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ABSTRACT

The objective of this report is to give corporations a glimpse at past disasters, pandemics and disruptions in supply chains. Provide them with tools to gauge their preparedness and plan for inevitable disruptions. The report includes methods they can use such as preparedness score cards, prep-checklists, and final plans to fortify their supply chains. prepare their companies supply chains. The hope is that with these tools companies can avoid such extreme supply chain disruptions by preparing themselves for the next natural disaster, pandemic or economic crash.

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SUPPLY CHAIN DISRUPTION BY PANDEMICS, DISASTERS AND FUTURE
PREPAREDNESS

Christopher Johnson

Under the Supervision of Mary R. Bartling

Statement of the Problem

Research has shown that humans throughout history have dealt with Natural Disasters and Pandemics regularly and continue to show a lack of preparing a plan to protect their supply chains. We as a species have always been dependent on Supply Chains requiring us to move things or ourselves in order to fulfill our needs.

When supply chains are disrupted, our lives are disheveled and, in many instances, destroyed. Hard facts and research have shown that we continue to be ill prepared for these disasters and desperately need a blueprint of preparedness to preserve Supply Chains when disaster strikes.

This research will discuss the history of the effects pandemics and natural disasters have on Global Supply Chain; and what companies can do moving forward to be better prepared. The problem of not being prepared should be an excuse of the past. Time and time again corporations overlook the possibility of the inevitable disaster and use their resources elsewhere in lieu of a plan to keep their Supply Chain functioning even in the face of disaster.

Purpose of the Study

The purpose of this study is to shine a light on the repetitive nature of disasters, with the intent of sparking the interest of corporations to develop a plan of preparedness to protect a company's supply chain. One can only hope that people will read this and have a moment of clarity to address Supply Chain Disruption Preparedness (or lack thereof), not making the same mistakes of the past. The accounts of Supply Chain errors throughout history are intended to bring attention to the lack of preparedness plans and the need of them going forward if the world is going to end Supply Chain Disruptions.

The plan is to write a basic skeleton plan that can be adapted and molded to most industries supply chains. This plan will give an outline and check list of things that they need to do and prepare to prioritize their supply chains needs giving it a stronger foundation for when the next disaster strikes.

Significance of the Study

There is no guaranteed plan of preparedness to protect companies against a Supply Chain "melt down". The longer a supply chain can endure the strain these disruptions cause will have a significant effect on the health and viability during the recovery period. The significance of a company being able to continue most of its activities while its competitors are shut down is invaluable. It could mean the difference between bankruptcy and leading a sector as the most profitable and successful company amongst your peers.

The significance of keeping up on a plan of preparedness for a Supply Chain disruption could also mean keeping hundreds if not thousands of employees from being laid off. Our most recent disaster Covid-19 shut down manufacturing all together, driving ad-hoc trucking prices to all-time lows and then skyrocketed when manufacturing opened back up. These fluctuating prices are causing major problems for not just trucking companies but any company that ships freight causing mass layoffs just to stay afloat. Transportation Managers are working hard to streamline pricing and hold their carriers accountable to uphold their rates; but a good preparedness plan in place could have prevented a lot of uncertainty and most likely layoffs.

Assumptions

This report does make the assumption that companies following the plan have customized it to their specific circumstances. It also assumes that they move or receive freight and have control of their supply chain. The report and the plan that is outlined have made the assumption that the disaster is temporary and the economic market that the company is in will make a full recovery. Nuclear winters and changes to the environment that permanently shut down or destroy the planets ecology have not been considered in this report and we will assume all plans can go out the window when apocalyptic type events occur.

Delimitation of the Study

One of the main questions that continues to run through my head is: Can humans stop making the same mistakes? Is it in our nature to destroy everything out of selfish gains, including ourselves? Will companies take preparing for the worst seriously this time? History has proved time and time again that we always think, “it can’t happen to me”. I’ve written this plan for companies; but in some ways people can adapt it for their own personal preparedness of their supplies. The boundaries I’ve set are for: companies of considerable size (large enough to have a transportation manager) and companies that receive goods and/or ship goods. We can’t test a plan protecting a company’s supply chain from natural disaster or pandemic artificially. This means instilling a plan then waiting for a disruption to see if it’s a success.

