



UNIVERSITY OF WISCONSIN, PLATTEVILLE

UNITED STATES OF AMERICA

The attached educational project, by MICHAEL KATCHER, entitled THE CORONAVIRUS CHANGING THE WORLD: HOW HAS THE CORONAVIRUS IMPACTED THE SUPPLY CHAIN” S DAY TO DAY FUNCTIONS AND THE DIFFERENT PATHS COMPANIES TOOK TO OVERCOME THE NEGATIVE ECONOMIC IMPACT, when completed, is to be submitted to the Graduate Faculty of the University of Wisconsin - Platteville in partial fulfillment of the requirements for the (MASTER OF SCIENCE IN INTEGRATED SUPPLY CHAIN MANAGEMENT) degree.

Approved: *Xiaotong Liu* Date: 12/27/2020

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Suggested content descriptor keywords: COVID-19, global supply chains, pandemics

THE CORONAVIRUS CHANGING THE WORLD

The Coronavirus Changing the World: How has the Coronavirus Impacted the Supply Chain's  
Day to Day Functions and the Different Paths Companies took to Overcome the Negative  
Economic Impact

Submitted to

the Graduate Faculty of the

University of Wisconsin - Platteville

in Partial Fulfillment

for the Degree of

MASTER OF SCIENCE IN INTEGRATED SUPPLY CHAIN MANAGEMENT

By

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Year of Graduation: Fall 2020

### **Abstract**

Observing the recent events of COVID-19 and how it is impacting the supply chain today, many industries are having a difficult time staying afloat during these unprecedented times. The supply chain has become a key element to all industries and companies around the world especially during the peak holiday season. The purpose of this paper is to understand how this deadly pandemic has impacted various industries and their supply chains all around the world as well as strategically planning for the future of their industry and their supply chain. This paper will provide many scholarly journals, articles and other forms of data/information that were published recently to help elaborate more on COVID-19 and how it changes our supply chain for the future. Information provided throughout this paper is intended to educate others about how this pandemic impacted our supply chain and how customers relied greatly on this industry to fuel their lives during COVID-19/Coronavirus 2020.

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## **Introduction**

### **Statement of the Problem**

According to the World Health Organization (WHO), the Covid-19 pandemic started back on December 31, 2019 in the Wuhan province of China as a cluster of citizens showed similar symptoms to pneumonia. The disease continued to spread from person to person via droplets and quickly took over China. As China was working on how to contain the spread of the virus amongst its population, the virus began to spread globally starting in Thailand and within months making its way to all parts of the World including the United States, Europe, and Latin America. (World Health Organization, 2020). To combat the spread, governments put in place mandatory stay-at-home orders causing businesses to come to a halt. Companies were quickly faced with pivotal decisions that heavily laid on the capabilities of the company's supply chain and some decisions decided the company's future.

Examples of these decisions vary by industry. The retail industry was hit hard, possibly one of the hardest hit industries, as it was one considered "non-essential". With very little notice, companies in the retail industry had to find a way to keep their company afloat when all stores were closed, and warehouse facilities were limited. Unforeseen challenges were quickly realized including increased storage costs, increased shipping costs, seasonality of clothes in the warehouses and at stores becoming obsolete due to the lag time it took to reopen, apparel manufacturers that typically reside in China facing labor shortages, and much more (Castano, 2020). Specifically, supply chain professionals at retail companies had to combat the negative effects of increased inventory with decreased demand, changing geo-political environments with manufacturers, increases in shipping costs due to lags at customs and increased safety regulations.

The agriculture, shipping, and customer household product industry were also negatively affected by Covid-19, but not due to decreased demand as mentioned previously. These industries faced an increase in demand that was unprecedented and still required knowledgeable supply chain professionals to navigate the increased demand under a limited workforce, increased safety protocols at warehouses and in stores, and volatile geo-political environments which involved the closing and reopening of borders, delays at clearing customs, and increases in shipping costs.

Covid-19 will continue to have negative effects, not only on individual companies, but the global environment. The decisions made by companies within the first year of the pandemic will be material to the success or detriment of the companies' future.

### **Purpose of the Study**

The primary purpose of this research is to educate individuals, specifically supply chain professionals on the monumental effects a pandemic can have on a company and an entire industry. It has been seven months since the pandemic began and by the time this paper is concluded, it will be almost a year since the first case of Covid-19 was encountered. It is imperative to analyze how each of these industries was affected by COVID-19, so the world can be better prepared for a possible pandemic in the future. It is also important to analyze the key decisions made by top companies in each of these fields to educate supply chain professionals on possible similar future situations. The best way to learn is to learn from the past, so this paper will also analyze how the supply chain has been affected by previous pandemics and how long it took each industry to recover.

