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## AMERICAS SUPPLY CHAIN: UNFORCASTED COMMERCE CHALLENGES OR LEADERSHIP FAILURE

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AMERICAS SUPPLY CHAIN:  
UNFORCASTED COMMERCE CHALLENGES OR LEADERSHIP FAILURE

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## Abstract

The current supply chain disruptions are affecting commerce in some manner which leads to scarcities of products and labor globally. The research will show that supply chain issues are directly related to commerce and leadership which plays an important role in our economy. Supply chain operations are defined, and the different levels of supply chain activities are explained. Possible points of failure within the system as well as probable causes leading to empty shelves and unavailable products is explained in detail. The research describes how massive labor shortages, high petroleum prices, and shortages of essential sub-components has led to this crisis. Providing possible solutions or an insight into how leadership may be able to mitigate the supply chain issues. In summary, this project identified the many issues affecting the supply chain from pre-pandemic commerce leadership failures through current government mandates that directly affect the supply chain. Is the supply chain affecting commerce globally or is it just a local issue? What can leadership do to mitigate the effects to the supply chain both now and long term?

*Keywords:* supply chain, commerce, leadership

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## **Introduction**

For the last two years now, our country has been fighting an unseen enemy, the global pandemic known as COVID-19. Many people believe the pandemic caused many of the supply chain issues within manufacturing and commerce since early 2020. What are these supply chain issues, what is the cause of the failures, and what can be done by business, our elected leaders or can anything be done to make us whole again.

The supply chain is a part of commerce, it can be a part of the manufacturing process, or it can be part of getting products to the marketplace, or it can be a part of both (International Statistics, 2021). As a part of the manufacturing process, the supply chain is involved with providing raw materials to a manufacturer to build a complete product. The supply chain also provides for subcomponents of larger products to be delivered on-time for production. Finally, the supply chain is the system of transportation getting the manufactured goods and supplies to retailers for use by consumers.

The supply chain is an important part of all economies foreign and domestic. Any disruptions to the supply chain will cause immediate and long-lasting affects as well as a ripple effect throughout many businesses worldwide. Today, there are many issues affecting the global supply chain which will continue for many years to come. There has been much research about how to make business more efficient and cost-effective, but no research could have predicted the supply chain failures over the last two years.

Some of the questions that will be addressed in the research are: What are the major issues affecting the supply chain as it pertains to commerce in America today? Were any of these issues avoidable or just a normal part of doing businesses? Was this a leadership failure of business itself or a failure at multiple levels of government?

## Supply Chain

One area of interest when investigating delays in the supply chain may be due to not having as much agility in the supply chain as business leaders believed. Having an agile supply chain (ASC) is essential for production to meet customer needs according to Tarafdar and Qrunfleh (2017). Supply chain agility is also critical for rapidly introducing new products into the market based on customer demands that are rapidly evolving. Almost 90% of companies recognize the importance of an ASC, but very few understood how it could improve supply chain performance.

Performance and profit are a companies' bottom line as stated by Tarafdar and Qrunfleh (2017) and can be accomplished by using ASC and supply chain strategy (SCS) together to achieve performance-oriented goals. SCS by itself is the specific goals of the supply chain. It determines the cost and responsiveness to the supply chain which is the overall focus. The SCS influences processes such as inventory, logistics and procurement which is critical to providing quick and effective response to ever changing customer needs.

Yildiz et al. (2016) points out that risk management in supply chains has been receiving increased attention over the past few years, managing, and controlling risk is critical to minimizing cost and maximizing reliability. There are many risks to a supply chain network, such as supply risk, manufacturing risk, financial risk, and others. To mitigate the associated risks to a supply chain and establish reliability, a method must be developed which compares total reliability and total cost. While mitigating risks and lowering costs conflict with one another, new analytical methods must be utilized to manage tradeoffs when encountered.

Supply chain risk management was relatively new when Yildiz et al. (2016) looked at internal factors such as the manufacturing process and lead-time uncertainties. The research

conducted established that there must be a reliability index that takes multicriteria modeling to consider cost and reliability. The primary advantage to establishing a single value for reliability and cost is the ease and practicality in which it can be entered into the decision-making model. Transportation issues were identified as external and should be looked at as strategically interrelated but physically independent of the supply chain.

The supply chain depends on a reliable and robust transportation network and is considered by many supply chain managers to be the most significant threat of all the risks (Yildiz et al., 2016). The risks pointed out in the works show the importance of cost and reliability with an emphasis on a robust transportation network or the whole supply chain could fail. The total supply chain reliability calculations are extremely complex, but the bottom line is that the entire supply chain fails if one portion of the chain fails to perform to standard.

### **Sustainability**

Supply chain managers are discovering the difficulties involved with an increasingly complex system of resupply procedure despite the numerous mitigating strategies. Businesses everywhere over the last several years have adopted green practices, these are designed to reduce the carbon footprint on the environment and increase the sustainability of the firm. Actual risk management may not reduce the risk experienced by the companies despite the strategies. The sustainability efforts implemented by businesses recently have been found to be extremely effective at mitigating risks (Gouda & Saranga, 2018).

Businesses have come to expect a seamless supply chain, with endless options available to customers and global resources available for customers to choose from. There appears to be some vulnerabilities in the supply chain system however, like the amount and severity of the disruptions to service. Gouda and Saranga (2018) looked at disruptions to the supply chain and

found that internal factors such as accidents, theft, and sabotage as well as external factors such as labor strikes, legal disputes and natural disasters have caused detrimental effects to the firms. These affect not only the financial situation of the firm, but the reputation and support of the customers buying the products could be severely affected.

Risk management is an important strategy used by businesses everywhere to help avoid disasters, preventing accidents and mitigating the negative effects as much as possible. Gouda and Saranga (2018) noted that disruptions to the supply chain are increasing and are extremely costly to firms in financially and reputation. Adopting supply chain mitigating strategies such as maintaining strategic stock, flexible supply base, flexible transportation, revenue management and dynamic pricing are designed to avoid the high impact effects to the business.

Sustainability is more important than risk management to managing supply chain risks. Tracking software has been developed to monitor various categories of supply chain disruptions and risk such as environmental disasters and labor issues. Many global corporations have adopted environmental and social sustainability practices which primarily mitigate the risks much better than the previous risk management solutions (Gouda & Saranga, 2018).

Supply chain vulnerability has been defined by Gouda and Saranga (2018) as being exposed to shocks both outside and within the supply chain itself or an event that impacts the performance of the supply chain. Sustainable resourcing may be one of the most valuable methods global firms can implement to ensure disruption free supply chains. By manufacturing firms making their suppliers aware of sustainable practices, they eventually developed into a synergistic relationship benefitting all partners and reducing the risks to the supply chain.

Supply chain risk management (SCRM) has been used to describe the vulnerabilities to supply chain operations. SCRM has been broken down into two segments, operational risk, and

disruption risk. The first is operational risk which is generally caused by internal factors that can be controlled such as a supply-demand mismatch. The second form of risk called a disruption risk, whether manmade or natural are far less controllable events. Internal and external factors affecting the supply chains are also considered as risks affecting firms and SCRM is the method used to assess the risk (Gouda & Saranga, 2018).

Risk assessment continues to be a critical function of supply chain management helping to develop the proper risk mitigating strategy and provide a positive impact on global supply chains. Risk criteria is measured by probability and likelihood that an event will negatively affect the firm by means of inbound transport or shipping. The two ways to mitigate the risk is by prevention and the other is to react to threats. When increased levels of risk are likely, firms will invest more into the programs preventing such an event from occurring in the first place (Gouda & Saranga, 2018).

Stakeholders and firms have been putting an enormous amount of emphasis on firms' ability to understand the economic, social, and environmental performance risks involved, called the triple bottom line and are indicators of success or failure. Gouda and Saranga (2018) discussed the SCRM process even further by noting the relationship and differences between supply chain risk and supply chain sustainability. Traditional SCRM strategies are focused on operational attributes such as quality, cost, and delivery. Sustainable risk management reduces risk through environmental and social methods.

Environmental sustainability takes a new look at an old problem where firms have formed a dependency on natural resources to maintain an advantage over other competitors. There are three strategies of environmental sustainability, pollution prevention and product stewardship provide a competitive advantage by lowering emissions and reducing life-cycle

costs of the product. Sustainable development gains the advantage when the unmet needs of the customer are fulfilled (Gouda & Saranga, 2018).

Social sustainability practices have an impact on the firm and personnel are the key resource that are required to achieve a competitive advantage. Employees with a strong set of skills and experience are critical to supply chain operations. Corporate social responsibility must include employee health, safety, and motivation to be a positive for a firm's performance. Many supply chain disruptions can be avoided by managers implementing better health and safety policies and employees show up and perform better in a healthy work environment (Gouda & Saranga, 2018).

Supplier sustainability begins when firms educate suppliers on sustainable practices and ensure that those policies are being followed and reinforced when they are not. Firms will identify and assess the probable risks, develop a process to mitigate the risks and follow up on these activities over time to increase awareness and improve the supplier's sustainability. This process allows suppliers to meet regulatory requirements in timely manner and deliver high quality goods that the customers demand. Suppliers who do not meet the minimum standard are a threat to the supply chain and severely impact a firm's performance (Gouda & Saranga, 2018).

### **Shipping delays**

There may be numerous reasons for the supply chain crisis, but the shipping component makes up the largest and most expensive portion of the supply chain. This segment is divided into multiple categories such as overseas shipping and overland shipping which make up the bulk of shipping and its subcomponents. The supply chain has been running smoothly for the most part prior to 2020, with only minor glitches for business leaders to make course corrections.

Shipping delays have many causes both internal and external factors within the network. Internal factors affecting shipping may be due to unforeseen issues by management and leaders at all levels, and the delayed or wrong response to problems. External factors are found outside the firm which have a profound effect on supply chain such as the shipping companies that are not owned by the firm themselves.