Methodology

Due to the fact I am writing the prep-scoring system, prep-checklist and a generic preparedness plan that can be adjusted to fit any companies supply chain structure concurrently; I won’t have time to test them out on a sufficient enough sample size to ultimately say my methods work. There will be some speculative findings that can be tested in the future. A lot of it will be common sense that their supply chain will undoubtedly be better prepared. The problem lies in the costs that the preparedness will cost in things such as safety stock, carrier contract rewrites and possible relocation of highly vulnerable facilities to name a few. Each plan will ultimately be tailored to the individual company, their needs, and problems they faced during past disruptions. We

must wait for the next disruption to be able to collect data and publish the findings. I will make up a scenario and give examples in tables, diagrams and charts to help visualize hypothetical real-life examples of plan initiation and execution.

Literature Review

Regarding Supply Chain disruption and a plan for preparedness, Sanjeev Sanyal (2012) researches the history of Supply Chain. He explains how in ancient times a supply chain was basic and simple. Typically, products were constructed close to the source of raw materials. These historical trade routes such as the Silk Road in Central Asia and the Spice Route over the Indian ocean were literally taking a product from its source directly to its final destination. The cost was extremely debilitating causing most products to be made locally. It wasn't until the 18th century where technology in shipping allowed for a large-scale global supply chain. Even in the past natural disasters and pandemics created disruptions shattering supply chains globally. Storms, war and plagues have throughout history been a thorn in the side of global supply chains.

These disruptions can have devastating effects on corporations. Resolver (2021) examines companies' worst nightmare – Mother Nature's Wrath. Natural disasters seem to be occurring more often than ever. The effect they have on both local and global companies is profound. Resolver examines Hurricane Isaac as the most recent disaster to have significant impact on the U.S. and globally. Its research from The Insurance Information Institute notes that approximately 30 percent of American oil is based in the Gulf and 20 percent of our natural gas. The Gulf Coast has some of the most highly trafficked highways, rail lines and ports. After Katrina devastated it in early 2005 you would have thought a preparedness plan would have been in place by companies to avoid the same devastation Katrina delivered. This is very disturbing that businesses were caught unprepared yet again. The article shines a light on the inadequate preparation, risk

management and supply chain coverage that was in place when disaster struck again. These supply chain disruptions in the Gulf Coast resulted in billions of lost profits, that most companies still have yet to recover from. It gets worse in countries that have no requirements to fortify cities against natural disaster or any plans to protect vital infrastructure. China in particular stands out because it happens to be the main place U.S. companies go looking for cheap labor for manufacturing. This research from a separate study by FM Global found that 95% of companies reliant on China were concerned about a supply chain collapse but only 65% of them considering means to mitigate the risks. The article really encapsulates the fact companies know there is a problem, yet very few are doing anything to create a plan to prepare for disruptions.

Time and time again supply chain disruptions are causing global catastrophes. Bob Ferrari (2020) thoroughly examines how history provides a reference to past events that were widespread long before the current disruption. Specifically, Ferrari cites two examples dealing with global supply chain disruptions caused by economic shock and supply chain conflicting stakeholder interests. His research of the Great Recession of 2008-2009 started exposing the implications of a global financial meltdown and a term called “backflush” which refers to the flushing of all replenishment inventories when a major disruption occurs. Ferrari examines 2020 and how it will likely be talked about in future supply chain academic communities as the newest reference in the backflush of global supply chains. He exposes the flaws in globally extended supply networks managed by lean inventory management principals. The research of past problems such as PPE shortages in 2016 should have brought attention to major flaws. In this 2016 survey over 400 doctors, nurses and supply chain administrators were questioned. In this

study Ferrari states that 57 percent of physicians did not have the right products needed during a planned procedure, and that one in four hospital staff had witnessed expired products being used on a patient; 18 percent had observed or heard of a patient being harmed due to shortages of necessary supplies. More responses indicated that 20 percent of front-line workers time was taken up by supply chain expediting or follow-ups brought to their superiors' attention. This 2016 survey highlights that healthcare workers should not have to be constantly concerned with supply chain related shortages. Ferrari suggests “globally extended supply chains while cost efficient have supply risk of over dependency or single sourcing. He explains that resiliency is predicated on moving beyond sequential planning and customer fulfillment processes and more toward concurrency in active contingency planning, continual end-to-end product demand and supply network visibility” (Ferrari, 2020).