### **Significance and Implications of the Study**

The significance of this research resides behind the understanding of how an airborne pathogen quickly took over many industries, specifically focusing on the retail, customer household product, shipping, and agriculture industry. If this can be carefully analyzed, then this paper can be served as a proper educational source for the future when a different pandemic affects the world again and how to counteract some of the negative effects of the current pandemic as a widespread vaccine is not expected for at least a year.

Research has already begun on the detrimental effects of this pandemic and this paper serves as a tool to build upon others research. According to the article, *The Impact of the Coronavirus on Agriculture: First Evidence Based on Global Newspaper*, the Coronavirus quickly interrupted the agriculture industry. For instance, “Many articles expressed concern that farmers would stop producing because of the pandemic (as they get sick) and less food will be available, if at all, at higher prices” (Balogh, Czine, Jambor., 2020). As the progression of the virus picks up, farmers and their livestock are being affected by the virus and it may cause a bottleneck to happen due to the stop of production in the farming process. This will cause an increase in demand for products with a decreased supply and drive-up prices. By understanding the reasoning behind the virus, it will help the farmers control their product availability, which will then help their supply chain not form a bottleneck due to the virus.

As the agriculture industry is being affected, other industries are being affected as well. The retail industry is slowly dying due to the stop of manufacturing and limited resources. The Customer Household Product is running low on resources of paper, pulp to create the toilet paper, paper towels and other paper products that are essential during this time of distress. As each

industry is having their own impacts, the shipping industry is trying to understand how to forecast for the sudden peak of products hitting the seas. Therefore, the significance of this paper is to illustrate how the four industries have been impacted by this virus followed by how they were able to bounce back and possibly restore our world's economy.

### **Literature Review**

As research shows, Wuhan province China was the epicenter of the Coronavirus dating back to the end of 2019 beginning of 2020. According to an article called *Coronavirus and the Supply Chain: The super virus has killed many across the world-and its impacts on industry are only beginning (Cotte,2020)*, some of the industries being impacted by the pandemic are predominantly the automotive and aviation. Many manufacturing plants were shut down which impacted the production of automobiles as well as individuals' jobs. The aviation industry had to shut down operations all around the world but first, in and out of Wuhan China to help keep control the spread of the Coronavirus. Approximately, 73 airlines had cancelled flights because of the shut-down (Cotte,2020). As a result, China had to come up with a short-term solution which would have to become a long-term solution as China starts to combat this virus from spreading.

Since there is no solution as of now to overcome the Coronavirus, the impact of the Coronavirus keeps on spreading uncontrollably. As the virus keeps growing, the impact is far greater than the automotive and aviation industry. The impact is controlling all industries around the world, which is putting everyone into crisis mode. Economies are shutting down, hundreds of thousands of humans are losing jobs and suffering due to the Coronavirus. Furthermore, since people are in crisis mode, more industries suffer due to the lack of spending (which impacts the economy) and the amount of inventory building up which creates a bottleneck within companies supply chains. After diving deeper into the overall impact, peoples purchasing habits began to alter by purchasing the essentials which would be groceries, household and personal care products, health products and beauty products. (Pastore, 2020) With the increase of spending on essential items, 21% of the purchases are made online makes it 30% less in-stores (Pastore, 2020). Since

more purchases are being made online, our supply chain is functioning on all cylinders which generate more room for error, as well as potential bottle necks and complications in the long term.

Considering the increase of essential products being purchased, increased the likelihood of having more demand for the products in a short amount of time, which would increase the supply for the non-essential products. With the increase in demand for the essential products, prices increased as well as the ability to manufacture, ship and distribute the product begins to generate a newer and greater problem than what existed before. For example, the food sector is unclear about how they will progress during and post Coronavirus due to the impact of the virus in this industry. Krissa Welshans, the author of *Coronavirus impact on food sector unclear*, illustrates how the relationship of Coronavirus is impacting this sector since they bring similarities to how SAR's packed this sector prior. At the beginning of SARS's, the food industry in China and around the world had "slowed more than gross domestic product growth May 2003 to worst period of the SARS epidemic showing a 15.5% year-over-year decline. (Welshans, 2020). Following the SARS epidemic, the food industry had rebounded as fast as it could in the following quarters due to heavy demand across the world. As the Coronavirus spreads, customers are not willing to dine out, the meat and agriculture industry had a tough first quarter. As for the meat and agriculture industry, they paid the price when the coronavirus pandemic started back in 2019 and is still being impact (especially companies like Tyson, Purdue) and other meat/poultry companies because of the demand and the ability to not meet the market demand for the product. As people can see, the Coronavirus (from the supporting article) mentions what we know "it's causing some general economic disruptions" (Welshans, 2020). Companies in the meat/poultry and agricultural industries will have to increase their supply to meet the demand if their customers. Even if companies are able to increase their supply and speed up their supply chains to align with the

change in demand schedule, the agriculture, specifically the Fruit and Vegetable industry, are still being hit by unprecedented challenges and have already begun seeking government assistance (Johnson, 2020).

