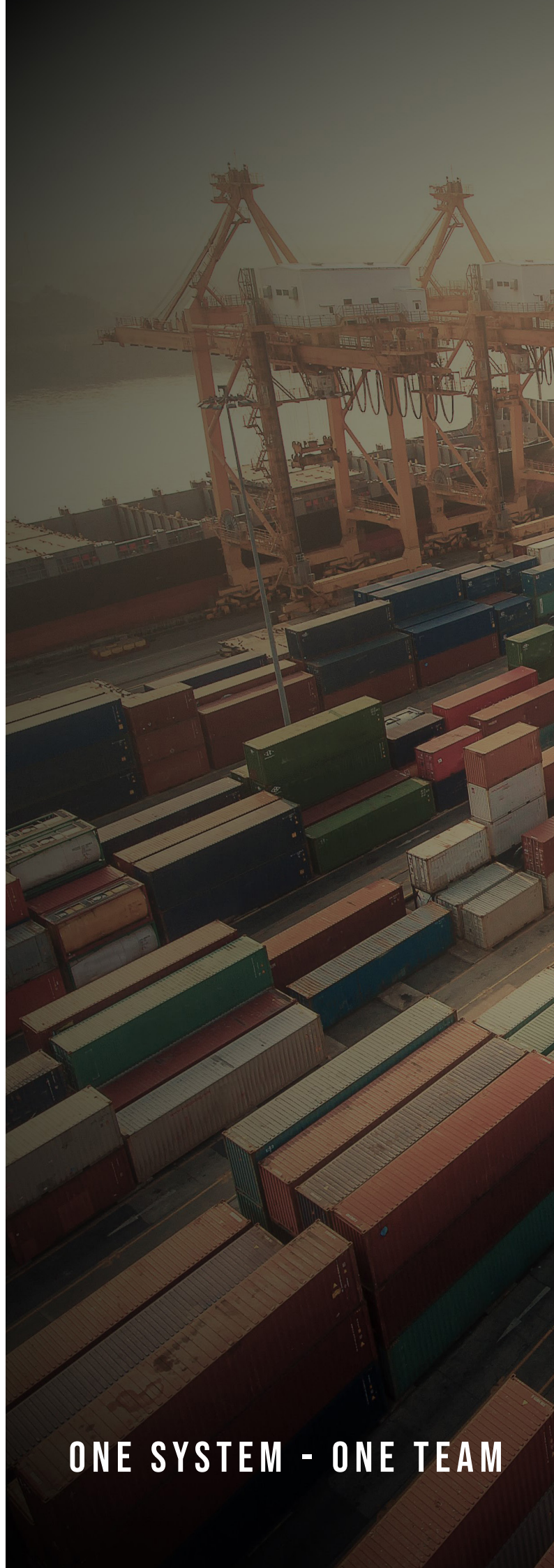


POST COVID-19 CRISIS SUPPLY CHAIN



A TIME TO RISE

WHITE PAPER WRITTEN BY
ROBERT O. MARTICHENKO



ONE SYSTEM - ONE TEAM

DEDICATION

This white paper is dedicated to all healthcare and logistics specialists who are giving everything to help us through this crisis. Thank you so, so much. You are true heroes.

A “BLACK SWAN” EVENT

A “Black Swan” event is defined and characterized as being of extreme rarity, severe impact, and the widespread insistence that the event was obvious in hindsight. That is, we should not be so surprised the event happened because we had already been warned.

Enter the Coronavirus - COVID-19.

Up until this month, a large part of our population believed that pandemics were a medical discussion and not a supply chain discussion. Now we know differently.

Up until this month, a large part of our population believed that national security meant being protected from enemy forces as opposed to being protected from a pandemic virus. Now we know differently.

Everyday citizens are now learning about the criticality of logistics and supply chain processes. While a few negative stories are being published about supply chain failures relative to COVID-19, there are far more reasons to be proud of our supply chain and logistics community. Our truck drivers, warehouse workers, healthcare supply chain professionals and all logistics functions supporting them, have stepped up to the plate.

Yet, we can be sure that when we are over this crisis, it will ‘be over, but not forgotten’. This will allow us time to reflect, to analyze, and to learn. It’s safe to say that a ‘new normal’ will be an outcome of the crisis, which will include how we think, plan, execute, and improve our supply chains relative to a healthcare crisis.

In the spirit of optimism, the future holds a very exciting and important time for supply chain professionals to be part of this new and improved normal.

This reflection, learning and subsequent work will be meaningful because we are quite literally discussing supply chain matters relative to life and death. We know we need to do better, and to get better requires us to challenge our current thinking, to ask hard questions, and to actually complete the extremely hard and complicated work that will come from the discussion.

No doubt this discussion will lead to the conclusion that we need a ONE SYSTEM - ONE TEAM approach to improving our response to a medical crisis.

In order to learn, we need to focus on the right conversations. With the COVID-19 crisis, we recognize that relative to supply chain failures, and hence improvements for the future, there are in fact two distinct conversations:

The Corporate Supply Chain Conversation:

Supply chain improvements that organizations in general will need to undertake from all the learnings relative to the COVID-19 crisis. This is a conversation that is unrelated to the medical inventory shortages in the current public healthcare crisis and is more focused on supply chain weaknesses that have become visible as our economy shut down as a result of the virus. This is a corporate conversation to be had within our organizations immediately upon us returning to some sense of new normality and stability. This conversation will center on Supply Chain Risk Analysis and will no doubt drive significant changes in current supply chain strategies.