It's very troubling that there is so little being done to prepare for global supply chain disruptions. Helen Carey (2020) researched past natural disasters and the fact that they are an inevitable part of our planet, repeating themselves year after year. The 2011 Japan earthquake and subsequent tsunami stopped critical car parts from being distributed to manufacturing facilities creating losses in the hundreds of billions of dollars leaving businesses dependent on Just-in-Time (JIT) deliveries in crisis. Carey elaborated on the shocking fragility Hurricane Sandy exposed in 2012 on almost every link in the fuel supply chain. The hurricane blocked oil tankers, destroyed pipelines, and created a shortage of tanker trucks being commandeered by FEMA. She found that energy companies were overwhelmingly under prepared just as corporations in the Carolinas during Hurricane Florence in 2018. Road and rail connections were shut down due to

flooding all along the I-95 corridor creating disruptions across all industries. Then in 2017 Hurricane Maria single handedly wiped-out Puerto Rico's largest pharmaceutical and medical device industries. Carey found that in each natural disaster the effects never stayed local but spread globally disrupting supply chains of companies that weren't near the epicenter of the disasters. She examines the process of developing a Supply Chain Disaster Preparedness plan. This plan must start by creating a disaster response and recovery plan. Companies need to lock down backup suppliers and continuously improve the plan. Carey's research led to her finding that engaging with suppliers and practice consistent supply chain risk management is crucial to the plan. She recommended creating a supplier scorecard that can analyze risk levels and potential problems. The collected data during disasters gave companies the opportunity to learn from past mistakes, figure out what was done right and fix their plans based on the data findings. Helen Carey's research illuminated the fact that catastrophic disasters are unpredictable but undoubtedly inevitable. She strongly recommended a regular reassessment of corporate disaster response plans, risk analysis and construction of a support network for rebuilding and recovery should the worst occur.

You can never be too safe, but you can be sorry. Barry Hochfelder (2017) examined things companies can do to respond and rebound from natural disasters. His research according to The Swiss Re Group, a wholesale insurance provider provides some shocking statistics of the cost's disasters caused in 2016. The Japanese earthquakes (\$40B), Canadian wildfires (\$4B), storms and floods in Europe (\$4B) and Hurricane Matthew (\$8B) just to name a few. Hochfelder explains that disasters are going to happen guaranteed and even with a strong risk management plan in place companies can be

devastated. Hochfelder (2017) research data from the Business Continuity Institute shows that when business disruption occurs there is a:

- Loss of productivity 68% (up 10% over previous year)
- Increased cost of working 53% (up 14%)
- Damage to brand reputation or image 38% (up 11%)
- Customer complaints received 40% (unchanged)
- Service outcome impaired 40% (up 4%)
- Loss of revenue 37% (down 1%)

His research suggests that there is no quick turnaround and that the more time with no production, the lower the odds a company will survive. The development of a preparedness plan is more important than ever. In his article he quotes FEMA that more than 40% of businesses never reopen after a disaster, and the ones that reopen only 29% are still in business after two years. If it's shut down for more than nine days after a disaster bankruptcy will follow within a year. All of his research makes a great case for companies to invest in a preparedness plan that will outline everything a company will need to do to prepare and recover from disasters. Hochfelder recommends all companies that have planned and mapped out the strengths and weaknesses of their supply chain and suppliers to invest in insurance against disasters. Even after preparing and running through scenarios a company cannot prepare for everything and should cover their assets and losses with insurance policies specifically to cover natural disasters. The Dallas-

based International Risk Management Institute offers a formula to help businesses calculate their claims: $BI = T \times Q \times V$. T equals the number of time unit's operations are shut down; Q equals the quantity of goods normally produced or sold during that unit of time; and V equals the value of each unit of production (usually expressed in profit).

This formula should be in a preparedness plan to help corporations figure out how much insurance they need to own. His research also established some additional items to include in a preparedness plan such as a plan to ensure equipment is safe and operational with replacements or sub-contractors ready to go. Additionally, conducting frequent inventory assessments, keeping alternative suppliers on standby, and communicating effectively and efficiently along the entire supply chain. Staying in the know regarding if your suppliers can still supply your needs and keeping your customers in the know can be crucial steps not to be dismissed.

