

THE BEST OF TIMES, THE WORST OF TIMES

Outlook—2021 and Beyond



By Ann Grackin
ChainLink Research
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Cover from the [Project Gutenberg EBook of A Tale of Two Cities](#)

A Season of Light, A Season of Darkness—Introduction

*“It was the **best** of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us...”¹*

This often-quoted passage of Charles Dickens sums up, for many, the year 2020, and the decade we are just leaving. We are—and will—still be living with the pandemic and other major forces² for some time as we struggle to recover.

It is important to note that although the overall cloud has been one of negativity, there are also many stories of transformation and progress—in science, in technology, in business; and the creativity and good will of so many people in our families, social networks, companies, and communities. For many, the pandemic has catalyzed our coming together to innovate/produce new products and services, create channels for communication and education, and even go on spiritual retreats.

As we continue to assess the damage and rebuild, we need to understand not just how to “keep our thumbs in dikes,” but how to take this opportunity for real, lasting change. And although the pandemic, politics, and economics still dominate so much of our thinking, as supply chainers we have a lot more in our universe that is bringing dramatic change.

What are some of those changes? Technology innovations. Globalization. Trade wars.³ Climate change. Demographic dynamics. All of these are part of the palette. But, *how* will they impact us?⁴ Which way do we go? What is most important to our customers, our company, our employees, and our trading partners?

¹ [A Tale of Two Cities](#)

² [Top 12 Events of the 21st Century](#)

³ “Trade Wars and their Effect on the Economy and You—[Why Trade Wars Are Bad and Nobody Wins](#)”

⁴ For an interesting read, this article, but especially some of the 1,000+ comments it invoked, are very insightful. For perspectives on how we got to this crisis, what it revealed, and how to go forward, read: [It’s the End of the World Economy as We Know It.](#)

A Thumb in the Dike—Getting Beyond the Pandemic

We all, on some level, have been feeling the effects of the pandemic. Some have lost jobs or seen their company/business shut down. Others, more fortunate, have experienced a kind of bonanza due to higher demand for goods and expanded channels of fulfillment to the customer. As we have written before,⁵ businesses that were well prepared and who invested in resilience and their future fared much better than many.

But for small businesses or independent contractors, it's been very tough going. For example, handymen, lawn services, plumbers, painters, construction workers and subcontractors have experienced huge swings in demand, and/or shutdowns, as well as challenges in sourcing from offshore suppliers.

Some small retailers, restaurants, and some local, small service providers have been able to pivot their business model and survive. Others have lost most everything.



From: Hans Brinker and the Silver Skates

Large industries such as auto parts, oil and gas, hospitality, and the airlines have also suffered. Industries that depend on trade and consortia agreements such as energy, chemicals, agriculture, and even textiles are struggling to balance demand, supply, and prices as they deal with trade wars and gyrating regulations. But, if you pause and step back, you know we have been on an economic roller coaster for many years.

⁵ [Demanding Better Demand Planning](#)



Source: FactSet, Baird Analysts

So, a “thumb in the dike” approach (see [current](#) stimulus proposal for U.S.) will not be enough, since it does not address the more long-term and, ultimately, more impactful issues we have to address. (Read: *A Crisis Is a Terrible Thing to Waste!*)

Yes, on one level this is quite bleak—the worst of times.⁶ But on another level, we, in supply chain, know we have needed to make a lot of changes in how we work, our technologies, and maybe who we trade with.

The changes in how people work and shop have changed how they purchase, and, therefore, our supply chain strategy: how we fulfill, who or what does the fulfilling, and our channel strategies.

As one retailer noted, “Every day now seems like Black Friday,” as they adjust to a totally different customer fulfillment model, close stores, and maintain social distancing in their warehouse facilities (to name of few issues).

Usually, this type of article talks about trends. That implies a statistically interesting data collection—a forecast. But we have moved beyond that, now. Real change is happening—companies are making specific changes in process. No doubt the transformation will take time. (We don’t lose twenty pounds in a month.) And often, when we reach our goal, we see more that needs to be done beyond the initial changes. So, let’s look at the big picture, the forces that are driving change and then what supply chainers are—or could be—doing.