“UP UNTIL THIS MONTH, A LARGE PART OF OUR POPULATION BELIEVED THAT PANDEMICS WERE A MEDICAL DISCUSSION AND NOT A SUPPLY CHAIN DISCUSSION. NOW WE KNOW DIFFERENTLY.”

-GLEN WRIGHT

TWO DISTINCT CONVERSATIONS

The Public Health Supply Chain Conversation:

Supply chain improvements that we as a general population, as a world community, will need to make as a direct result of the COVID-19 crisis. This is the conversation around surgical masks, ventilators, virus testing kits, medicines and all other products that are required today to keep healthcare workers safe, and to keep sick people alive. Unlike the corporate discussion, this dialogue will now include people dynamics. We have quickly learned that for healthcare workers to do their jobs effectively, they need the required supplies, and they need to stay healthy. Therefore, supply chain processes and people processes have now become one of the same ecosystem.

Both of these conversations are important; however, the Public Health Supply Chain conversation is critical right now. So, let's begin by asking hard questions to drive dialogue.

The list of questions will be long, however, some examples to explore are:

- Is it reasonable to hold private enterprises accountable to have inventory available for these types of black swan events?
- Can we actually protect ourselves by stockpiling massive amounts of inventory for just-in-case scenarios, and if so, who should be the 'supplier of last resort'?
- What alternative supply chain strategies can we consider in preparing for the next event?
- How do we create an effective and reliable ONE TEAM approach to coordinating supply chain efforts during a healthcare crisis?
- Where do we actually start?

This is a short list of important questions we need to explore as a result of COVID-19.

Let's get started.



IT'S NOT ABOUT TOILET PAPER ... BUT THERE IS A LESSON

The COVID-19 situation is as serious as can be. Supply chain issues are literally life and death. Ventilators, medicines, masks, sanitizers and all sorts of personal protective equipment (PPE) are in short supply, or if they are available, they are not necessarily in the right place at the right time. It's important not to trivialize the seriousness of these shortages by talking about toilet paper. However, toilet paper, or lack thereof, has somehow become the embodiment or metaphoric symbol of recent failed supply chain management processes.

Considering the serious impact of true medical material shortages, it feels insensitive, or perhaps even downright irresponsible, to be talking about toilet paper. However, there is learning in this discussion that we can use to bridge to the more serious discussion.

The question then is, did weaknesses in corporate supply chain strategies create empty toilet paper shelves? The rational answer to this question is no. What is most probable is that panic-stricken, social-media watching and irrational human behavior resulted in empty toilet paper shelves. There is no shortage of toilet paper, the inventory has simply been replaced into the homes of individuals who feared grocery stores may close. If we are not careful, a classic bullwhip effect will take place in the next several months, and there will be plenty of toilet paper sitting inside trailers outside of big box stores.

Yet, there are lessons here.

Lesson 1: Let's not confuse empty shelves with inventory shortages, and let's not compare toilet paper hoarding with possible supply chain malfunctions relative to the availability of life and death medical equipment and materials.

Lesson 2: Relative to emergency management, the general public is self-trained for hurricanes and weather-related events. This means we empty the bottled water and toilet paper shelves even when the crisis may very well have no impact on bottled water or toilet paper supplies. Therefore, as we design our post COVID-19 supply chains, we need to develop some sense of how we can educate the general population to make more rational decisions during a time of crisis.

Perhaps fundamental supply chain courses will now become common place in our schools and organizations. I know for a fact that the Council of Supply Chain Management Professionals (CSCMP) organization is up to this task.

Notwithstanding our two lessons above, we do need to bridge these supply chain challenges to the more serious discussion. Can we rely on known supply chain best practices to get us through a healthcare crisis, and if not, what may need to change?



“LET’S NOT CONFUSE EMPTY SHELVES WITH INVENTORY SHORTAGES, AND LET’S NOT COMPARE TOILET PAPER HOARDING WITH POSSIBLE SUPPLY CHAIN MALFUNCTIONS RELATIVE TO THE AVAILABILITY OF LIFE AND DEATH MEDICAL EQUIPMENT AND MATERIALS.”



**“CORONAVIRUS
HAS DISRUPTED
SUPPLY CHAINS FOR
NEARLY 75% OF U.S.
COMPANIES.”**

-AXIOS, FEBRUARY 2020

**“CORONAVIRUS HAS DISRUPTED SUPPLY CHAINS FOR 100%
OF U.S. COMPANIES.”**

-ROBERT MARTICHENKO, MARCH 2020

PRIVATE ENTERPRISE - SUPPLY CHAIN MANAGEMENT AND INVENTORY OPTIMIZATION

For purposes of this writing, I will combine a few terms together and define them as the “lean supply chain.” Just-in-Time (JIT), efficient-consumer-response, continuous flow and operational excellence are a small sample of terms that can be considered part of the lean supply chain lexicon. In addition, the principles of the lean supply chain are a good representation of known best practices that many organizations embrace.