Preparing can be the difference between success and failure. Graham Parker (2019) examined how natural disasters are not new to the World but the rate that they are happening is alarming and companies need to plan for them. He discusses that everyone recognizes the cost of human life that these disasters cause but overlook the havoc that they have on global supply chains. The disruption of raw materials, consumer goods, customer orders and supplier meltdowns can ruin a company's bottom line even if these disruptions are for a short time. Parker's research regarding the relevance of "real-time" data to help companies identify risks before they occur. He suggests digitizing the supply chain management process that has the ability to monitor thousands of data sources simultaneously such as port closures, traffic, weather and global supply shortages to name a few. Having this digitization as part of a preparedness plan is important if they

plan on proactively mitigating potential issues. With all this data a transportation manager will have the data to make important decisions such as re-ordering supplies that will not reach production before a plant shutdown or activating an alternate supplier to fill in potential supply gaps. Parker suggests that this data should not just be limited to weather, port closures or traffic; but should also include political protests, currency exchange rate volatility, transport strikes and even economic collapse. The goal to achieve transparency into every part of a supply chain is critical. The status of vendor incoming supplies, movement of inventory and purchase orders all using a real-time automated system will help create a strong preparedness plan foundation. He exclaims that natural disasters will strike; but the impact on your company doesn't have to be debilitating if a efficient digital supply-chain management platform has been implemented correctly. Parker sums it up by stating, "...the faster you're made aware of "breaking news," the faster you can address and mitigate potential issues. You're proactive, not reactive" (Parker, 2019).

Proactiveness has been a solid precursor to a company's viability to recover after disaster. Benton (2020) examined the effects of natural disasters on manufacturing and engineering businesses. He found that preparedness is the key to avoiding major supply chain catastrophes associated with natural disasters. This preparedness involves the creation of a strong supply chain foundation. He insists that companies must develop a plan and insist that their suppliers do the same. The collection of centralized data and the ability to accurately interpret it becomes imperative in creating a proactive contingency plan. With the understanding of supply chain weaknesses companies can pin-point areas that are most likely to be impacted by natural disasters. Benton strongly implies that

companies who prepare for the worst will often gain advantages over competitors that planned poorly for supply chain disruptions.

Adapting and continuous improvement to a plan is critical to long term success. Willy Shih (2020) examines how Supply Chains must adapt in a post-pandemic world. The supply crash started in China after the virus was first identified. The whole shutdown of the world exposed huge vulnerabilities in supply chains everywhere. Shih (2020) explains how companies are going to have to uncover and address hidden risks. Companies will need to develop a plan to protect themselves from shutdowns due to supply chain volatility such as a missing component to complete a product. Having multiple sub-contractors for each component is going to be key moving forward in a post-pandemic world. You never know where the next disaster is going to strike but you can be prepared to move from one supplier to another to maintain a streamlined supply chain. Identifying vulnerabilities to develop a proper and functional preparedness plan for when and after disaster strikes. Shih adds how expensive it can be to diversify your suppliers and which is why most major companies focus on one direct supplier. The thing his research has proved is that the cost of a halt in production or supply link can be overwhelmingly more expensive than a deep analysis into their supply chain. He recommends categorizing your suppliers as low, medium or high risk and applying metrics such as the impact of revenues lost if a supply is unavailable. Shih (2020) makes it very clear how vital it is to know how long your company can be shut down, ride out a supply shock or a plan to create alternate supply sources available. After identifying your risks you can diversify your supply sources to create a supply chain that isn't heavily dependent on any one supplier. He adds that if alternate suppliers aren't an option, then a

company needs to plan out how much extra product to hold and in what form and where along the supply chain. Keeping extra stock goes against Lean and JIT but a good plan of preparedness should calculate the savings gained by having them during a disruption and for how long.

There is no perfect plan but not having one is a recipe for disaster. Sarah Silver (2021) researched that out of 715 supply chain professionals the pandemic disrupted 78% of them during the Covid-19 pandemic, more than any other event in the last decade. She reports that 3M used emergency planning and grabbing safety stocks in its organization with the ability to adapt to quickly boost production of its pandemic gear. Caterpillar found alternate suppliers and utilized air freight to build up extra inventory. Arrow Electronics already had designed their production to be close to their customers which allowed it to work around both tariffs and the pandemic. Planning is going to be vital for companies moving forward. This pandemic finally scared corporations into thinking about developing a preparedness plan. In the near future there is going to be a script for companies to follow that will prepare them for the worst.

Summary, Conclusions and Recommendations

The history of natural disasters and severe disruptions in Supply Chains should be enough to at a minimum start the discussion of a Disaster Preparedness Plan (DPP).