Shortages of truck drivers and trailers have been identified by Milliot (2021), congestion at the ports and escalating transportation costs are all factors putting pressure on the global supply chain and just getting worse. The book industry is just one of the many who are suffering an existential threat. Due to printing capacity diminishing and labor shortages, printers, wholesalers, and retailers are unable to fully staff their businesses. The issues don't stop there, there are shipping delays from most vendors, and do not believe the problem will be resolved before the 2021 holiday season.

The solution for the supply chain delay was to inform all accounts to allow extra lead time and take advantage of what was already in stock. This is what Milliot (2021) discovered from Bookazine while researching for this article. The factors created a supply chain bottleneck that could cascade throughout the entire system. The problems were thought to be more severe in 2021 than the prior year due to having to order larger quantities of product, even earlier. Publishing is not the only industry affected by bottlenecks, but other mass marketers had supply shortages as well.

Milliot (2021) also discovered that publishers had investigated printing here in the U.S. a few years ago, but there is not enough printing capacity here to make that cost effective. With the high costs of ocean shipping, printing here in the U.S. looks even more attractive to publishers. With the high costs of shipping from overseas printers, the prices have gone up to consumers.

There is concern over the last mile carriers such as UPS, becoming overwhelmed before the holidays, continued high costs with publishing and shipping, the supply chain problems will continue well beyond spring 2022.

Partida (2021) explains that shipping delays have been experienced all over the world and all economies have been affected by Covid shutdowns since early 2020. The pandemic has caused more people to shop online for more products, consumer spending is up 32.4% from \$791.7 billion in 2020. The shipping delays are further exacerbated by material shortages, higher demand, and staffing insufficiencies. Supply chain bottlenecks, massive backlogs and extensive lead times are the result of factories, distribution centers and ports to cease operations for covid related mandates.

Crisis disruptions to the supply chain have occurred in the recent past like the 1990 recession, 9/11 terrorist attacks, 2008 mortgage crisis, 2014 Ebola crisis, and the COVID-19 pandemic. All these events have had a major impact on the economy as Tompkins (2020) describes it and were considered normal or have created the new normal. The business world has experienced high levels of volatility, uncertainty, complexity, and ambiguity (VUCA) over the past several years. VUCA is used to describe the post-cold war environment.

VUCA can be applied to the business world to describe innovative disruptions caused by today's high tech digital devices or other crisis disruptions like the current pandemic. These crisis interruptions have a profound impact on supply chains and commerce as well as the ripple effect throughout global economies. Tompkins (2020) looks at how VUCA affects supply chains and commerce and how businesses can overcome these issues.

*Volatility* is described as change or the nature and frequency of change, this has been described as the "disruption cycle". The circle of life for companies requires all three steps to be

successful in today's digital world: continuously improve, transformation and reinvention. To be innovative and bold is the path forward in the disruptive cycle and to dispel the status quo. Companies able to create new innovations, and have bold, courageous leadership will achieve profitable growth (Tompkins, 2020).

*Uncertainty* makes it extremely difficult to make accurate predictions or to define what the standard operating requirements are. Tompkins (2020) explains the need to focus on a flexible supply chain instead of the optimal solution, capable of adapting to multiple scenarios. Unable to predict the future, businesses will need to have the greatest number of options available to satisfy the needs of the customers and meet their immediate demands.

*Complexity* refers to the increased digitalization of commerce and how complex the economy has gotten in recent years. This refers to retailers selling direct to consumer (D2C) when there used to be a distinction between retailer, distributor, wholesaler, and manufacturers. Now to achieve success, businesses must diversify sales strategy, incorporate all channels and methods to reach as many consumers as possible. Broad sales strategy requires businesses to act like a supply chain and provide customers the products they require at a single location (Tompkins, 2020).

*Ambiguity* would describe the inability to understand what will happen in the marketplace and how digital technology affects all businesses into the future. To prevail, all businesses must prepare now for new products, services, and business models to go digital in the new world of technology. Tompkins (2020) says it the best when describing how the market changes its mind faster than the company's ability to respond. This lack of uncertainty has businesses and consumers wondering what the new normal will look like.

The newest strategy in use today, beginning with the pandemic and moving forward, is VUCA 2.0, developed by Bill George, a senior fellow at Harvard Business School. The VUCA 2.0 philosophy represents the top four leadership traits vital to be successful in business today. Tompkins (2020) looked at the strategy that Bill George developed and explains it in detail below.

Tompkins (2020) continues by explaining how vision, understanding, courage and adaptability have become the cornerstones to a successful business. *Vision* explains that the company leadership must have a well-defined mission, core values and a clear strategy to guide the business in the right direction. *Understanding* is essential to navigating a business through unpredictable times with a clear understanding of organizational capabilities giving leadership the clarity to identify changes in their markets. *Courage* is the ability for leaders to make accurate and timely decisions without hesitation or the fear of criticism. *Adaptability* is the ability for leadership to remain flexible and quickly identify courses of action that align with the strategic direction of the business.

### **Maritime Transport**

Products produced overseas in places such as Asia, South America and Europe require enormous sea going vessels carrying a large quantity of shipping containers to North America. Maritime transport begins at the port of departure and completes its journey at a port usually nearest to the country in which items were shipped. The major ports along the east and west coast of America may have major issues with the container vessels getting into and offloading cargo in a timely manner. In some cases, it may be cheaper to sail to a port further away to avoid bottleneck issues at the closest ports. Companies receiving goods will have to do an in-depth cost to benefit analysis to understand all the implications (Hiekata et al., 2021).

There are definite advantages and disadvantages to shipping companies spending more money on fuel to travel longer distances and possibly pay tolls or a tariff to lock through the Panama Canal. The higher costs attributed to more time at sea may be offset by less time spent in port. The possibility of cheaper labor at the smaller ports, commodities bound for the middle of the continent should be another major advantage to shippers. Overland transportation costs will be less since the products are closer to the destinations as well. The supply chain delays may be reduced, and costs can remain low given the current economic situation.

Another method recently investigated the ability to overcome supply chain issues is for shipping companies to adopt a practice widely used by the airline industry for years called yield management (YM). Lin et al. (2020) explains the YM practice in depth in the research article where airlines studied demand forecasting, overbooking control, dynamic pricing, and seat allocation. The study also extended to railway transportation, hotel management, and car rental industry; the in-depth study led to significant improvements in the airline industry.

The results of the study revealed the benefits of yield management can be applied to the cargo shipping industry to achieve significant benefit from the practice. The research into yield management in the cargo container industry began in the 1990's with allocation management and a pricing model. The study revealed that container shipping increased greatly since then, but methods have not changed much over time. The major issues noted during the yield management study were ship capacity control and shipping services. There were gaps in the research that were not fully considered, and future research needs to be conducted to investigate this problem more thoroughly (Lin et al., 2020).

Limitations to yield management are many but the focus is on the vessel itself where total container capacity, vessel deadweight and the number of electrical outlets for the freezer units

are the issue. Special characteristics to consider are the different container types (dry vs. refer), container physical size (20 ft vs. 40 ft), and terms of contract (short vs. long) when using yield management as a discriminator to supply chain delays. Many of the limitations previously noted are common throughout the cargo container shipping industry and remain an issue to this day.

Lin et al. (2020) also described a trade imbalance to the cargo shipping industry with the eastbound and westbound traffic. Service routes from Asia are fully loaded going to Europe and returning to Asia with empty containers. This poses a special problem for yield management and the container shipping industry. The cargo shipping industry relies on consistent and frequent use of container ships, and it is a big problem when freight is not on a permanent schedule. Fluctuating prices and dynamic customer demands are difficult to plan for on the scale required to operate the container ships no matter what optimizing model used.

Widespread shutdowns and increased customer demand for home delivered goods have caused traffic jams and major delays at airports, and shipping harbors. A cargo vessel became stuck in the Suez Canal for nearly a week during March 2020, causing a major backup of many other container ships using the shipping channel. This unforeseen problem has led to large retailers like Amazon and Walmart to experience long shipping delays with the ripple effect to last for several months to come (Partida, 2021).

Risks to the maritime supply chains are continuously affected by weather and other uncertainties, such as oil spills, climate change, security, and socio-economic instability as described by Mankowska et al. (2021). Commonly identified sources of disruption are related to the ground transportation and information sharing with the maritime crew. These and other disruptions can lead to significant port delays and port inoperability issues. Natural hazards are continuously monitored but difficult to avoid and harder to predict.

Maritime supply chain disruptions were diminished by a function of port resilience, where any vulnerability to an operation is overcome by its capacity to recover to a sufficient level within an acceptable amount of time. Mankowska et al. (2021) also states that port resilience has accounted for the overwhelming success of the system to quickly recover and mitigate the negative effects to ports under normal circumstances. Global supply chain resilience has also been closely linked to port vulnerability and some of the shipping ports have been impacted severely by the global pandemic in a negative manner.

Transporting maritime cargo is complex and involves companies that ship the goods, companies involved with the building of ships, as well as port and terminal operations. The shipping companies are bound to important functions such as transportation of the cargo and changing of the location as necessary. A subset of functions such as safety, efficiency, and punctuality which are clarified to be an important performance index of top-level functions. Shipping is further broken down into internal functions like sea transport, seaport operations and ground transportation (Hiekata et al., 2021).

The cargo ship itself is not broken down into internal systems however, the ship falls under the function of sea transport with properties such as voyage plans, direction, situation, and location as described by Hiekata et al. (2021). Internal instruments of the ship include the navigation and communication, machinery and propulsion, ship structure and the cargo handling systems. The navigation and communication are sensitive to changes by humans who operate the ship and are an attribute to the system. Also affecting the ship's status is the ship structure, machinery, and propulsion systems which interact with the navigation and communication system to update the status of the ship.

Experiencing delays and waiting times when handling cargo and is a sub-function of port operations. Hiekata et al. (2021) described that the instruments of loading and unloading of cargo, port operators and port facilities are considered a part of the system architecture model. Any changes to this system architecture or any external influences such as weather conditions will affect the performance of shipping services globally. Profitability for maritime transport companies relies on the price of fuel and transportation fees to remain constant while mitigating the delays at the ports and the decrease of incidences while at sea.