Let’s introduce a definition:

The lean supply chain is an end-to-end supply chain that is planned, visible, stable, flexible, reliable, and highly collaborative, and it provides an operational-feedback loop. Supply-chain initiatives relentlessly focus on end-to-end flow, speed, and lead-time reduction by identifying and eliminating all non-value complexities and waste. This is accomplished through rigorous process discipline, inventory optimization, and first-time quality of processes.

The lean supply chain flows to the pace of customer demand, where all supply-chain activities are triggered by the pull of the pace-setting process. The goal of lean supply chain operations is to deliver the highest value to the customer at the lowest possible total cost to the business.

There is obviously a lot to unpack here, no less than twenty operational principles, and some of the unpacking is for a later day; however, some content is appropriate for today’s critical conversation.

What’s very important to recognize is the lean supply chain (and by proxy just-in-time inventory) is not a supply chain where the organization is minimizing inventories to the point that we create operational instability and ultimately fail our customers. Stability and customer satisfaction are core tenants of lean thinking.

However, it may be argued the lean supply chain and just-in-time do not provide for just-in-case. In other words, if our organizations planned for more just-in-case inventory, perhaps we would not be failing our healthcare system today.

Let’s examine this argument.

From our definition above, we can paraphrase: **The lean supply chain has a principle of inventory optimization, and this optimal inventory flows to the pace of customer demand where all supply-chain activities are triggered by the pull of the pace-setting process.**

A key term here is **inventory optimization**, not inventory minimization. The goal of the lean supply chain is not to minimize inventories, but rather to optimize inventories. Which begs the question, what are optimal inventory levels?



PRIVATE ENTERPRISE - SUPPLY CHAIN MANAGEMENT AND INVENTORY OPTIMIZATION



Optimal inventory levels are those levels that will allow us to be successful as it relates to what we know about current customer demand patterns and our operational capability to fill this demand. From an inventory management point of view, this means optimal inventories are those where the stocking levels are calculated with three types of inventory: cycle stock, buffer stock and safety stock, where we define these as:

- **Cycle Stock:** Inventory required to meet average demand (in days/weeks), and inventory to support demand during replenishment lead time.
- **Buffer Stock:** Inventory to protect against common cause variation in demand (e.g. daily variation of usage or demand by the end consumer as a normal course of business).
- **Safety Stock:** Inventory to protect against special cause variation in demand (e.g. protection against severe weather, machine downtime, transportation interruptions).

As we see from these three variables, two of our drivers, buffer stock and safety stock, are in fact just-in-case inventories. Only cycle stock is just-in-time. Therefore, and at the risk of talking in absolutes, it is safe to say that best practices in supply chain planning certainly plans for some variables that can be described as just-in-case.

However, what is now acceptable to inject into the argument is: Fine, then why do we not have hand sanitizers, ventilators, surgical masks and other seriously needed medical supplies?

The short answer is because inventory models in general do not take black swan events (catastrophic and unprecedented) into consideration. For a host of well-intended reasons, both financial and operational, the average for-profit company does not plan for catastrophic emergency inventory, nor should we expect them to. Private organizations by design strive to be effective and efficient. Efficiency is what allows an organization to be competitive, and ultimately thrive and survive. Consequently, it would be unreasonable for the general public, or our governments, to hold private enterprise solely responsible to plan, prepare, and pay for emergency inventory for an unknown health crisis.

However, private enterprise must play a key role in the new post COVID-19 team, working alongside with members from public, not-for-profit, academic and governmental agencies. For us to significantly improve our supply chain response post COVID-19, we will need to form teams of private and public organizations to manage the ecosystem that is created during a crisis.

This will require all members of the solution to be systems thinkers.

HEALTH CRISIS SUPPLY CHAIN AND SYSTEMS THINKING

A SUPPLY CHAIN IS AN ECOSYSTEM

**“STATES
BIDDING
AGAINST
EACH OTHER
PUSHING UP
PRICES OF
VENTILATORS
NEEDED
TO FIGHT
CORONAVIRUS,
NY GOVERNOR
CUOMO SAYS”**

-FORBES, MAR 2020

A supply chain is an ecosystem. This means it is like a living organism where the ultimate health of the system is a function of the interconnectedness of the many processes making up the system in totality. Therefore, to accomplish any type of significant improvement, we need to think and act upon the supply chain from a systems point of view.

Supply chain professionals, by nurture and nature, are systems thinkers. We understand intuitively that a supply chain is a complex set of functions and processes that are interconnected and dependent on each other. We respect that a change in one area, no matter how small or seemingly insignificant, will have an impact in other parts of the business. As systems thinkers, we are very interested in how the overall system will be affected by our actions. This means we are cognizant of the intended consequences of our decisions, but also the unintended consequences of these same decisions. It is this perspective that allows us to understand total performance across the extended supply chain.

Systems thinking is a learned skill that requires practice. And practicing being a systems thinker begins with changing our approach to asking good questions. Yes, we are interested in the specific strategies we pursue, but we are also very interested in how our particular strategies impact the rest of the supply chain. In other words, how do our actions within our supply chain impact the actions of others during a health crisis?



“SUPPLY CHAIN PROFESSIONALS, BY NURTURE AND NATURE, ARE SYSTEMS THINKERS. WE UNDERSTAND INTUITIVELY THAT A SUPPLY CHAIN IS A COMPLEX SET OF FUNCTIONS AND PROCESSES THAT ARE INTERCONNECTED AND DEPENDENT ON EACH OTHER.”