Unfortunately, corporations turn a blind eye to spending the money needed to prepare themselves for the inevitable. The reluctance always gets snagged justifying spending the money to their board of directors, investors, and shareholders. Creating a simple way for companies to analyze data and their individual risk of severe capital loss would go a long way in convincing upper

management that a DPP is a justifiable expense. With that in mind I have three corporations with different needs, goals, products and supply chain configurations: Company A, Company B, Company C (see Table 1). The first thing each corporation needs to do is to take a simple questionnaire to help identify their risk (see Table 2).

Table 1
Company Study Data

Company A = total daily profit \$16.5M

	# parts	% made by one vendor	Units made per day	Total profit per unit	Shut down costs per day in labor/lack of production	% of backup vendors within 500 mi of primary	% of profit that goes to transportation/logistics
Product 1	118	11	1400	400	570000	50	5
Product 2	32	3	200	1000	12900	100	10
Product 3	2	1	20000	500	550000	100	20

Company B =daily profit 500M

	# parts	% made by one vendor	Units made per day	Total profit per unit	Shut down costs per day in labor/lack of production	% of backup vendors within 500 mi of primary	% of profit that goes to transportation/logistics
Product 1	11	100	100	1000	50000	0	5
Product 2	3	100	2000	9000	1600000	0	5
Product 3	1	100	250	500	90500	0	5

Company C = Daily profit 105M

	# parts	% made by one vendor	Units made per day	Total profit per unit	Shut down costs per day in labor/lack of production	% of backup vendors within 500 mi of primary	% of profit that goes to transportation/logistics
Product 1	11	3	60	80000	10000000	5	50
Product 2	32	10	20	90000	10000000	20	50
Product 3	2	100	25	15000	20000000	10	50

Table 2

Initial Questionnaire

- 1) What percent of components that make your top 3 selling products can only be made by a single vendor?
- 2) What percent of backup vendors are located near (within 500 miles) of the 1st place vendor?
- 3) What is the average percentage transportation/logistics eats out of your top 3 selling or revenue producing products' profits?
- 4) If all of your top 3 selling products were to halt in production for 1 day how much profit will you lose as a percentage of your total daily profit?

If the total of all four questions is over 80% the corporation is in severe risk

If the total of all four questions is between 50-80% the corporation is at moderate risk

If the total of all four question is between 10-25% the corporation is at low risk

If the total of all four questions is below 10% the corporation is at little to no risk

*Each company was given the questionnaire (Table 3)

Table 3

Company A

- 1) What percent of components that make your top 3 selling products can only be made by a single vendor? Approximately 11%
- 2) What percent of backup vendors are located near (within 500 miles) of the 1st place vendor? Approximately 83%
- 3) What is the average percentage transportation/logistics eats out of your top 3 selling or revenue producing products' profits? Approximately 12%
- 4) If all of your top 3 selling products were to halt in production for 1 day how much profit will you lose as a percentage of your total daily profit? 6%

If the total of all four questions is over 80% the corporation is in severe risk

If the total of all four questions is between 50-80% the corporation is at moderate risk

If the total of all four question is between 10-25% the corporation is at low risk

If the total of all four questions is below 10% the corporation is at little to no risk

Questionnaire – Company B

- 1) What percent of components that make your top 3 selling products can only be made by a single vendor? Approximately 100%
- 2) What percent of backup vendors are located near (within 500 miles) of the 1st place vendor? Approximately 0%

- 3) What is the average percentage transportation/logistics eats out of your top 3 selling or revenue producing products' profits? Approximately 5%
- 4) If all of your top 3 selling products were to halt in production for 1 day how much profit will you lose as a percentage of your total daily profit? 6%

If the total of all four questions is over 80% the corporation is in severe risk

If the total of all four questions is between 50-80% the corporation is at moderate risk

If the total of all four question is between 10-25% the corporation is at low risk

If the total of all four questions is below 10% the corporation is at little to no risk

Questionnaire – Company C

- 1) What percent of components that make your top 3 selling products can only be made by a single vendor? Approximately 27%
- 2) What percent of backup vendors are located near (within 500 miles) of the 1st place vendor? Approximately 12%
- 3) What is the average percentage transportation/logistics eats out of your top 3 selling or revenue producing products' profits? Approximately 50%
- 4) If all of your top 3 selling products were to halt in production for 1 day how much profit will you lose as a percentage of your total daily profit? 38%

If the total of all four questions is over 80% the corporation is in severe risk

If the total of all four questions is between 50-80% the corporation is at moderate risk

If the total of all four question is between 10-25% the corporation is at low risk

If the total of all four questions is below 10% the corporation is at little to no risk

The main point of the questionnaire is to show a sample of companies with different flaws and strengths in their supply chain. It takes a well-rounded supply chain to mitigate damages from supply chain disruptions. A company may have back up vendors/factories for everything they make on standby, using outsourced factories with zero shutdown expenses but vendors all on the east coast of china for their main components. If a disaster such as a tsunami were to hit China, all the good things your company did right are now negated because deciding to put all your factories/vendors all in one place is a recipe for disaster.