Products received on the docks of the port transition to an overland shipping mode of transportation going to a distribution center or a hub located near to the destination. From this point in the supply chain, products will be sorted and loaded into ground transportation, either trucks or rail. Overland transport begins when products arrive at seaports and enter the ground transportation segment of the supply chain network bound for the interior destinations.

### **Overland Transport**

Overland transport is the portion of the supply chain where products travel in bulk commodities to different points around the country. Whether the goods are manufactured overseas and arrive at the ports for distribution, or they are built in another part of the country, products will require overland transport to distribution centers (DC) as noted by Yildiz et al. (2016). The overland transportation network has the problem of deciding which of the existing and/or new locations should be used to service which customers. Another aspect to consider about DC's is which suppliers should supply which plant based on specialized characteristics such as speed of travel and the quantities of products to move.

### ***Rail***

Many if not all rail companies have been affected by the supply chain crisis. Rail workers are testing positive for COVID-19, quarantined at home, and adding to the many delays experienced by the rail industry. Korman (2021) explains that with so many rail workers off the job for the reasons stated previously, there exists massive shipping delays. The pandemic has affected the rail industry with a lack of healthy workers to keep things moving on schedule. The rail employee leadership wishes them a speedy recovery but explains that safety is their priority.

Rail companies have been fighting supply chain issues since early 2020, when the government declared the pandemic an emergency. A rail contractor was a public-private partnership and classified as an essential business by the government and that meant they could continue working without shutting down. This problem was that employees became sick or were quarantined and could not comply with the provisions in the contract. This led to cost overruns, time extensions and high absenteeism of workers and the prime contractor involved in a breach-of contract lawsuit filed by the government. This led to the ripple effect in the rail industry and further exacerbated the supply chain crisis (Korman, 2021).

### ***Trucking***

The trucking industry is the backbone of the supply chain when shippers and producers need to get the goods and services delivered overland. One possible cause to the crisis is the shortage of qualified over the road truck drivers since the backlog began in 2021. According to the American Trucking Association the truck drivers needed to fulfil obligations to the shipping industry are short an estimated 80,000 drivers. Not due to get any better in the future, truck drivers will be 160,000 short by 2030 as they plan to retire (Older Truckers Could Help Ease Supply Gridlock, 2022).

With the average age of over the road truckers currently 46 years old, and new drivers being trained at 35 years old, there are about 2 million drivers on the road. For many people over the age of 50, going on the open road is appealing to them for the freedom and the extra pay. People over the age of 50 want to feel productive and the small amount of social security does not meet the needs for older people, makes truck driving an attractive option. Drivers can make very good money, there is a growing need for them, and the supply chain needs more people like these to fill the gap in the trucking industry (Older Truckers Could Help Ease Supply Gridlock, 2022).

Overland transportation may be slow and filled with many delays enroute to their destinations. When products need to arrive at the customers location in the quickest amount of time, air transportation is the quickest method of transport. There are many pros and cons to this method, the biggest advantage is the speed at which critical components reach the destination. Manufacturers and end use consumers demand the things that they need to be shipped to them in the fastest form of transportation. The downside to air transportation is that it is the most expensive of the methods of transport within the supply chain.

### **Air Transport**

The air transportation domain operates as a system of systems (SoS) designed to improve the decision-making process. The SoS process is useful for understanding how the behavior of individual team members affects overall team performance. Generating an understanding of performance improvements or emergent behaviors with the overall goal of identifying why one process is preferred to another. The SoS structure is a bottom-up approach rather than a top-down process making a better method to improve the performance of the entire system (Esmailzadeh, 2018).

Due to the dynamic nature of the air transportation domain, air traffic controllers and facility managers are required to make numerous routine and sometimes ad hoc decisions. These decisions are being made generally based on the past experiences, knowledge, and best judgement of the controllers and managers. Esmailzadeh (2018), explains that the problem with the current system is not only the many factors specific to a certain condition but also the limitations and the time sensitive nature of decisions being made. By providing an improved model that combines all the available quantifiable information and expert knowledge to significantly improve the performance of the entire system.

Esmailzadeh (2018), makes the case for the improved process by using key performance factors in every decision needs to be identified and configured effectively to maximize performance throughout the system. Airline personnel, traffic controllers, and managers during their daily recap of operations, have identified conditions that are not always customized effectively for the occasion. Over restrictive strategies may cause major delays in air transportation and are based on past experiences of managers and controllers. An alternative process introduces a more efficient strategy designed to generate less delays in the system.

By developing a repeatable and data-driven process into air transportation will enable decision makers to manage the industry effectively and more efficiently. Individual decision alternatives do not exist in the current system and remain a capability gap within the air transportation industry. Esmailzadeh (2018), states that the inefficient strategy design leads to performance gaps, unnecessary flight delays, and ultimately a reduced performance of the air transportation SoS.

The intent of the new process is to provide flexibility and a design change which will improve the current model and offer a higher level of success to decision makers within the air

transportation industry. This improved model is believed to provide a better decision-making guide for the airlines, traffic controllers and managers to evaluate any possible variables and to increase the overall performance of the industry. The improvements are intended to decrease flight delays and increase situational awareness of the airlines which allows the ability to see the impact of decisions before implementation of any strategy (Esmailzadeh, 2018).

Utilizing the new model of SoS, and improving decision making, airline agents can avoid costly delays in scheduled departures and routes while increasing the overall team performance of the airlines. Esmailzadeh (2018), also explains the interactions between the hierarchy of air lines industry and the decisions made by the agents in the field, can make more informed and better decisions than previously. Air transportation is a complex and dynamic segment of the supply chain process with the main goal of SoS providing an improved decision-making guide to the agents when applied achieves outstanding team performance.

### **Local Delivery**

The rapid increase of e-commerce has caused many companies to begin home delivery to their customers. This form of commerce is called business to consumer (B2C) and is at the end of the supply chain sometimes referred to as the last mile delivery. Tadić and Veljović (2020) have researched the different ways to supply households and found that delivery of groceries and regularly used items was commonplace before supermarkets and big box store. Traditionally, the supermarkets could offer larger quantities of supplies and a wider variety of products at a lower cost, but you had to come and pick them up yourself.

By providing more variety and larger quantities of goods at the shopping superstores, customers found that it was more economical for them to go and get the supplies that they need far less often. Home delivery of furniture and white goods continued to be popular with

consumers due to the amount of logistics involved with delivering these types of items. Supply and demand drive the increasing growth in the home delivery sector of the economy and the emergence of the internet is the main reason for this. E-commerce has evolved greatly over the last couple decades. Shoppers used to buy online and pickup at a physical store to what is now bought online and shipped directly to the home (Tadić & Veljović, 2020).

Home delivery or the last mile delivery is a critical component to the economy today, goods can be delivered directly to the customer without the business need a physical building. Without the cost overhead of labor to operate the physical store and resources required to run it, businesses can reduce costs to the customer. Tadić and Veljović (2020) discovered that business to consumer (B2C) operations have changed the dynamic between business to business (B2B) operations by altering relationships with producers, wholesalers, and retailers. B2B typically had a more robust and efficient system of transport, able to move larger volumes on regular schedules.

B2C operations have a significantly lower efficiency compared to B2B since the distribution centers are widely dispersed based on the geographic location of the customers. The customer demands are constantly changing, and the quantities demanded are on a much smaller scale than B2B making it extremely challenging for manufacturers and delivery systems involved with last mile delivery. Home delivery has many more benefits to consumers who cannot or are unwilling to leave the house because of COVID-19 or other reasons. Customer satisfaction is high for home delivery due to customers are unwilling to deal with large crowds even though there may be more costs involved (Tadić & Veljović, 2020).

Fragmented shipments to delivery companies have increased the costs of home delivery, this increase in freight shipment is also causing increased traffic congestion, increased air and

noise pollution, and potential security threats to population centers. Tadić and Veljović (2020) looked at the challenges associated with the high demand of products being shipped directly to the home. Customer satisfaction is directly influenced by the aspects of home delivery, basically the speed, correct contents, and condition of the contents when the package arrives at the doorstep. There are numerous sources providing service to the door, such as package delivery services, courier services, and less than load (LTL) carriers.

E-commerce seems to be more efficient in urban areas than in more rural areas due to the greater abundance of reliable high-speed internet and the larger selection of delivery methods available there. There are many terms describing delivery to the customers door and e-commerce is the reason for the need, or the driving factor of home delivery. When customers place orders with companies for goods this activates order fulfillment process which Tadić and Veljović (2020) explain the delivery process and how that affects the supply chain, logistics and other processes of door-to-door business.

Consumers have a choice when it comes to the delivery of home delivered items, some may choose to have items delivered directly to their doorstep while others may prefer to pick them up at a location nearby that is convenient to them. Shippers and consumers have the option to use third party carriers to make these deliveries, but recently a few larger companies have gotten into the delivery business such as Amazon. These innovative companies have taken third party delivery services out of the equation leading to greater profit, reducing overhead, and eliminating the middleman (Tadić & Veljović, 2020).

Tadić and Veljović (2020) describe how supply chains have gotten better over the years at anticipating and mitigating negative effects of the economy and the B2B issues. The B2C issues are constantly evolving and highly dynamic which require businesses needing to establish

new and improved methods to deal with them. The internet and e-commerce have caused shipping companies to gain new customers and remain viable and an important source of last mile delivery of supplies to customers. The new and emerging technology that is gaining influence with consumers is the large companies that can ship their own goods direct to consumers. Economic, environmental, and social aspects are considered when deciding on home delivery, all of which are important to businesses, consumers, and the supply chains themselves.

Some things that are not very easy to predict like the labor shortages, labor disputes, layoffs and shutdowns associated with pandemics. Some of the greatest issues affecting the supply chain during the last two years has been the ability of businesses to remain in business. Most businesses affected by shutdowns were faced with labor shortages due to insufficient quality and quantity of personnel required to operate the business.