For example, the current COVID-19 health crisis cannot be compared to weather-related emergencies such as a hurricane. In a weather emergency, the epicenter is localized, and all non-impacted areas (cities and states) are available to help the impacted areas. Consequently, needed supplies can be sent to the impacted areas from non-impacted areas. With COVID-19, all parts of the country are impacted, therefore, all states and provinces are attempting to buy up what supplies are available. This has significant unintended consequences as the supplies that may in fact be available are not at the right place, at the right time, in the right quantities.

The reality with this example is that we are not responding as systems thinkers, we are not collectively managing the system, and the not-so-surprising outcome is that we do not have the supplies we need where and when we need them.

HEALTH CRISIS SUPPLY CHAIN AND SYSTEMS THINKING

The post Covid-19 crisis supply chain must be designed as ONE SYSTEM and planned, practiced and executed by ONE TEAM.

The customer of this ONE SYSTEM must be the healthcare specialist and the ultimate patient.



As we read the news, we may be left thinking the COVID-19 supply chain malfunction will become known as the 'you are on your own' event. We may get the feeling that Governors are not relying on federal assistance for supplies, counties are not relying on governors, and hospitals are not relying on the county. The vibe is, 'it's every hospital for themselves,' and sellers of medical equipment and personal protection equipment (PPE) have no guidance on who should be getting what. It might suggest that the system has basically gone rogue. While this may be the feeling for some who are in the trenches, we know that all people at all organizations are doing their best. The challenge is we are not managing ONE SYSTEM as ONE TEAM.

The post-COVID-19 supply chain will need to be a system that is managed with principles of systems thinking. This will not be an easy task as it will require involving all aspects of the ecosystem that make up the health crisis response supply chain. This will include private enterprise, public sector, not-for-profit, academic and volunteer organizations. It will truly be a ONE SYSTEM - ONE TEAM strategy.

To build this system and manage the new post COVID-19 health crisis supply chain requires a thorough questioning of everything we currently believe about supply chain management in healthcare. We will need to challenge all mental models that exist, and we will need to start watching a different movie.

The first segment of the current movie that needs to change is the illogical belief that we can stockpile inventory in order to be fully prepared for a health crisis.

EMERGENCY STOCKPILING: EASY TO SAY, NOT SO EASY TO DO

It's very important to make the following clear: It's not acceptable for healthcare workers to lack the tools they need to do their jobs. It's not acceptable for hospitals to not have ventilators for the sick; it's not acceptable for doctors to be forced to decide between two patients and one piece of equipment. In all cases, by any rational person, these situations are deemed a failure of planning, a failure of process, and a failure of operational execution. This is fact, and no argument should suggest this is not fact.

But, the juxtaposition, the yin vs. yang of this statement as already mentioned earlier, is that it is equally unacceptable to believe that efficiently run private businesses or the government can be held accountable to react (with inventory) to any and all possible events that may or may not occur at any given time.

Supply chain professionals know that stockpiled inventory can buy some time, but as a strategy, it is not practical or operationally feasible to be the one sole strategic solution to a healthcare crisis. It is not a panacea. This is attributable to the fact that the complexity of healthcare inventory exceeds our ability to plan and execute that plan effectively.

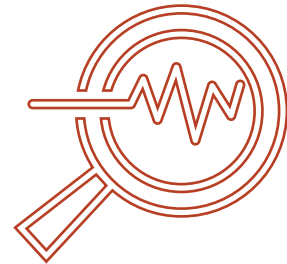
HEALTH CRISIS SUPPLY CHAIN COMPLEXITY

COVID-19 is a contagious respiratory virus. This means ventilators, surgical masks, gloves and hand sanitizers are important to the medical effort. Does this mean we should have stockpiled these items in anticipation of the virus? What if the next crisis is a blood virus? Are ventilators even part of the solution? What about earthquakes, hurricanes or any other thousand possible unplanned events that humans would need to react to? Do we believe it's reasonable to pre-identify and stockpile all necessary items to be prepared?

Let's continue to say, Yes, we should stockpile all necessary items for all potential catastrophic events that may or may not happen to us as a world community. If it's easier for discussion purposes, we can even cascade this down to, Yes, we should stockpile all necessary items for all potential catastrophic events that may or may not happen to us in the USA (or Canada, for my Canadian friends).

And with this supposition, here are a few of the many questions we will need to answer.

1. What is the list of possible emergency events to plan for?
2. What are the items we will stockpile to protect us from all possible events?
3. How will we determine how much of each item to stockpile?
4. Where will we stockpile it?
5. Who will manage the stockpile in the event it is not used?
6. Who will manage the stockpile in the event it is used?
7. Who will pay for the stockpile?



I stopped this list at seven items because I realized it could go on forever. Frankly, I'm uncomfortable I actually included 'who will pay for the stockpile?', considering we are talking about life and death decisions. Yet, this is the reality. Post COVID-19 supply chains will be different, and we will need to understand how we will collectively resource and pay for the new normal.

Notwithstanding the financial commitment, it's simply not practical to believe we can stockpile all required materials for all possible unknown events.