While the meat/poultry and agriculture industry has been disturbed by the Coronavirus because of the demand for the product and not being able to support the demands, the shipping and retail industry is taking a drastic toll. The shipping industry is getting disturbed by the infrequent amount of sailings they need to do to support the demand for essential products because of the lock down in the far east due to the virus. As a result, shipping lanes not just had blank/void sailings but also had to cancel bookings due to the space and overbooking vessels sailing from the far east. “The disruption to the logistics and freight networks endanger trade and distribution of essential goods to combat the crisis and foster the recovery” (Rastogi, Arvis, 2020). With this disruption, companies must figure a way to mitigate the risk and form a quick solution to overcome the disruption by the shipping industry. A result to the disruption of the shipping industry, many companies diverted to air transportation due to the low transit time to deliver essential products to hospital and stores while understanding the (increase of cost). Therefore, the virus impacted the ability to move products swiftly from overseas to its destination.

As the shipping industry is trying to focus on shipping essential products as well as having frequent sailings, the non-essential products and the industries that make up the non-essential items were taking more of a financial hit versus the essential industries. The retail industry is one of the non-essential industries that is being hit by the Coronavirus. Overseas, specifically in China, many manufacturing facilities were shut down temporarily to decrease the spread of the virus, many companies had to redirect their manufacturing to neighboring countries to help subsidize. As a result, Vietnam, Thailand, India, and Bangladesh were the areas that companies flocked to in the

meantime so they could manage them remotely. With the temporary shut down and the demand of products, the retail industry according to CEO officer of First Insight said, “market and supply chain disruption are causing unprecedented shifts in both supply and demand” “For the first time in history of modern retail supply is constrained”. (Zackiewicz, 2020).

Due to the disturbance, retail companies and their supply chains had to quickly form an action plan to make sure they stay up float. Per an article called *Five actions retail supply chains can take to navigate the coronavirus pandemic*, the authors discuss action plans to keep supply chains moving within this industry since it was marked as non-essential. Mentioned before, the switch in spending from non-essential items post coronavirus to now, retail companies can make priorities in five different areas. “Suppliers, Merchandising, Distribution, Logistics and Fulfillment” (Aryapadi, Chandra, Dekhne, Haddioui, Lange, Kumar 2020,). As the article identifies the five major aspects, retail companies will be able to support all aspects of their supply chain to meet the demand during the pandemic.

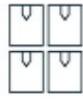
**Retail-supply-chain changes**

● Nondiscretionary categories ● Discretionary categories



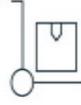
**Suppliers**

- Establish daily meetings with strategic suppliers
- Reduce product variety
- Reduce on-time, in-full requirements, as well as payment terms for key suppliers
- Mitigate risk for existing orders, in collaboration with suppliers



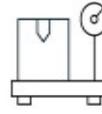
**Merchandising**

- Revise buy plans and reallocate staff toward high-demand categories
- Override algorithms to redirect inventory to high-density areas
- Dial down near-term buy plans to preserve cash
- Anticipate future increases in sales and adjust buy plans accordingly



**Distribution**

- Retrain employees and redeploy them to distribution centers in high-demand areas
- Raise wages and make temporary hires
- Maintain good workplace hygiene
- Cross-train store and back-office personnel to assist with e-commerce



**Logistics**

- Allocate more transport capacity to high-demand items
- Have suppliers deliver directly to stores
- Stage products at strategic hub stores to feed smaller stores
- Explore alternative and supplemental delivery options
- Offer transportation capacity if private fleet is available to support movement of critical goods



**Fulfillment**

- Relax same-day/next-day delivery requirements
- Optimize routing and accommodate more delivery slots
- Enforce order maximums
- Expand fulfillment and return options to give customers flexibility

(Aryapadi, Chandra, Dekhne, Haddioui, Lange, Kumar, 2020). The specific divisions can utilize the points, with their suppliers, merchandising, distribution channels will help facilitate a smoother fulfillment and logistical strategy. The major impact during this coronavirus pandemic not just disturbed the essential products and the supply chain capabilities but also impacted the non-essential industries that had to quickly adjust to keep up with the demand as well as financially switch gears and improve processes during this pandemic.