### **Labor Shortage**

Labor is another main component to the supply chain and has far reaching effects. The far-reaching effects are also known as second and third order effects. Partida (2021) explains how businesses are still unable to become fully staffed and meet customer requirements. Unemployment levels have been on a steady decline since April 2022, but businesses remain short staffed and struggling to keep up with consumers high demand for goods and services. Postal workers are affected by the labor shortage as well, resulting in long delays in package delivery for postal customers.

According to Phelan (2021) nearly 40% of school districts in the United States are experiencing staffing shortages described as severe to very severe. School administrators asking about two thirds of their district employees to take on additional responsibilities to help ease the shortage issue. Bus drivers are always experiencing shortages but has not been this bad in the

past. Another segment experiencing labor shortages is the school nutrition programs where district leaders are unable to adequately staff and maintain these positions. School districts in the severely affected regions have had to shut down temporarily due to these labor shortages and causing disruptions to the supply chain.

The pandemic has put enormous pressure on workers over the last two years especially the education system which has been experiencing shortages since before the pandemic. Most employees in the education systems are women and must be able to balance life, career, and pandemic situations with making a living wage. Childcare is expensive and women with children requiring supervision, need to make time management decisions based on cost-benefit scenarios. The labor shortages in the school districts can be attributed to some women needing to take care of their children versus going back to work in an uncertain environment (Phelan, 2021).

Phelan (2021) explains how the labor shortage primarily due to the pandemic is causing manufacturers and distributors to inadequately staff assembly lines, pull products from shelves and drive the delivery trucks. The results of the labor shortages are that retailers are only receiving about 65% of the products requested, arrival time of goods and the costs are unknown until the truck arrives. To improve operations, employers are attracting new workers with big signing bonuses, increased pay, and better benefits for unfilled positions.

Teachers, staff, and administrators must fill the gaps created by the labor shortage until the positions are filled with competent replacements. Personnel filling positions not of their perspective expertise, in the case of understaffed school systems, children are not receiving the benefits that a fully staffed education system. Phelan (2021) believes that the personnel used in alternative positions are experiencing enormous amounts of added stress and difficulties with their additional duties. When school districts experience shortages of food for school lunches and

school supplies, the parents and communities are asked to help with donations and volunteers (Phelan, 2021).

## **Unions**

A strong labor union has costs to production as well, such as limitations to the hours a person can work to rules and regulations which are union specific. School teacher unions have in many cases asked the government to implement mask mandates. The unintended consequences are far reaching for many people. Abrams (2021) explains how labor unions have become relevant again during the Covid pandemic. Workers doing specific jobs during the pandemic became an essential worker by the federal government. This designation allowed for specific types of industry personnel to go to work even though proper precautions were not in place to protect the health and safety of their employees.

The labor unions began to speak out with protests, strikes, and sick-outs to put a spotlight on the health concerns of workers that were deemed as essential by the government. Workers in the health care industry, school systems, and grocery store employees had gained support of the unions through this collective action. For several years union membership has been on the decline and the pandemic has not reversed this trend however, they have made the case for getting workers the personal protective equipment (PPE) and supplies required to work safely in the current work environment.

The Biden Administration has reversed the Trump era employer-friendly executive decisions in favor of worker rights and union friendly legislation. The Executive Actions were designed to increase collective bargaining, increase minimum wage, and ease the shortage of supplies and equipment such as PPE with the help of Occupational Safety and Health Administration (OSHA) to enforce the rules. Essential workers kept working throughout the

pandemic and this did not have much effect immediately on them. The government responded with a coronavirus relief package that had enormous loopholes in it but was supposed to protect workers with paid time off and federal hazard pay (Abrams, 2021).

These loopholes allowed billionaires to get richer during the pandemic and many essential workers are still struggling with their pay increasing only \$1.11 per hour since the beginning of the pandemic. For many workers, going on strike is an unpleasant situation losing pay and benefits for an undetermined amount of time. Businesses are losing a vital element of production and company profits when the workers decide to strike over better health and safety concerns. The Center for Disease Control (CDC) was not much help for the hospital workers, but teachers' unions did have some influence with the CDC.

Workers are not overly excited to join unions for many reasons and not much is known about them or even if one is available for essential workers to join. When employees decide to strike for better health and safety concerns, being a union member does have advantages. Unionized nursing homes had greater access to PPE and a lower infection rate among its members and a 30% lower mortality rate than non-union jobs. Union members also have the advantage of increased wages and higher limits on healthcare premiums than nonmembers. With all the benefits of unions, labor organizers are hopeful that numbers increase in the future (Abrams, 2021).

## **Unemployment**

Two possible economic solutions were available to assist businesses during the pandemic, unemployment compensation for people who could not go to work, and the other option was to freeze the economy. Konczal (2020) explains that the result for either option was to help the economy recover on its own after the outbreak was under control. Unemployment

compensation and payroll protection were created by the government to allow people to stay at home and receive a paycheck for not going to work. This compensation was designed to help workers pay bills and buy food while they are not working. This policy was expanded during the pandemic and went on for approximately 99 weeks or until the state governors ended this policy in their respective states.

The massive expansion of unemployment insurance ran into problems during the execution of the government funded program and was making recovery worse. The idea for the government to spend enormous amounts of money and expand the already existing unemployment compensation program had gone very badly for them. States were allowed to modify the terms of the program and establish guidelines as to whom can receive the compensation. The federal government expanded individual payouts by as much as \$600 per week per authorized worker above what was previously authorized under the rules of the program (Konczal, 2020).

The massive government spending program ran into difficulties when the states could not keep up with the high level of demand for compensation and the difficulties encountered by people attempting to apply for the funds. Konczal (2020) states that people experienced uncertainty, stress and anxiety while waiting to find out if they qualify for the compensation. The macroeconomic effects of the program were weakened due to the execution failures and intense lack of clarity of what goals the program was designed to achieve.

In addition to the unemployment compensation, another program evolved from a backstop for small business to make payroll to an incredibly complex loan program in which small businesses were not required to pay back. The Payroll Protection Program (PPP) loans allowed small businesses to apply for loans that were poorly implemented and limited the

amount they could receive. The U.S. banking system received a cut of the money and larger businesses made efforts to get a cut of the money as well. With the intense lack of clarity on the rules surrounding the funding this had led to endless fights and absurd campaigns over who should receive the money rather than economic stability (Konczal, 2020).

There is so much lack of guidance from the government regarding this loan program that people are uncertain if they are even required to repay the loan, some businesses have decided to not apply for the funds altogether. Konczal (2020) describes that the ambiguous, undefined loan process is another poorly implemented national policy intent on providing pandemic relief that only exacerbated problems between the states and the private sector. Uncoordinated action by government, state, and local entities have further divided deserving from the undeserving businesses to receive the funding which causes further instability and inequity for businesses to succeed and survive the Covid pandemic and reducing the supply chain issues.

### **Shutdowns**

Shutdowns began in early 2020 and continue at the writing of this research. Illness due to Covid-19 and the follow-on variants has caused businesses to shut down and keep workers at home for a quarantine period. Some workers have transitioned to working from home, if possible, but still others are unable to work from home. The delta variant has forced one of China's busiest ports to shut down for two weeks to mitigate the spread of the highly contagious disease variant. Partida (2021) explains how shutdowns cause the major shipping delays and severely affect the supply chain.

Shoenberger (2020) examines the constitutionality of government shutdowns because the original framers of the constitution required that the government be effective and vigorous. Government shutdowns are occurring more and more frequently causing second and third order

affects damaging the economy and the supply chain. The Anti-Deficiency Act preserves some of the government functionality during a shutdown but does not address all issues or concerns. The Anti-Deficiency Act may violate the framework of the constitution, Article II, and the delegation of powers to the legislature. With all these inconsistencies, the Anti-Deficiency Act has never been challenged in the Supreme Court for a ruling. Government shutdowns go against the intent of the constitution and create inconsistencies within government, therefore reducing its overall effectiveness.

Government shutdowns traditionally have been due to funding and budget issues with congress, but recently the government had been shut down due to Covid-19 pandemic issues. The shutdowns impact the lives of federal workers, government contractors and even people that rely on government regulators to do their jobs. Shutdowns have financial repercussions for employees and government alike since the government does not receive any taxpayer money when they are out of work. The funding gap in the government results in lost revenue in the billions of dollars and costly supply chain disruptions (Slaughter, 2020).

Government shutdowns sometimes cause specific employees to go on furlough, while others are considered essential which allows them to continue normal operations. Slaughter (2020) states that political stalemates and budgetary problems in congress have typically been the reasons for government shutdowns. These can cause major issues for ordinary people that rely on appropriated funds for their livelihood. If workers are sent home and do not perform their work, the U.S. Treasury is not obligated to provide funding for paychecks to government contractors unless the President declares a national emergency.

The President has a tool to combat shutdowns and other declared national emergencies with the National Emergencies Act. If a government shutdown is constitutional and legal, every

part of government does not work, the President has the provisional authority to provide funding during the resultant shutdown until permanent funding can be restored. The House of Representatives decide what money is to be appropriated and the Senate approves the amount of funds to be dispersed. The U.S. Treasury disperses the money when the President signs the bill into law or can veto the bill and it goes back to congress. The statutory powers of the National Emergencies Act override the normal functions of appropriations when enacted (Slaughter, 2020).

### **Government Regulation**

Governmental regulation has caused many issues to the supply chain and businesses to suffer in the process over the last two years. Some may say it is government overreach and others believe the government is choosing which businesses will survive and which will fail. The government has imposed regulatory and criminal mandates associated with vaccines, indoor mask wearing as well as testing and quarantine procedures in differing and ever-changing forms. The government regulations lead to a labor shortage which continues to negatively disrupt the supply chains and their sustainability (Huang et al., 2021).