Once again, in the spirit of challenging our mental models, let's assume this is wrong. Let's assume we could identify every product we need, calculate the exact quantity we need, and design the network where we need to place it. Let's assume we can get that work done, and let's assume we do it. Then what happens? At the risk of sounding pessimistic, here are a few scenarios:

- Most of the materials never get used and they simply sit forever.
- The materials are needed after sitting for five years, and they are out of date or don't work because they have been sitting (machines like ventilators with moving parts are not made to sit).
- The materials are needed, but there are newer and better materials available, so these stockpiles are obsolete from a features-and-function point of view.

The reality is that executing an emergency preparedness plan relative to inventory is extremely challenging and complex, and the more we attempt to prepare by stocking inventories, the more inventory we will end up stocking; and therefore, the more complex it will become. And the more complex it becomes the less effective we will be as we will be overwhelmed by the complexity.

There is an old saying in the lean world, 'the more inventory you have, the less likely you will have what you need.' That is, there is a reciprocal relationship between inventory and having the right inventory. The premise is that as inventory levels rise, so does the complexity of managing this inventory and eventually, the complexity will outstrip our ability to react to emergencies.

HEALTH CRISIS SUPPLY CHAIN COMPLEXITY

There is one example of this strategy here in the United States where we do in fact stockpile emergency medical supplies. Known as the Strategic National Stockpile (SNS), the goal of the inventory position is to protect the public in the event of a major health crisis. Information on the SNS is limited for security reasons, however, some sources say the stockpile does in fact have surgical masks and ventilators.

However, the real question is how many of each item do we have in the SNS and how will management of the stockpile be coordinated? In other words, if the stockpile has an estimated 10% of the masks and ventilators that we need in the USA alone for COVID-19, how will these be distributed?

It gets extremely complicated very quickly, hence we cannot rely on inventory stockpiles as our sole response to a health crisis. However, as system thinkers, and considering these are life and death decisions, we must attempt for inventory to play some role in the equation.

Perhaps with big data analysis and artificial intelligence modeling, we can identify critical products that may be required for the majority of cases of most crises – the traditional ‘A’ moving SKU’s. And perhaps once these products are identified, we can forecast some sense of quantities and location placement. However, the real work here will be day-to-day management of the inventory so the product is, in fact, ready for use when the need calls. This means we will need to take a PFEP (Plan for Every Product) approach to the planning, management and execution of pre-planned emergency inventory.



The good news is, we know how to do this! We know how to do this because these are principles of operational excellence and the lean supply chain. Assuming governmental agencies are at least partly responsible for these inventories, the future will need these agencies to be trained on best practices relative to supply chain, logistics and inventory management processes. As mentioned above, in supply chain management, process matters.

Because when the crisis hits, all plans go out the window and the value we bring to the public is nothing more than a function of the effectiveness of the processes that we designed in anticipation of the black swan event.

FEMA - MARCH 29, 2020

CORONAVIRUS (COVID-19) PANDEMIC WHOLE-OF-GOVERNMENT RESPONSE

“As of March 28, FEMA, via the Strategic National Stockpile (SNS), has delivered, or is shipping: 11.6 million N-95 respirators, 26 million surgical masks, 5.2 million face shields, 4.3 million surgical gowns, 22 million gloves, 132,000 coveralls and 8,100 ventilators. FEMA is expediting movement of critical supplies from the global market to medical distributors in various locations across the U.S. Movement of supplies began on Saturday, March 28. The first flight will arrive on Sunday, March 29.”

This is much needed help for our healthcare workers and this data will allow us to understand the level of support we can provide using a pre-positioned inventory stockpile as a first responder strategy.

THE FUTURE IS NOW: SUPPLY CHAIN PROFESSIONALS RISE UP

In today's social media and political environment, it's very easy to take a populist stance on real-world, complex problems. To take a populist view on a problem means that we trivialize the complexity of a problem and then offer high-level simple solutions that gain easy popularity from the population. The challenge, though, is the solutions are generally not true solutions to root causes of problems and often simply address some symptom or countermeasure to the real issues. This is the case when we trivialize the COVID-19 medical equipment supply chain challenges by simply saying we should carry more inventories.

Yet, something needs to be done as the current situation is not acceptable, and we need to do better when we experience the next unplanned crisis.

Let's explore possible improvement strategies, but first, let's summarize the problem statement with COVID-19 and our supply chains.

COVID-19 Supply Chain Problem Statement:

The world was impacted by an unplanned virus, and we didn't have the required sanitation products, testing, medicines, medical equipment or medical materials (PPE) available in the right place, in the right quantities, at the right time.

If we review this problem statement, we can rephrase the problem statement in supply chain language:

Demand exceeded our current inventory supply, and demand also exceeded our ability to make more in the required timely manner, all resulting in our healthcare workers not having the proper equipment to do their jobs or stay safe from the virus.

While this situation is not acceptable due to the seriousness of the situation, the good news is this problem statement is not anything new to supply chain professionals. All organizations that face intense seasonal demand for products know about this supply chain challenge all too well.

And because this is not a new problem, we do know the possible countermeasures to the challenge. Some more good news is that there are only two options to the supply chain problem of meeting unexpected demand. These are:

Option 1: Have inventory on hand to meet the new demand.