## **Methodology**

This paper dives deep into the Coronavirus pandemic with information provided by researchers and universities who had recently written scholarly articles that discuss current COVID-19/19-Coronavirus pandemic global supply chain related issues. The information provided throughout all articles provide significant information that help portray recent industry-based supply chain issues. Furthermore, COVID-19/Coronavirus pandemic originated in China, the biggest manufacture and supply chain orientated economy that impacted various local and overseas industries and economies. Scholarly articles written indicate and validate the importance of how many industries were impacted and/or deemed as essential or non-essential to help slowdown the progression of this deadly virus. Finally, evidence from the scholarly articles and expert supply chain professionals share their input on how industries and companies have adapted and improved their supply chains for future pandemics as well as post pandemic environments.

## Discussion

Today, as the world still pushes to combat the coronavirus countries, states and cities around the world still recommend everyone to stay at home and if they need to proceed to a non-essential or essential business, proceed by wearing a mask to keep themselves and others safe. In the USA as an example, stores, restaurants, and any public places mandate only 20% indoor capacity as well as closing by 10 PM (Restaurants & Bars). By setting a specific minimum, this rule allows restaurants, stores, and public places to be open and allow the economy to keep circulating. Even though the examples provided are great, this is only available to people who live in a warmer climate the majority of the year (when its not summer for eastern coastal lines & mid-west USA). As a result, during the summer times, the exposure rate was low and citizens around the world were happy. Now as the seasons have changed the exposure rate has started to increase and our society is being disturbed. However, even though during the warmer months, the economy was “getting back to normal”, the supply chain and many industries were still being disturbed and no one had lost sight about this virus.

Companies had moved more production out of China and into other surrounding far east countries to produce products and help fuel the world back into spending mode. With that, India had become one of the biggest trade partners especially with the United States of America. That comes to show that any country can provide great value either during a pandemic or to broaden trading capabilities with other countries. Diving deeper, India as once known only for exporting only “spices, textiles, apparel, jewelry and handicrafts (Bagla, Govindarajan 2020), India has expanded their repertoire. Per a recent article, “According to detailed current data from India’s Ministry of Commerce, Indian companies export billions of dollars each in categories as diverse as: furniture, medical and surgical instruments, electrical machinery, ships and boats, vehicles, boilers,

parts made of plastic, steel and aluminum, organic and inorganic chemicals and more. We believe that many of these Indian suppliers are ready for first world markets. American companies can source these and other goods from their Indian corporate counterparts; unlike in China, these suppliers are not affiliated with the government (Bagla, Govindarajan 2020). With the support from other countries, companies will be able to swiftly move production to various countries if they decide they would like to get out of China.

Since companies are straying away from China as being a primary country for trade, with the downfalls of our supply chain in various industries due to the virus, what we soon to realize is that our supply chain has become more resilient. Various companies have already figured out how to work with a disturbed supply chain. A great example is General Motors; they anticipated this supply chain disruption and not just moved production from cars to ventilators. They used a process called mapping. Mapping is a process which engages companies and suppliers to document the exact source of all materials, processes, and shipment involved to get the product to the market successfully. When utilizing mapping as a supply chain technique, General Motors as the example “have gone beyond that and spent many years extensively mapping their supply chains. Mapping involves engaging suppliers to understand their global sites and subcontractors, as well as knowing which parts originate or pass through those sites. Companies who invest in this type of effort benefit when disruptions happen, because they can triangulate within minutes or hours how their supply chain could be impacted in the days, weeks, months to come. When companies have advance knowledge of where the disruption will come from and which products will be impacted, they have lead time to execute avoidance and mitigation strategies immediately — like shaping demand by offering discounts on substitutes, buying up inventory, booking capacity at alternate sites, controlling inventory allocations, and so on” (Linton, Vakil., 2020). By using the mapping technique, many

companies can become more relentless and our supply chain will become stronger as more companies utilize this technique.