⁶ I try to remind the impatient, the rebellious or resentful that many disasters occur that are devastating to communities—earthquakes, floods, “localized” wars (Afghanistan and the Middle East such as Yemen and Syria, currently), economic struggles that lead to corruption and violence, and many of them are ongoing. These areas are suffering double and triple what we in the so-called developed and less densely populated areas have to go through. And that also, globally, people have had to endure longer and more catastrophic events such as world wars, where people really sacrificed so much and many lives were lost.

Dilemmas for a Generation

What we confront today are not problems that will be solved in a year or two or three. At this point, no one is certain how long the pandemic will linger.⁷ And pandemic aside, the overarching dilemmas around us will take the collective will of society to address. But, of course, how our companies respond to them is more to our point in this article.

So, what are those dilemmas?

Economic Bullwhip

A few economic hard facts:

- Congressional Budget Office: [Budget and Economic Outlook 2020-2030](#)
- According to the [IEA](#), **Global debt soared to a record high 331% of GDP (\$258 trillion) in Q1 2020.**
- Business losses/debt also represent terrifying levels: see [FRED Economic Data](#) and Reuter's on [corporate debt](#)
- [Energy, Oil and Gas](#)
- IATA: [Airline industry](#)
- [Chemicals](#)
- Logistics industry sectors such as air freight and maritime have significantly increased prices. Yet shortages in equipment and personnel dampen outcomes.

Changes in spending Habits, too!

- Less travel—for now
- Less malls and restaurants
- Less buying [stuff?](#) Maybe
- Student Loan [Debt](#)- \$1.6 Trillion!

⁷ Uncertainty in distribution of vaccines as well as **the** new variants of covid-19 leave the pandemic “exit” uncertain.

1. Demographics and Population

Product designers and marketers have known that culture, age, and gender are all factors in how they design and market products. Today, product design and content go to another level, to community issues—population density and service availability, for example, and to deeper values such as sustainability, products that do no harm to the environment or living creatures, and are not created with [forced labor](#).

All these deeply affect our end-to-end supply chain strategy: from whom and how we source to how things are packaged and delivered, and by whom. In addition, the infrastructure of supply chains also needs to reflect the societal goals. This includes reducing package waste, carbon footprint/emissions in manufacturing and transport, and other methods to reduce the impact on the environment. Measuring and managing is key. And as we have successes, communicating them to the communities we operate in and the concerned consumers is essential.

Consistently, [government recovery](#) efforts have sought to stimulate consumer spending, which is seen as the catalyst for the whole value chain. However, a consideration that short-term economists are not talking about is that among all nations, government debt has soared, and long term, societies will have to figure out how to function with less—not more—government services and stimulus money.

The day of reckoning will come in our lifetime, and already has for the less fortunate in our world. But the burden will fall mostly on our children and grandchildren, unless innovative solutions are derived. Economists state that we can expect a widening gap between the rich and poor. The young, with fewer benefits and more debt will have less expendable income and eschew luxury spending. And there is a lot more of the young! (see Statista's [worldwide age distribution by region](#).) They do shop and will need to buy differently. Hence, products, services, and sourcing will all need to reflect the distribution and demographic realities. The bottom line here is: *the voice of the customer has to be expanded and nuanced!*

A Story of Socks

Over the years, companies went from S, M, L and maybe they made an XS, or XL—but rarely.

And then came S/M.

Or the “one size fits most.”



But, after years of hunting for clothes and socks that fit, innovative consumers have launched companies, such as sock companies, selling them exclusively online with online and TV advertising, bypassing the traditional channels.

Your foot size is 5? Yes, you can buy that. Or 6.5? Yes. Or how about 13? Yes.

The question for supply chain pros that needs to be asked is: Did our forecasting systems miss these now lucrative sectors?