Option 2: Have the capacity and capability to make (manufacture) the products required within a time frame that meets the needs of the new and unexpected demand.

As we already mentioned, the challenges with events like COVID-19 are that we don't know when the new demand will be, where the new demand will be, what new products will be in demand, or what new quantities will be needed for these unknown products. As discussed earlier, this almost eliminates option one as a viable option. In other words, it is almost impossible to have an inventory plan to support an event like COVID-19; however, as mentioned, we can give it our best shot by implementing a Plan for Every Product supply chain principle. But it will not get us all the way there.

If we agree that an inventory stockpiling strategy cannot get us there, then we are left with option two. We, as a world, as North America, as countries, need to have the capacity and capability to be flexible in our means of production. We need to be able to instantly surge capacity and make vital lifesaving products in the short term when new and unexpected demand hits us from a crisis. This competency needs to be considered a function of national security.

Perhaps we'll call it a national core competency.

We are actually witnessing public and private organizations doing this during the current COVID-19 crisis; however, we can argue that it took too long, and it was random in its execution. In project management speak, it was unplanned and lacked any essence of coordination. Tooling was not ready, inbound raw material supply chains were not in place, and the companies involved did so almost in a reactive manner. We lost weeks of vital time. For clarity, we are not talking about implementation of the Defense Production Act, where the government can force companies to make products. Health crises are measured in days and weeks, not years. If we are relying on the Defense Production Act, then we are already too late.

This flexible and capable manufacturing required for a healthcare crisis needs to be pre-planned from a point of view of who, what, when, where, why, and how. I suspect this is our first task as a nation – to prepare for the next crisis by focusing on flexible means of production and effective supply chain processes that when called upon, will actually work. This is the job of the ONE TEAM.

The good news is this approach may be the least complicated and the least expensive to implement. This is because it supports the supply chain principle that the further we are up the supply chain, the closer we are to raw materials, the cheaper and more flexible we are. To understand this principle, consider the differences between stockpiling billions of dollars of finished goods (the inventory example) as compared to having a factory with preplanned tooling and raw materials that could be flexible and capable to build multiple different products when called upon.



FIXING AMERICA'S BROKEN CORONAVIRUS SUPPLY CHAIN

"THE SENIOR NAVY OFFICER NOW IN CHARGE OF FIXING AMERICA'S CORONAVIRUS SUPPLY CHAIN IS TRYING TO FILL THE MOST URGENT NEEDS: VENTILATORS AND PERSONAL PROTECTIVE GEAR. BUT BARELY A WEEK INTO HIS ROLE AT THE FEDERAL EMERGENCY MANAGEMENT AGENCY, HE'S STILL TRYING TO ESTABLISH WHAT'S IN THE PIPELINE AND WHERE IT IS."

"TODAY, I, AS LEADER OF FEMA'S SUPPLY CHAIN TASK FORCE, AM BLIND TO WHERE ALL THE PRODUCT IS," REAR ADM. JOHN POLOWCZYK SAID.

-AXIOS, MARCH 2020

ONE SYSTEM: PLANNING AND IMPLEMENTING FLEXIBLE PRODUCTION & SUPPLY CHAIN PROCESSES

Creating flexible and responsive manufacturing and supply chain processes will no doubt be a huge job. We will need to understand all manufacturing and supply chain availability and capacity and connect it to forecasted requirements; we will need to plan to localize factories (and suppliers to these factories) into the planned demand regions in order to be responsive from a time and place point of view; we will need to design minimal viable products with standardized raw material inputs; we will need to preplan tooling and machines that are designed for small and frequent manufacturing batch sizes; we will need to significantly reduce order to delivery lead times (from trigger of need to actual delivery); and we will need to have the logistics ability to flow products and corresponding information in small and frequent delivery frequencies, all at the pull of the ultimate customer, wherever they may be during the crisis.

These flexible and responsive operations are not limited to factories making healthcare supplies. An important COVID-19 lesson is we also require the ability to build makeshift hospitals and all related equipment, increase medical staff (eg. retirees) and support all the other functions and workers who are keeping our essential services going. This is the quintessential ecosystem.

The good news is, we know how to do this! We know how to do this because these are the core principles of lean manufacturing, disciplined supply chain management, and building cultures of operational excellence. From a supply chain perspective, the post COVID-19 healthcare supply chain will need to be designed and executed around fundamental lean and operational excellence principles.

These principles will include: **visibility, flow, pull, standardization, quality at the source and velocity**. However, the most important principle for the new post COVID-19 flexible supply chain will be **lead time reduction**.

ONE SYSTEM: LEAD TIME REDUCTION AND NEARSHORING

There is no question that one aspect of our post COVID-19 new normal will be the challenges and arguments against the global supply chain. The everyday citizen has now received an education on just how much we are reliant on products coming from China and other countries that are considered low cost countries. While it's probably naive to suggest the global supply chain will be completely reversed, it is fair to say that nearshoring (make where you sell) will be a hot topic for products deemed essential for human health or national security. In general, these products fall into categories that reflect energy, defense, infrastructure, mobility, food and health. Examples include oil, tanks, steel, cars and airplanes, beef products, medical equipment and pharmaceuticals. We simply cannot be dependent on other countries for these necessities. This is not about nationalism or being anti-global trade, but rather it is about being anti-extended lead times and anti-supply chain instability. It's about caring for the health of the citizens of your country.

