests include applied operations research, logistics & supply chain, blockchain technology, distribution center design, unconventional logistics systems design, and OR applications in healthcare and the military.