Oppressive regulations imposed by the government has caused intense competition for employers to attract competent and willing workers capable of fulfilling their needs. The education system is no different and need qualified people to fill the school nurse positions when they are trying to manage their own health concerns, COVID-19 protocols, and mental health issues. Many qualified workers are choosing positions that offer fewer health risks and stress as well as increased benefits and better pay which is adding to the problems (Phelan, 2021).

School districts are working closely with state and federal governments to get additional funding and assistance for the purpose of getting nutrition and supplies for students attending

public schools where they might not receive it at home. With the nutrition of school lunches regulated by the U.S. Department of Agriculture, the school systems requested that the department take appropriate steps to ensure that they are receiving the food they need in the quantities and types requested due to a breakdown in the supply chain. Even others are using the government money from federal COVID relief to ease staffing issues and keep kids in school (Phelan, 2021).

With the pressure on state and federal government agencies by the public, some of the bureaucratic red tape has been removed for the hiring of bus drivers in New York. To relieve the stress on bus drivers, the state opened more commercial licensing test sites and recruited drivers with military, fire, and law enforcement credentials to operate the vehicles. School districts are using the COVID relief money sent by the government to manage outbreaks and ease staffing shortage issues. COVID money is being used for the hiring of more school nurses and social workers to assist in the mental health issues experienced by children during the pandemic (Phelan, 2021).

The World Health Organization (WHO) declared the novel coronavirus COVID-19 a worldwide threat in 2019. Governments around the world responded by implementing numerous anti-contagion and economic policies to mitigate the spread of the viral outbreak. These policies impacted everyone with invasive containment policies and contact tracing initially to the closing down of the economy later in the pandemic. These policies were meant to flatten the curve and slow the spread of the disease but became intrusive to individuals being able to make their own decision regarding healthcare (Chung et al., 2020).

The influenza (H1N1) pandemic of 1918 was the last major threat to public healthcare when the government reacted with policies meant to mitigate and suppress the disease. Chung et

al. (2020) looked at the government policies of the current pandemic and found that while suppressing and mitigating the virus also caused unnecessary and devastating effects to the world economies. Disruptions to the supply chains due to travel restrictions, a ban on public gatherings, and stay at home orders impacted businesses and people's ability to work and make money to pay bills until the vaccine was distributed increasing suppression and mitigating the disease process.

Pandemics have constantly been a part of life throughout human history, and governments have implemented a variety of policies such as quarantines in response to these outbreaks. Chung et al. (2020) noted that these government policies were effective at slowing or containing the spread, they also caused economic and social disruptions to people's lives. The strict policies did not correlate with any immediate reduction of the daily confirmed cases; however, they did show a decrease in cases over time leaving people to wonder if there were other mitigating circumstances involved.

### **Pandemic**

The pandemic has been an issue for over two years now when the government first announced the stay-at-home order. The intent of the order was to keep people at home for two weeks to flatten the curve. This government mandate turned into several months where people did not even leave their homes. Stores and restaurants were struggling for products and labor. Hospitals were stretched to the breaking point with overworked doctors, nurses, and staff. Essential workers were the only ones headed out into the streets, as everyone else stayed home.

COVID-19 has also greatly affected seaport operations with the shore side personnel and seaport cities and communities that serve them. Supply chain disruptions at seaports can cause a ripple effect known as propagation affect. Mankowska et al. (2021) also discovered that

maritime operations strategies did not account for the pandemic and therefore caused unpredictable disruptions with cascading effects to the seaports. Numerous restrictions and procedures related to cargo handling and personal safety protocols have been implemented to mitigate the threat and prevent further transmission of the disease.

The path forward after the pandemic is complex and cannot just go back to business as usual, companies have been divided into two categories, the haves, and the have-nots (Tompkins, 2020). The two categories describe the performance of companies prior to the pandemic and how strong or weak they were. If companies had financial stability, were customer-centric, robust strategic plans, clear and decisive priorities, core competencies, sense of urgency and passion for success, open and eager to improve, perseverance with a high level of integrity and honesty, aware of the importance between customers, suppliers and staff, and a strong organizational alignment.

Without any of the previous mentioned performance characteristics businesses were weak and saw a reduction of business during COVID-19 and not believed to achieve success. Some of the industries that had great success during the pandemic were drug stores, e-commerce, grocery stores, pharmaceuticals, streaming services, large chain stores, as well as wine and spirit sales. Some of the losers during the pandemic were the airlines industries, cruise line, hospitality & conventions, fitness centers, restaurants, schools, luxury goods, sporting goods, and in-store retail (Tompkins, 2020).

Supply chain disruptions due to COVID-19 have disrupted business over the last two years and leadership now has another tool (VUCA 2.0) to succeed and combat mediocrity. Tompkins (2020) believes that it is impossible to predict what the future holds, but COVID-19 has informed us of the weaknesses in the traditional supply chain models. The introduction of the

virus from China and the ripple effect throughout the shipping and supply chains has taught us those traditional models are not as effective as they once were.

The pandemic created a catastrophic disruption in supply chains that caused a ripple effect to both supply and demand which has affected nearly all global economies. Huang et al. (2021) notes that China supplies many raw materials and basic sub-components to manufacturers around the world. Manufacturers did not receive the items in a timely manner, and unable to build products and ship out to the end users. Fresh food was not delivered on time leading to another supply chain issue when they had to destroy rotten food.

Firms and industries have been using “just in time,” “build to order,” and “vendor managed inventories” over the past several decades as an efficient method to build products. These methods of production were extremely successful until recently when the pandemic has caused global supply chains disruptions. Production plants that previously used these methods to manufacture goods had been halted due to missing components and reduced or non-existent supplies required for manufacturing (Huang et al., 2021).

### **Vaccine Mandates**

Frontline medical personnel are considered essential personnel and not subject to the lockdowns implemented by the states and federal government. These frontline heroes provided excellent patient care and kept working through the worst parts of the COVID pandemic despite much personal sacrifice. When the vaccine became widely available for the taking, mandates were put in place for healthcare and other frontline workers to get the vaccine or you could be terminated from employment for non-compliance with Covid vaccine mandate (Owens., 2021).

Supply chains can only function properly when everyone in the chain does their part, many organizations required their employees to get the vaccine not just frontline medical or

government employees. Owens. (2021) describes that non vaccinated employees were subject to bullying, threats, and intimidation by the leadership within their organizations for declining the vaccine due to health considerations. There was no long-term empirical data showing the safety of the vaccines to all people who receive the vaccines, and companies would not be liable for any side effects or personal injury due to the vaccine.

There were options for mandated individuals to not receive the shot and that was to get a religious exemption. Federal and certain state jurisdictions allow for individuals to refuse the vaccine and retain your job with an exemption. Although the process is easy to file for an exemption but not all exemptions were granted, and some people lost their jobs and only source of income in the process. OSHA was the enforcing authority for federal laws and must allow for medical and religious exemptions in Title VII of the Civil Rights Act and Title I of the Americans with Disabilities Act (Owens., 2021).

Employers by law must respect every persons sincerely held religious beliefs, and this applies to the Covid vaccine as well. Owens (2021) has outlined that employers must provide reasonable accommodation to employees who have these beliefs. Written documentation to the employer is mandatory providing a precise reason for the exemption. It is not a requirement nor is it mandatory for an employee to have a religious leader of their faith provide proof of faith regarding any vaccine mandate.

Medical exemptions to the Covid vaccine are available if they meet the criteria for such in the Americans with Disabilities Act (ADA). 42 U.S. Code 12112 states that no person will be discriminated upon due to a physical disability regarding job placement, conditions, or performance. Medical exemptions to the Covid vaccine are based on Center for Disease Control (CDC) guidance and they have listed several conditions that apply. If an individual meets the

qualifications for an exemption, it must be signed by a physician and is a legal document that will uphold in a court of law. Medical exemptions may be temporary up to 365 days or it may be permanent (Owens., 2021).

Some people may shop around for a doctor to sign their exemptions and even others may provide a consultation over a zoom call, which ever provides the best care or outcome to the patient. It is also possible that claims requesting reasonable accommodation for a medical or religious exemption are denied and then the requestor must file a complaint with the Equal Employment Opportunity Commission (EEOC). Owens (2021) explains the process allows for 180 days for private employers and only 45 days for government employees. In the case that rights were violated, employees need to complete all claims within the timeframe allowed, not doing so may forfeit any further legal claims (Owens., 2021).

### **Mask Mandates**

Face mask wearing and the mandates imposed to wear them have been a topic of debate for several years now. Zimmermann et al. (2021) describes the main purpose of the face mask is to prevent the spread of disease or an airborne infection to others. Face masks have other social and cultural meanings as well, such as showing personal attitudes and compliance while wearing the mask in public places. The compliance with mask wearing is perceived as pro-social behavior and shows social cohesion within a society. Reasons for compliance in the mask wearing mandates varied widely, like the individual justification versus the communal considerations with the mask wearing.

Initially scientific proof of mask wearing effectiveness was severely lacking and the mask was not believed to be an important part of universal precautions. Face masks were extremely scarce early on in many countries and the quality and characteristics have not been fully studied

resulting in the World Health Organization (WHO) not recommending the general population wear face masks in public (Zimmermann et al., 2021).

The debate over the effectiveness of face mask wearing has been controversial for the last two years regarding the spreading of SARS-CoV-2 virus. Zimmermann et al. (2021) explains that scientists are now saying that the evidence was there all along and when used in combination with other containment measures has been found to be very effective at controlling the spread. The government has been criticized for not making the mask mandate sooner, but countries with national mandates did not show significant improvements in daily infection rates. Mask effectiveness is directly related to the proper wearing, the choice to use one, and the perceived benefits are all variables facing individuals during the pandemic.

Whether wearing a mask because of the mandates or it was a personal choice, there were primary and secondary side effects noted while wearing masks. A recent study showed that for some people wearing the mask was not well tolerated and difficult to breathe, exhausting and inconvenient to others. Some people thought that the mask was to keep themselves safe and protected from getting Covid, while others thought that the mask mandates were symbolic or psychological in nature. Regardless of the reasons or imposed mandates, many people wore a mask while in crowded public spaces and got vaccinated at the first available opportunity (Zimmermann et al., 2021).