It is interesting that the recent trade wars (and tariffs) recognized the need for internal competencies relative to certain products for national security reasons. We are all too familiar with comments like: 'we are not a country unless we can make steel,' or 'we need to be energy self-sufficient for our basic security.' Who in their wildest dreams would ever have said: 'we are not a country unless we can make surgical masks that cost pennies to make,' or 'we need to make all medicines and pharmaceuticals in our country for national security reasons?' This conversation will now take center stage.

All countries need to do their best to have farming, manufacturing and supply chain competencies to support the flow of essential products. Once we believe this in principle, we can get to the hard work of planning what to nearshore and execute strategic repatriation of certain manufacturing processes.

The irony is the financial discussion on nearshoring may become easier as cost of labor (primary reason for globalization) is becoming less significant in the overall cost structure as a result of technology and automation in manufacturing processes. In other words, the main reason we chased the global supply chain (labor) is no longer the main driving force. The fact is China and other low-cost countries remain cost competitive now because they have all the major factories, and hence incredible economies of scale, in addition to possible government subsidies and low barriers to get factories built. Balancing our need to nearshore manufacturing while maintaining high standards for the environment will no doubt be a juggling act in the USA and Canada, but one we need to grapple with.

ONE SYSTEM: LEAD TIME REDUCTION AND NEARSHORING

As supply chain professionals, we will play a significant role in this nearshoring initiative. We will need to sharpen our skills in logistics network design, manufacturing design, and we will need competencies in calculating total landed cost in order to solidify the hypothesis that the global supply chain falls short from a competitive point of view. However, if we truly believe aspects of nearshoring are in the interests of national core competency and basic life purposes, this should make the financial discussion much easier. That is, maybe we won't even have the financial discussion; maybe we will simply do the right thing because it is the right thing to do.

ONE SYSTEM: NEARSHORING MANUFACTURING FOR NATIONAL COMPETENCY

THE GOALS:

- Develop a manufacturing design plan that will meet and exceed our emergency needs.
- Develop an internal logistics plan that will support the manufacturing design.
- Develop an external logistics plan that will support the internal logistics design.
- Develop a roadmap to successfully implement the new required state.
- Implement and practice the roadmap.



This is not about being anti-global or anti-trade; this is about being anti-lead time and anti-supply chain instability. This is about all countries having the national core competency to keep their citizens safe and healthy during a healthcare crisis. Healthcare is now part of the national security conversation.

ONE SYSTEM - ONE TEAM: THE RISE UP OF THE SUPPLY CHAIN PROFESSIONAL

Several years ago, I had the privilege of hosting a group of healthcare supply chain executives to LeanCor's headquarters in northern Kentucky. We spent two days mapping the current supply chain challenges that these executives had inside their hospitals and hospital networks. When completed, we had a long list of possible improvement projects. Before we left, I asked these executives what they will need (back at work) to get the work done. Collectively, the answer was they would need C-level support. I asked how they may get that. The answer was that they would need to convince the CEO that supply chain processes connect directly to patient care and patient safety; the priorities of the CEO. Perhaps the COVID-19 crisis will now make the all-important connection between supply chain performance, healthcare worker care and patient care. Perhaps we will now have convinced the unconvinced.

In addition to this mapping session, I personally visited several hospitals and collaborated in a logistics network design with one of the world's largest healthcare logistics companies. My conclusions from this work? Healthcare supply chains are extremely complicated, and at the same time, healthcare has not invested in enough talent relative to supply chain disciplines. Considering healthcare supply chains may be the most complicated of all supply chains, one might conclude that the healthcare industry would therefore have the most skilled, most experienced and the most resourced supply chain professionals. This is not the case. The professionals I met were amazing, skilled and smart individuals. However, in general, they were mostly under-resourced, under- tooled and under-supported from top leadership. This needs to change, and it needs to change fast.

Last year I was asked to sit on the board of the American Logistics Aid Network (ALAN). ALAN is an industry-wide organization that exists to provide supply chain assistance to disaster relief organizations (and other non-profits). This is accomplished by bringing the expertise and resources of the logistics industry together with non-profit disaster relief organizations so that we can help solve their most pressing supply chain challenges immediately after disasters strike.

My tenure on the board is short and, therefore, I am still the student. However, I do feel that I have learned a few things relative to disaster relief and our supply chains. The first is that we are all in this together. Private organizations, public and government institutions, not-for-profit, formal volunteer organizations and informal volunteers (individuals) make up the core team when disaster strikes.

The second learning is that we have an incredible opportunity to improve our approach to the coordination of supply chain and logistics activities during a national crisis. We are surrounded by so many smart people, benevolent private organizations and skilled government agencies who want nothing more than to get it right. We can do this, but it will take a whole new level of coordination between all the different levels of organizations, both private and public. It will take ONE TEAM.



A MEDICAL CRISIS IS DIFFERENT

Natural disaster humanitarian aid is different than a medical emergency like COVID-19. During a natural disaster, all people can help by sending general items to the impacted area. Water, food, blankets, clothes are examples of the abundant items the average citizen will provide. Unfortunately, much of it goes to waste and never reaches the impacted people.