Think of your preparedness to disaster like a retirement fund- DIVERSIFY!

Corporations most of the time are not in the position to move their production facilities or add vendors for their ultra-personalized parts. In these types of scenarios, companies need to stock up on insurance. Thanks to the International Risk Management Institute we have a formula to help businesses calculate their claims: $BI = T \times Q \times V$. T equals the number of time unit's operations are shut down; Q equals the quantity of goods normally produced or sold during that unit of time; and V equals the value of each unit of production (usually expressed in profit). Table 4 has each product for each company solved for 24 hours of shutdown equal to one unit of time.

Table 4

Company A

Product 1 = potential claims per day = 1 day x 1400 units made x \$400 profit per unit
= \$560,000

Product 2 = potential claims per day = 1 day x 200 units made x \$1000 profit per unit
= \$200,000

Product 3 = potential claims per day = 1 day x 20000 units made x \$500 profit per unit
= \$10,000,000

Company B

Product 1 = potential claims per day = 1 day x 100 units made x \$1000 profit per unit
= \$100,000

Product 2 = potential claims per day = 1 day x 2000 units made x \$9000 profit per unit
= \$18,000,000

Product 3 = potential claims per day = 1 day x 250 units made x \$500 profit per unit
= \$125,000

Company C

Product 1 = potential claims per day = 1 day x 60 units made x \$80,000 profit per unit
= \$4,800,000

Product 2 = potential claims per day = 1 day x 20 units made x \$90,000 profit per unit

$$= \$1,800,000$$

Product 3 = potential claims per day = 1 day x 25 units made x \$15,000 profit per unit

$$= \$375,000$$

When a company plans to purchase insurance, it is best to cover at least 50% of a complete shutdown plus plant shutdown costs for a minimum of 6 months if costs permit. In summary, Company A was doing a great job establishing back up vendors to minimize downtime if one of the primaries were to shut down. They also had very low transportation overhead getting supplies to their factories and getting the products to the shelves. What company A lacked was a geographically diverse supply chain set up. The clumping of the majority of their vendors within 500 miles of each other is problematic. Companies are finding this harder and harder to do with China monopolizing much of the World's manufacturing, leaving little choices for second vendor location options. Company A was the smallest of the three which should allow them to purchase insurance for a majority of their daily profit for minimal cost. Company B decided to keep all of their manufacturing to a single vendor. Keeping one vendor in an ideal location close to main customers can reduce transportation and other supply chain costs. This issue for Company B is that with only one vendor they aren't leaving themselves any options if there is a disaster halting production. This is highly discouraged for obvious reasons. The positive Company B has going for it is that its top 3 products account for very little of their total daily profit. Without seeing more data on Company B, it's hard to tell if "B" has a multitude of products or creates its top 3 in the same factory and every other product geographically diverse. Company C is keeping its vendors geographically diverse with a good number of backups on hand. The problem is that C

is overspending on its transportation and has astronomical shutdown costs. When disasters strike transportation costs always rise in and out of effected areas. With a 50% transportation to profit cost ratio any more transportation cost increases could mean little to no profit for Company C.

Preparation, diversity, and knowing your supply chain strengths and weaknesses will be the difference between success and failure for companies dealing with supply chain disruptions. The mindset of “when” the next disaster will hit no “if” should be the mindset of corporations going forward. History has proved time and time again that disaster is coming and the time to prepare is now. Getting prepared by analyzing supply chain data needs to be a cornerstone of any plan. Stocking up on insurance when there is no realistic fix to potential problems is a great safety net to possess. No supply chain can withstand disaster 100% of the time. The key is to create a supply chain infrastructure that can endure the pinnacle of disaster and allow for a quick recovery during the aftermath. Establishing a company that remains functional during a disaster will help distinguish mediocre companies from great ones. Having a great preparedness plan has the potential to give a company an upper hand on their competition and thrive when all your competitors are just trying to survive.

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