### **Local vs. Federal**

According to Newcomb et al. (2022) the local county levels of SARS-CoV-2 were monitored during the pandemic showing the infection rate among the counties and reporting them. The study provided information about government implemented social options for controlling the spread of Covid-19 and the actual number of cases experienced. Social distancing

and other options designed to reduce the spread of the highly contagious disease and the variants had a negative impact on the local economies. The state of Florida was in lockdown from April 3, 2020, to May 4, 2020, non-essential workers stayed on the job and all others had to stay home, further damaging the economy and supply chain operations.

Social control measures were noted to have some affect during the period when a vaccine was not available, while the economy suffered under the lockdown and restrictions. Other measures may include mask wearing, contact tracing, testing, and quarantines, when necessary, were also found to be helpful when the social distancing mandate was lifted. Counties experiencing the lowest number of cases had zero hospitalizations and were able to interrupt the epidemic transmission and able to reopen their economies by the end of 2021 (Newcomb et al., 2022).

Newcomb et al. (2022) showed that a spatially tailored response would be much more effective at controlling the disease and minimizing the effects to the local economies. This type of response should be mirrored by all local communities providing minimal disruption to the local social systems and leading to an improved global economy as well. The measures implemented by local municipalities would allow for an earlier reopening of their own economies and eventually the entire state. A geographically phased reopening of other states could occur based on the low incidence rates of their counties, putting control of pandemic response measures in the hands of local communities not the federal government.

### **Economic**

There are many economic factors affecting the supply chain, most notably the price of fuel, inflation, raw materials, and the availability of sub-components. The trickle-down effects of high fuel prices have caused producers and manufacturers to pass on the costs to consumers. The

costs incurred by the inflation rate rising higher than it has been in decades has a profound effect on the supply chain. Raw materials are scarce to begin with, and they are becoming even more scarce as the supply chain continues to deteriorate. The sub-components required to manufacture items here in the United States has become a risky venture for even the biggest corporations as the supply chain stability is being challenged (Abdykirova et al., 2022).

### **Petroleum**

Worland (2020) examined how battling climate change has become a unique challenge to the petroleum industry. For several years the petroleum industry has been suffering under restrictive government regulations imposed by environmentally friendly policies designed to reduce the amount of greenhouse gasses that are believed to harm the atmosphere. The petroleum industry has been battling a different kind of enemy lately, the low prices of oil went from \$60 per barrel at the start of 2020 to an all-time low of \$40 per barrel by April 2020. The low prices are due to relaxed regulations, increased U.S. production, and the lack of people driving during the pandemic.

The oil industry could not get rid of the petroleum already produced which was discouraging, but economists believed the prices would eventually rise and save the industry. The prices continued to fall to \$13 per barrel of oil in the U.S. by April 28 but producers need to get at least \$50 per barrel for oil manufactured in the U.S. to make a profit. Low oil prices caused producers to look at other sources of energy that would provide another source of income to improve the investments and reduce the risk to stakeholders within the petroleum industry. Firms would need to invest in alternative sources and even clean energy sources to be competitive and survive the current state of the economy (Worland, 2020).

Worland (2020) noted that the pandemic has caused the oil industry to look at green energy sources about five years before they normally would have to. Green energy became another obstacle for the petroleum industry to operate at a profit, government had decided to go green leaving oil and coal in the past. Even with cheap gas prices, many companies decided to buy and operate electric vehicles to curb carbon emissions, improving the environment. Politicians everywhere debated on how to best recover their economies in a post-pandemic world, examining the threat of climate change versus the atmosphere polluting fossil fuel industry.

The energy infrastructure of the future is now beginning to look at how fast is the transition going to take for clean energy sources to get a foothold and slowly phase out fossil fuels. The recovery efforts in the U.S. propped up fossil fuels with economic stimulus measures for the petroleum industry avoiding a major shutdown and smaller companies from going out of business. Some climatologists have noted that the increased temperatures around the world will likely lead to climate destruction if industry and government do not change their business-as-usual policies (Worland, 2020).

Keystone XL pipeline has been a roller coaster ride of ups and downs since the project began in 2008, it was to be the most significant improvement to the petroleum industry in decades. In January 2021, newly sworn in President Joe Biden signed an executive order revoking the construction permit for the pipeline. The pipeline was designed to transport over 830,000 barrels of crude oil from Canada to a processing plant in Louisiana, creating jobs and providing cheap energy into the future. The pipeline which was approved by President George W. Bush, the Obama Administration rejected the permit, and President Trump revived the

project again in 2017 (Pros and cons of the keystone xl pipeline: Environmental stewardship versus economic loss., 2021).

Construction of the pipeline was halted on the first day of Bidens presidency when the claim was made by government to move towards a more sustainable climate by promoting clean energy. The administration claims that the world and the United States are facing a climate crisis which needs to be addressed with action at a speed and scale necessary to prevent the world from heading into a non-sustainable and possibly existential threat. Environmentalists believe that moving away from dirty fossil fuels and toward cleaner, smarter energy is better for the whole world and the environment. Indigenous groups also applaud the move towards ending the pipeline construction for preserving tribal lands and waterways (Pros and cons of the keystone xl pipeline: Environmental stewardship versus economic loss., 2021).

Local politicians and petroleum stakeholders want the Biden Administration to understand the negative affects surrounding the revocation of construction permits, such as major economic impact to pipeline worker, surrounding communities and energy independence. The pipeline was important to Canada, the U.S. and other countries that would benefit from the many products produced with the oil as well as the taxes collected for the federal, state, and local governments. Canceling the project has caused numerous problems including job losses directly and indirectly related to the construction of the pipeline and not very likely to affect any climate change at all (Pros and cons of the keystone xl pipeline: Environmental stewardship versus economic loss., 2021).

### **Inflation**

The American Rescue Plan (ARPA) of 2021 has cost American taxpayers \$1.9 trillion to the debt already accrued and increasing inflation. The stimulus act that was designed to focus on

the devastation caused by the Covid-19 pandemic expanded the Affordable Care Act (ACA) to enormous proportions. This piece of legislation meant to expand healthcare to more people and increase the affordability. The health insurance companies receive subsidies from the government to allow for the unemployed and lower-income patients to receive healthcare. The Congressional Budget Office (CBO) believes that as many as 2.5 million uninsured Americans will have health insurance by 2023. Nearly 3.4 million low-income enrollees will enjoy a nearly 100% decrease in premiums due to the ACA (Adashi & Cohen, 2021).

The ARPA expands the ACA marketplace subsidies with premium tax credits during 2021-22 calendar years to decrease the cost of health insurance premiums. Adashi and Cohen (2021) describe that low-income individuals who earn up to 150% of the federal poverty level (FPL) were previously required to contribute nearly 4.14% of household income will receive relief under ARPA. The health insurance premiums be fully subsidized by the government for those earning up to 150% of FPL, additionally those households that make 400% of the FPL, will be required to contribute no more than 8.5% of their annual income.

According to Adashi and Cohen (2021) the new ACA revisions on individuals receiving unemployment compensation will become taxpayers under the law and begin receiving marketplace subsidies even if their income falls below 100% of the FPL threshold. As well as low-income individuals receiving better benefits at a reduced cost, employees who have lost their employer provided health insurance benefits are eligible for marketplace premium subsidies. Displaced employees or compromised by under-employment between April 1, and September 30, 2021, will receive benefits under ARPA through the Consolidated Omnibus Budget Reconciliation Act (COBRA) further adding to inflation.

ARPA has made the case to further expand into the 12 states not yet taking advantage of the ACA increases by matching the federal funding and further increasing the Medicaid systems by 5% over a two-year period. The federal expansion will cost nearly \$10 billion and is designed to encourage states to join the federal system and not continue expanding the state-run systems. With a few states waiting for their legislatures to decide on the expansion of their own state run systems or going with the federal system, the ARPA along with the augmented ACA face many challenges (Adashi & Cohen, 2021).

The biggest challenge according to Adashi & Cohen (2021) is for the federal government to get the Department of Health and Human Services, the Internal Revenue Service, and the Department of Labor all together to enforce the rules and regulations required for the ARPA and enhanced ACA to work as the legislators have intended. Another challenge facing the ARPA is the getting the state-based marketplaces upgraded to the current standards which have cost the ARPA \$ \$20 million to modernize the systems. Other issues remain about the feasibility of the ACA, is that the implementation of the Tax Cuts and Jobs Act of 2017, which eliminated the individual mandate for healthcare and rendered all or some of the ACA unconstitutional according to the Supreme Court.

### **Raw Materials**

Abdykirova et al. (2022) explains that raw materials such as manganese are growing in demand by industries causing this and other raw materials to become extremely scarce. When costs were low and material was abundant, mining operations left behind some valuable materials. Certain raw materials as the main ingredient for new technology-based components are becoming increasingly important as they become extremely rare. Greater industrial demand

for these rare materials has caused the industry to develop a process to extract the valuable contents from low-grade ore to meet the demand of the manufacturers.

Due to the significant increase in the valuable and rare raw materials, manufacturers have been able to solve two problems at once. The low-grade materials usually left behind as tailing piles, are now being reprocessed with newer equipment able to recover the lower grade ores. The new equipment and processes are cleaning up the environment and lowering costs to industry when they recover the raw materials. Areas previously thought to be mined out are being cleaned up and sources thought to be too costly to mine are being reconsidered as a viable resource and cost effective (Abdykirova et al., 2022).

Limited parts availability and critical material shortages are causing frustration to companies despite the increasing demand for products. The companies are experiencing record-long lead times and critical shortages of raw materials severely limiting their ability to meet the customer demands. Difficulties continue to plague manufacturers with the transportation of materials to the plant and delivering finished products to the customer. All segments of the manufacturing economy are affected by high worker absenteeism, short term shutdowns, and the inability to fill positions limiting companies in reaching their growth potential (United States Manufacturers Are Concerned About Ability to Meet Growing Demand., 2021).