A medical emergency requires specific medical equipment, medical supplies and health care professionals. **We cannot accept waste of these materials.**

CREATING ONE TEAM

The big question in front of us is how to coordinate such an effort. Central command (e.g. Homeland Security, FEMA) bring the power of a public agency with resources and authority. However, they have the inherent challenge of processes being hindered by politics and bureaucracy, both of which impact the ability to make fast and effective decisions which are critical in a healthcare crisis. In addition, a central command and control also produces a possible single point of failure. The idea of a 'single throat to choke' sounds fine in theory but knowing who to blame is not the goal of emergency management.

The opposite spectrum is to outsource our response to private enterprise, and as taxpayers, be accepting that we will pay these organizations to plan, to practice, to prepare, and to execute when the time arises. Private enterprise brings a wealth of operational knowledge and advanced supply chain best practices. The list of possible organizations to engage is long with examples including manufacturers, transportation and warehousing companies, and supply chain technology organizations.

Perhaps the answer is a thoughtful hybrid of public, private, academic and not-for-profit organizations, where the effort focuses on leveraging each other's strengths and being honest and transparent about each other's weaknesses. This is probably the starting point of this discussion. There are already many examples of public/private/not-for-profit organizations doing great work. ALAN, CSCMP, Association for Manufacturing Excellence (AME), Warehouse Education and Research Council (WERC), The Lean Enterprise Institute, (LEI), The Shingo Institute, Healthcare Ready, Catalysis and FEMA's National Business Emergency Operations Center are just a small example of already existing organizations whose mission is to improve supply chain processes around the globe.

How can we coordinate as ONE TEAM in order to plan and manage ONE SYSTEM?

FEMA - MAR 30, 2020

FEMA FACT SHEET – CREATION OF SUPPLY CHAIN STABILIZATION TASK FORCE

“The Supply Chain Stabilization Task Force is executing a whole-of-America approach to address limited supply of critical protective and life-saving equipment.

Through a four-prong approach of Preservation, Acceleration, Expansion, Allocation, the task force's primary effort is the sourcing of personal protective equipment, ventilators and other critical resources to respond to requests by states, tribes and territories. In addition, the task force is engaging manufacturers, distributors and healthcare networks to build the next phase of supply chain stabilization.”

This framework of “PRESERVATION, ACCELERATION, EXPANSION, ALLOCATION” can possibly provide a valuable starting point for our ONE SYSTEM – ONE TEAM strategy development.

CONCLUSION

Many articles have been written about the best approach to disaster response, and if you summarize these, we are left with common themes. These themes are that in order to be successful, the response system and infrastructure must have the ability to do advanced planning and practicing prior to the event, and then when the event happens, the operation must have the visibility and operational competencies to gather and share data and information flawlessly and quickly. And the operation must have the tactical ability to actually execute the plan that was practiced.

To accomplish this means we need to assemble our ONE SYSTEM - ONE TEAM from all parts of private and public enterprises, and we need to develop plans and simulate these plans (think war games) in order to understand the overall strengths and weaknesses of running scenarios that balance central coordination with decentralized execution.

These exercises will also allow us to better understand the supply chain impact of new and emerging technologies such as blockchain, artificial intelligence and advanced visibility. The logistics control towers that organizations are now embracing will no doubt be part of this conversation as well, as we are building out our world-class responsive manufacturing and supply chain ecosystems.

As a supply chain community, we have work to do. We know and understand this. And we accept this responsibility. As events like COVID-19 happen, we need to rise to the challenge and show the world the importance of what we do. In particular, when the outcome of our work is measured in life and death.

What a profound, meaningful and amazing challenge.

We got this!

ACKNOWLEDGMENTS

This paper is a result of many conversations and revisions. I want to thank Linda Angove, Glen Wright, Marcia Jones, Corinne Martichenko, Kathy Fulton, Tom Foco, and Kelley Prince. Let's keep writing!



ABOUT ROBERT

Robert O. Martichenko is the Founder and Chief Executive Officer of LeanCor Supply Chain Group. LeanCor Supply Chain Group is a trusted supply-chain partner with a mission to advance the world's supply chains. Robert is an industry thought leader and has spent over 25 years learning and implementing lean and operational excellence with a focus on end-to-end supply chain management across a wide array of industries.

As a professional speaker, Robert addresses topics such as lean, operations management, and leadership. He participates and volunteers on multiple advisory boards and educational institutions. Robert has written several business books, most recently, "Discovering Hidden Profit." His other books include two Shingo Research award-winning books: People: A leader's day-to-day guide to building, managing, and sustaining lean organizations and Building a Lean Fulfillment Stream.

Additionally, Robert is the author of "Everything I Know About Lean I Learned in First Grade" and "Lean Six Sigma Logistics." His debut novel, Drift and Hum, has won multiple awards including the IBPA Benjamin Franklin Gold Winner Award for Best First Book-Fiction. He has also written two children's books, It's Perfect Being Me and A Day Well Spent. He has received numerous prominent industry awards, most notably, the Distinguished Service Award by the Council of Supply Chain Management Professionals (CSCMP) - the highest recognition achievable for professionals in the supply chain industry. Robert complements his professional experience with a bachelor's degree in Mathematics, an MBA in Finance, and a Six Sigma Black Belt.



Robert can be reached at robert@leancor.com or on LinkedIn as robertmartichenko.