Throughout all the disruptions which were caused by the Coronavirus, companies make choices to enhance their supply chain to ensure they are making the best decisions for their company during these unprecedented times. Suggestions such as supply chain mapping and re-allocating sourcing of product helps not just all industries but specifically the shipping retail and agricultural/meat industry. As a result, the agricultural industry during this coronavirus pandemic has suffered and disrupted greater than what everyone had expected. According to an article called *Billions paid to farmers in coronavirus assistance*, this article not just mentions the assistance the United States government had on the agriculture industry, but also what contributions were made to assist this industry and their farmers. This article mentions, within the first couple of months, the “U.S. department of Agriculture’s Farm Service Agency (FSA) approved \$7.6 billion in payments to producers in the second round of the Coronavirus Food Assistance Program” (Fatka, 2020). Looking at how the government stepped in to assist in fulling the agriculture/meat industry it really demonstrates how important it is to ensure that this industry does not run out of resources. As a result of the government's contributions, the USDA & FSA had created a program that helps support the growth of this industry through this pandemic as well as any disruption to their supply chain in the future. The program that was created is called (*Food box program*). Per this article, “The program will continue purchasing combination boxes to include fresh produce, dairy products, fluid milk and meat products. The program also will continue to require that proposals illustrate how coverage would be provided to areas identified as opportunity zones, detail subcontracting agreements and address the “last mile” delivery of product into the hands of the food-insecure population) (Fatka, 2020). As shown this program helps assist local farms and the

agricultural industry by providing them financial support as well as a program that provides the necessary nutrition to all the people and families across the USA.

As the coronavirus is still impacting all the industries, but companies and countries are learning how to work and overcome this virus, many of our industries are improving and adapting to this new “normal”. Our supply chain and all its subsidiaries parts of the industry will continue dealing with the on-going disturbances. However, companies have started planning ahead in their supply chain for the potential post coronavirus era to start. Companies are trying to watch their carbon footprint but also, they believe the cost of materials is going to go up. In an article called *Sustainability: A Lever for Post-Coronavirus Relaunch*, many pivotal aspects will change within many industries but the majority in the supply chain. Per this article, “I think we don’t want to be hit by another global crisis, global warming, which might have an even more dramatic impact than this terrible pandemic,” he said. “Circularity offers new opportunities to reconsider manufacturing processes, products, technologies, consumption, and waste management, giving the chance to relaunch economic activities and create jobs.” (Turra, 2020). By accepting and planning into the future, people will realize that there are many other opportunities that are being created once a post coronavirus time exists. Furthermore, this article also mentions that “The fashion industry thus needs to reconfigure design, operation and supply chain strategies. We cannot afford to go back to business as usual when the growth is measured only in financial terms. We need an inclusive dialogue in which purchasing, consumption and corporate strategies put people before profit.” (Turra,2020). Therefore, in a futuristic scenario, hopefully, companies as well as the fashion industry which will impact the retail industry in many ways moving forward once, we enter a post coronavirus state.

All industries have been impacted and all must learn from the mistakes made during this pandemic. Each industry may have their own specific challenges to overcome, but the overall goal is the same. One article argued for companies to survive and remain sustainable, businesses need to revisit their strategies during current COVID-19 crises from three perspectives, “including supporting human resources financial commitment, forming cross functional teams and connecting with their supply chains, as well as investing in corporate social responsibility and doubling down efforts with regard to partnerships” (AL-MANSOUR, 2020). Basically, not only do companies need to learn from the mistakes they have made, but they must also come together and vow to do better. The more people work together the more challenges the World can overcome.

## Conclusion

To conclude, throughout the year 2020, the World is facing a difficult time overcoming the Coronavirus/Covid-19 pandemic. The World has changed because people were getting deathly ill and with that happening, made many industries suffer. As the main province in China (Wuhan) became contaminated, the automotive and aviation industry had slowed down and cut off all ins and outs of Wuhan China. With the automotive and aviation industry being one of the first industries being impacted, the supply chains for the retail, agriculture/meat industry as well as the shipping industry were impacted in a greater perspective. Many individuals lost their jobs, and our supply chain was greatly impacted. As a result, this disruption will remain until the World returns to a post coronavirus state. The retail, agriculture and shipping industry were disturbed, and they are adapting to the unprecedented circumstances by sourcing properly, providing food and keeping our supply chain moving with or without any disturbances.

With all of these challenges the World needs to focus on real-time solutions and become prepared for the next pandemic which will hit in the future. Short-term solutions have already been made for the most vital materials needed during this pandemic, PPE. As stated in the article, “Low-tech solutions for the COVID-19 supply chain crisis”, by Andrea Armani, local community members came together to fill the gap in the PPE supply chain and joined forces to make it easier for health care workers to get the safety materials they needed in order to serve the public safely. These community members came together and “we can learn from the present to harness the energy, creativity and generosity of makers” (Armani, 2020) to not only continue helping the PPE supply chain, but all of the other industries mentioned previously in this article. This will not be the last pandemic and the World’s supply chain will be tested again. Before the next pandemic

arrives, it would be wise for all industry leaders to come together and learn from the mistakes made in the past and develop a successful plan for the future.

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