### **Sub-Components**

Computer chips became a rare commodity during the pandemic which resulted in supply chain issues for manufacturers relying on others to produce sub-components. Partida (2021) explains how the computer chip shortage and limited supply of raw materials and parts have caused a supply chain bottleneck. Plastics and rubber are affected as well, with the longest lead times manufacturers have seen in 35 years. The copper and steel industries are experiencing

costly delays with copper and steel more expensive than ever, tech devices requiring these materials are becoming much harder for suppliers to stock.

Shortages of key sub-components and delivery delays are leading to soaring transportation and storage costs according to Bender (2021). Despite the challenges associated with the pandemic and supply chain issues, the construction equipment industry is experiencing a manufacturing boom. There is an increased demand from nearly all construction markets, causing concern for construction equipment manufacturers due lack of key sub-components. The backlogs are leading to long lead times, and disruptive delays of customers getting the equipment they need for their construction related businesses.

The global supply chain issues that began over two years ago are still disrupting manufacturing today. The world economies are re-opening for business due to vaccines being widely available now. Demand for construction equipment is experiencing record growth, while the supply chain is causing massive production delays. Inventory levels are declining rapidly, and the production cannot keep up with demand due to industry workforce shortages. Manufacturers are struggling to find qualified welders and machinists to perform specialized roles in the production process (Bender, 2021).

Lack of skilled workers and other supply chain issues are driving the need for manufacturers to put a laser focus on planning for the future. Manufacturers could not have predicted a global pandemic two years ago, but planning, forecasting, and scheduling are paramount to the success of going into the future. Bender (2021) stated that customers would not be able to have their demands immediately met like they were in the past. Equipment manufacturing is evolving strategies for success and continue to be resilient and optimistic.

Bender (2021) has mentioned that companies willing to move away from old school recruiting practices and moving towards building new talent pipelines are better able to meet production orders. Manufacturer hiring managers have updated their processes by directly recruiting the best talent with the skills required to accomplish production goals. Also noted with the new hiring practices is that companies were keeping older workers longer by offering incentives such as benefits, reasonable accommodations, and more flexible schedules.

The global shortage of electronics/semiconductors has caused increased lead times to product manufacturing as well as an inflation of prices. This shortage of critical sub-components is causing manufacturers to trim some production with demand for products expected to rise despite the reduction of available supplies. Copper and steel are getting increasingly difficult for production companies to acquire and increasing fuel prices to transportation and trucking remain a challenge to the supply chain. Demand for machinery is at an all-time high despite the lack of inventory, companies would sell much more product if the materials were available to build it (United States Manufacturers Are Concerned About Ability to Meet Growing Demand., 2021).

### **Cyber-Attacks**

Cyber-attacks perpetrated by foreign governments and other bad actors have caused a significant threat to supply chains and weakening national security in the process (Dinicu et al., 2021). Identity and data theft in the cyber marketplace is a target of opportunity and these attacks have increased exponentially over the last few years. With better internet being available to more people around the world and more people than ever before using the internet for shopping to on-line banking, the system has been inundated by massive security threats (Singh & Kumar, 2020).

Vital infrastructure has become dysfunctional due to cyber-attacks causing petroleum pipelines and food producers to shut down operations. These attacks further weaken the supply

chains by causing delays of critical supplies and fuel for transportation reaching consumers. It is difficult to comprehend the severity of damage caused by the attacks as well as the underlying cause of the perpetrator's motives. Attacks are increasingly more difficult to identify who and where these are coming from forcing governments and businesses to enact new strategies to detect and deter threats to national security (Dinicu et al., 2021).

According to Dinicu et al. (2021) cybercrimes are committed through telecommunication lines on unsuspecting industries and individuals from nearly anywhere on the planet. Due to the network connectivity available both critical infrastructure and everyday households are vulnerable to data and personal information theft from viruses and malware. The interest to destabilize the financial, political, and government organizations can be attributed to both state and non-state actors.

Dinicu et al. (2021) describes that the critical infrastructure vulnerability is a result of deficiencies in the functional security of computer networks. The economies of most modern countries are governed very closely and not at a distance through vulnerable electronic devices, making the hardware and software less of a target. With the economies closely guarded other national interests can be crippled by multiple sequential or simultaneous attacks from cyberspace.

Cyberattacks on critical infrastructure are illegal and cause numerous devastating dysfunctions and possibly even failures to the attacked system. The problems encountered may come in the form of malware, phishing, or an SQL injection which can result in loss of function or operational capacity. Other threats to national security include the stability of military assets in cyberspace, maintaining economic strength through electrical grids, transportation and

communication, and the decline in confidence of government leadership and their ability to maintain positive control of infrastructure during times of serious attacks (Dinicu et al., 2021).

The economic component to cyberthreats are supply, production and distribution and the military component is communications, intelligence, and the joint command. Understanding and prevention are critical components of national security which have created complex debates, regulations, and action programs over the years since the cold war. Real and potential threats are determined by the analysis of domestic framework and the level of economic and social development of states. There are numerous systems in place that define what is critical infrastructure and by which countries, the models are available to evaluate the possible threats (Dinicu et al., 2021).

The mal-ware and ransom-ware events are real and increasing at an alarming rate causing victims to lose their identity and costing them great deals of money to retrieve the stolen data. Cyber-attacks are not only causing identity or data theft, but some bad actors have figured out how to steal the intellectual property from manufacturing facilities, corporations, and government facilities. This information is used to develop clone products at a very cheap price to the counterfeiters because of them not having to do any research and development of the products produced.

The entire world relies on technology in one form or another and cyber-attacks can happen anywhere, any time, and to anyone. Singh and Kumar, (2020) suggest that businesses, universities, and governments all use computers connected to the internet to collect information, process, and store data which needs to be protected from theft. Cyber security is the practice of securing data, confidentiality, and information integrity of connected computers and networks

from intruders and others. To prevent unauthorized users from accessing information over the internet, best practices must be observed.

Cyber threats are increasing daily to businesses, medical facilities, and financial institutions which has enormous costs when they are successful. Corporations that transmit sensitive information over networks determine the methods used and are responsible for the safety and security of the information stored and communicated with the systems. These threats to individual health information and personal identifiable information can be released out to the public and never be recovered. In addition to sensitive information, intellectual property can be stolen and used by foreigners (Singh & Kumar, 2020).

Cyber protection is the process that secures information and data stored on computers, networks and prevents the interference, intrusion, or unauthorized access to valuable and sensitive data. The protection includes data storage devices, facilities, equipment, and extends to information technology as well. It has been estimated that cybercrime has cost \$6 trillion total in 2021, which threaten the creativity and production globally. Protecting information systems, databases and even mobile electronics is a growing business that must keep up with technology as it becomes more sophisticated year over year (Singh & Kumar, 2020).

### **Findings**

Disruptions to the supply chain have caused many issues for our families, the economy, and the global marketplace, the research has provided some possible root causes. According to the previous research, not having an agile supply chain (ASC) and an effective supply chain strategy (SCS) are each partially responsible for disruptions. ACS and SCS affects inventories, logistics, and the procurement processes which provide quick and effective response to the customers changing requirements (Tarafdar & Qrunfle., 2017).

Another major issue deteriorating the supply chain as it pertains to commerce in America today is supply chain risk management (SCRM). There are many risks to the supply chain and a reliable process must be developed to mitigate the risks and lower the related costs. When a multicriteria model was developed to calculate internal and external risks, the reliability index revealed that transportation was a very large risk associated with supply chains. The total supply chain risk management process is complex, but the bottom line is that if one portion fails the entire system fails (Yildiz et al., 2016).

Sustainability is a major factor affecting supply chains and commerce globally, which remains difficult and complex despite the mitigating strategies. Many companies have decided to go green with the supplies used in manufacturing and even reducing the carbon footprint of the finished products. Shocks to the supply chain system can be internal such as accidents, theft, and sabotage or external, such as labor strikes, legal disputes, and natural disasters can be extremely disruptive and very costly to firms. Sustainability is more important than risk management to managing supply chain risks. (Gouda & Saranga., 2018).

Shipping delays remain the most visible of all supply chain disruptions, with transportation being the largest and most expensive component. Maritime transport is severely delayed in getting to the receiving ports causing the overland transport to be further delayed in getting goods to their customers in a timely manner. Widespread shutdowns and increased demand for home delivered goods have caused major delays at shipping destinations. Local delivery or also called the last mile delivery has experienced problems recently as well. These, and other unforeseen shipping delays have caused a ripple effect throughout the supply chain (Lin et al., 2020).

Labor shortages are plaguing many companies with immediate and second/ third order effects. Companies unable to fully staff critical positions and not meeting the increased customer demands resulting in a bout 65% of customers receiving the products requested. The labor issues are hard to predict and have far reaching affects. The labor shortages can be caused by caused by strikes, layoffs, and shutdowns associated with the pandemic. The hardest part of running a business is for the business to remain open and fully staffed (Partida., 2021).

Unemployment insurance payments by the federal government were meant to alleviate the pressure felt on workers while the country was in a shutdown. The massive expansion of the unemployment compensation and payroll protection allowed workers to get a paycheck from the government for up to 99 weeks making it extremely difficult for employers to obtain and maintain the proper amount of fully qualified people to operate the business. The expanded unemployment program ran into big problems when the government realized they were spending enormous amounts of money and could not keep up with demand for the funds (Konczal, 2020).

Government regulations and mandates stifled business for two years, while spending trillions of dollars, increasing the federal deficit. Mandatory vaccines, indoor/outdoor mask wearing, testing and quarantine procedures, as well as choosing which businesses are identified as “essential” has allowed the government to pick and choose winners and losers, which businesses that will survive or fail during the pandemic. Essential businesses were allowed to stay open and provide goods and services to the supply chains and others were left to face a major decrease of customers, components and raw materials amid rapidly changing government rules and regulations meant to mitigate the spread of Covid-19. Government mandated shutdowns on “non-essential” businesses is still a major controversy facing the supply chain today, since they did not immediately reduce the cases of Coronavirus (Huang et al., 2021).

The pandemic is currently the largest threat to the supply chain and has been for the last two years, which will have long-lasting into the future. With people staying at home to slow the spread of the pandemic, there was little to no workers available to operate stores and restaurants or run the machinery to produce non-essential goods or services. The pandemic created a supply chain disruption of massive proportion, everyone was affected from seaports and the communities that serve them, this ripple effect is known as propagation affect which will take the economy years to recover from (Mankowska et al., 2021).

Petroleum was not an issue early in the pandemic since the economy in the U.S. was not beholden to outside sources and enjoyed low gas and oil prices. Early 2021, the Biden Administration adopted green energy policies shifting the primary goals of the government to “sustainable “ sources of energy and making policies that persuaded manufacturers away from dirty fossil fueled products. The green energy policies also halted construction of essential pipelines and reversed the permits issued by the previous administration causing further devastation to the economy which was already suffering from pandemic related issues (Worland, 2020).

Another economic factor affecting the supply chains besides the high cost of petroleum, increasing inflation, decreased availability of raw materials is the decreasing amount of sub-components available to produce electronic devices and vehicles. These economic issues along with high inflation are causing businesses to pass along higher prices to consumers and deteriorating the supply chain even further. Raw materials are rare because they are hard to find already, as they are becoming increasingly scarce, the economy gets worse. It has become a risky venture for companies to manufacture items in the U.S. due to the lack of sub-components and raw materials while the supply chain stability is being challenged (Abdykirova et al., 2022).

Cyberattacks on critical infrastructure are a real threat to national security and a significant threat to the supply chain networks as well. Increased access to high-speed internet has provided criminals and other rogue nations with the tools to attack individuals, business, and government from anywhere in the world. Much of the economy is based in cyberspace where many people have gone to for their banking, shopping, and storing important data in the cloud. This has opened a new frontier for cybercriminals with mal-ware and ransomware for the purpose of identity theft and ransom of vital or critical data from individuals. Cybercrimes usually occur in the form of intellectual property theft to businesses, manufacturing firms, and government facilities causing harm to the supply chain and profit loss (Dinicu et al., 2021).

The recent issues to the supply chain might seem unavoidable due to the many reasons listed above. The facts are real and undisputable, businesses leaders are continuously learning from the past to be better prepared for the future. Increased knowledge of the economy and better education of leaders in business and government is creating the tools required to better deal with supply chain issues in a timely manner. Leaders at all levels have acknowledged that the pandemic has caused major disruptions to the supply chain (Tompkins, 2020).

### **Recommendations**

The research has revealed a myriad of issues affecting the supply chain, both internal and external factors have devastated the current system. There does not appear to be one big solution to the problem, but there may be several smaller solutions to solve the bigger issue. Leaders of the cargo shipping vessels are forced to waste fuel idling out at sea for two to three weeks waiting to get into the closest ports and offload cargo. The solution seems to be sailing to a port further away and offload cargo without delays avoiding the heavy traffic and long delays of closer ports (Hiekata et al., 2021).

Based on the data gathered on the supply chain disruptions and the issues identified, sustainable resourcing may be one of the most valuable methods global firms can implement to ensure disruption free supply chains. Manufacturing firms educating suppliers on sustainable practices, eventually developing into a synergistic relationship reducing the risks to the supply chain and befitting all entities. Most internal vulnerabilities can be mitigated by implementing environmental and social sustainability practices excluding external factors (Gouda & Saranga, 2018).

Changing the current philosophy to combat supply chain issues in business today by utilizing different methods of training and leadership with the VUCA 2.0 strategy. *Vision* explains that leadership must have a well-defined mission implementing core values as a guide. *Understanding* gives leaders a clear understanding of organizational capabilities and the clarity to identify changes in their markets. *Courage* is critical for leaders to make accurate and timely decisions. *Adaptability* allows leadership the flexibility to make quick and decisive strategic decisions for the better good of the business (Tompkins, 2020)

The supply chain became unstable due to labor shortages and unable to meet the increasing demands of customers providing goods and services in a timely manner. Labor is a probably the most critical component to supply chain because without personnel to do the work a company will not stay in business long. There may be other options when it comes to product availability, but employees are essential. Employers have come up with a solution to the labor issue by offering new workers big bonuses, increased pay, and better benefits to fill positions (Phelan, 2021).

Business leaders faced with current and ongoing supply chain disruptions have developed a strategy to mitigate circumstances that are out of their control. An agile supply chain

is necessary to adapt to a constantly evolving customer demand as well as the inventory, logistics, and procurement processes of the business. Implementing performance-oriented goals will improve the responsiveness of the company to the supply chain variations. When used together, an agile supply chain (ASC) and effective supply chain strategy (SCS) can achieve performance and profit, which provides customers the things they want in a timely manner increasing profits to the business (Tarafdar & Qrunfleh, 2017).

Unemployment compensation and payroll protection created by the federal government to provide compensation for bills and groceries while staying at home. This added trillions of dollars to the national debt and the government could not keep up with the demand for people wanting the free money. This program was eventually found to be a major cause of disruption to the supply chain and becoming a burden to the economy. The expanded insurance program did allow states that wanted to restart their economies to make modifications and establish guidelines for whom could receive the funds (Konczal, 2020).

Government rules and regulations are an issue that will never go away, but business and political leaders can work around some of the regulatory overreach with some creative solutions. It was revealed that the mandates implemented by government officials and agencies did not have an immediate reduction in confirmed cases of Covid-19. Business leaders and the public need to come together and demand the government relook at the evidence that drove the invasive policies and reverse their decisions. The policy reversal will allow business and individuals to restore the economy and return to a normal social live (Huang et al., 2021).

In early 2021, the Biden Administration adopted a green energy policy meant to lead the country away from fossil fuels that ultimately led to higher gas and oil prices, lost infrastructure jobs, and a reliance on foreign oil. These policies caused the nation to become vulnerable to

higher and unpredictable prices set by foreign suppliers and causing further harm to the already unstable supply chain. Encourage political officials to revisit the recent policy changes on fossil fuel reduction and come up with better solutions to increase energy independence. Doing so will ensure cost reductions of fuel for deliveries, easing the challenges to the supply chain, providing more options to consumers, and creating competition which increases economic wealth (Worland, 2020).

The world economies are beginning to reopen, and manufacturers are still having an issue obtaining critical sub-components such as computer chips designed to be used in other products. The computer chip shortage is due to the lack of raw materials available to produce the chips and the supply chain disruptions getting these materials to the production lines. Some manufacturers in the U.S. rely on foreign companies to provide the computer chips to be delivered based on the “on- time” production strategies. When the raw materials, sub-components or the delivery cannot be made in a timely manner, manufacturing firms must decide to look internally for solutions rather than to continue with outdated policies that make them vulnerable to outsourcing (Partida,2021).

Cyberattacks continue to plague the e-commerce industry, supply chains, and the government by stealing identities, intellectual property theft, and hostage taking of critical data. Critical infrastructure is vulnerable to online thieves and other bad actors since they can perform their illegal activities anywhere in the world with only an internet connection and a computer. Possible solutions include, better software safeguarding the information stored on hard drives and in the cloud, increased training and education of the technology users, and stronger passwords with two-factor authentication will help in the near term to reduce the cyber thieves from retrieving critical information (Dinicu et al., 2021).

## Conclusion

Supply chains are vitally important to global economies and vulnerable to disruptions, because if one portion of this fragile system fails, the entire system fails. The disruptions over the last two years have severely damaged the supply chain due to labor shortages, shipping delays, and pandemic related issues creating the perfect storm of dysfunction. Shutdowns and other pandemic protocols have caused businesses to close indefinitely without the possibility of reopening due of lack of labor necessary to fully operate a business. Other businesses were declared “essential” and continued to operate, providing the goods and services needed amidst the shortages of raw materials and sub-components.

Supply chain disruptions became the new normal while living with a global pandemic and under the constraints and limitations imposed by government and corporations. Fear of the pandemic caused people to stay at home, some businesses were able to work around the regulations and critical supply shortages by being more flexible and reducing the internal disruptions to production. Businesses found that outdated company policies and strategies were ineffective and developed new strategies adopting more sustainable practices. Educating vendors and partners allowed the businesses to avoid many of the external effects on the supply chain increasing profitability and remaining a viable businesses into the future.

Transportation being one of the most important and expensive aspects of the supply chain did not go without major disruptions, from the maritime shipping ports to the last mile delivery providers they were plagued with increasing fuel costs and lack of qualified personnel to support the industry. The companies that acknowledged the massive delays in people getting the things they wanted caused businesses to pivot and provide higher wages, safer working conditions and sign on bonuses to get the labor necessary to meet company goals and customer demands.

Further adding to the supply chain disruptions, government leaders decided to cut fossil fuel production and adopt green energy policies in lieu of good paying infrastructure jobs and energy independence in America. The supply chain continued to suffer the consequences of poorly researched and vetted policies after the 2020 election. Businesses had to pass on higher costs to customers for goods and services or reduce the size and quantity of products as inflation increased. Already low production when they could not get the basic components to make the products and again when shipping the completed products to the marketplace.

With the many issues affecting productivity within the supply chains, government leaders need to revisit current policies and reverse the ones that are causing further harm. Allow business leaders to make necessary changes to their respective industries without invasive government regulations will create jobs, increase income for the government, fix the numerous issues in the supply chain and the economy should correct itself in the process.

The question about unforeseen commerce challenges has certainly proved to be accurate with the Covid-19 pandemic, nobody could have predicted an event as costly and devastating as that has been. Leadership failures occurred on many levels of local, state, and federal government and business leaders alike, it seems that business leaders have learned from the past making proper course corrections. Leaders of government and industry must consider making the necessary changes to improve supply chain operations, manufacturing, production, and delivery methods and procedures to make us whole again.

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