And note: In every industry there are similar stories of missed major swings in market opportunities.

2. Climate Change

With a new administration in Washington, as well as the interests of younger voters (not just in the U.S., but across the world), climate change will be at the top of the agenda for many governments as we get past executing solutions for the pandemic. This issue takes the form of short-term responses to natural disasters⁸ and long-term policy to address rising oceans and reducing our carbon footprint. Regardless of your belief in the cause or impact of climate change,⁹ it is time to recognize that “green” is big business. “I’m not going to sugarcoat this: the pace and scale of what we need to do over the next three decades to address climate change is Herculean. Every sector of the economy affects climate change, and every sector is vulnerable to climate impacts,” says Constantine Samaras, associate professor in the Dept. of Civil and Environmental Engineering, Carnegie Mellon University.¹⁰ And fact is, many industries actually stand to gain from developing and implementing solutions.

“Cooling the planet” industry is a multi-trillion-dollar market, according to various forecasts.¹¹ That does not include the conversion of autos and trucks, greener packaging,¹² and the many changes companies have been making to reduce their carbon profile, the latter including more innovation, creation, and yes, puts more money into the economy.¹³

3. Technology in the Quantum Age

While we were spending our days applying product forecasts and building plans, the data and computer scientists have been dreaming of and developing a new generation of technologies that will, in time, radically change our world.

⁸ It is interesting to note that most governments spend a lot more on antiterrorism than on internal disaster relief, yet natural disasters are far more damaging to life and limb and the overall economy than terrorism, and very little to none of prevention (i.e. sea walls, canals, levees, etc.) Read: [Natural Disasters' Economic Impact](#)

⁹ “The recent COVID-19 pandemic has reminded governments about the importance of managing tail risks, which are a form of portfolio risk, including green swans related to climate change, which occur outside the normal range of expected events. While pandemics may give a hand to the climate risk agenda by triggering nationwide lockdowns that help reduce greenhouse gas (GHG) emissions, paradoxically, there is mounting scientific evidence that global warming may facilitate the spread of a variety of bacteria, viruses, and vibrios, thus exposing the world’s population to severe epidemics or new pandemics. This adds to the list of well-known physical risks associated with global warming, such as droughts and wildfires, and confirms why tackling climate change is important. However, there are still roadblocks on the way to a greener future. A transition to a low-carbon economy will require concerted efforts among governments, companies, and households, plus significant investments into greener technology over the next 30 years.” [Gorgio Baldassarri, SPG Global Market Intelligence](#)

¹⁰ Read [“Here’s How Scientists Want Biden to Take on Climate Change,”](#) in Scientific American.

¹¹ Renewable energy alone is expected to cruise into over \$900 billion in the next ten years. Industrial solutions for preserving/reducing energy consumption, for clearing and cooling the air, for returning carbon to the earth (carbon conversion) are also changing the industrial equipment and manufacturing businesses.

¹² Read National Geographic’s [“Planet or Plastics?”](#)

¹³ That is the flipside to regulation. Often, regulations induce spending for new equipment, technology, and personnel, often benefitting the industry as a whole.

The geeks in our reader audience have heard of [Heisenberg's uncertainty principle](#).¹⁴ An outcome of the physics studies and debates of a group of [Niels Bohr's](#) students, this quantum crowd focused on how physical properties operate at the smallest scale (unlike Einstein, who focused on the largest scale). Without really knowing much about all this esoteric physics, the main point for us to know is that on the atomic level things are very powerful and very fast and information kind of exists in a parallelism.¹⁵

For several decades this has led chip and computer designers to work on developing quantum computers. Today, [Intel](#), Google and IBM, to name some of the mega-developers, have been working towards practical development of these quantum computers.

Cool. But why should we care? Because, today, our utilization of AI enabled by big data is only at its infancy. The huge quantities of data that could be processed with machine learning—sorting and identifying patterns rapidly so we can use them to predict, in nanoseconds, what to do next, could be reality. By most standards of really big data challenges, supply chain looks, well, kind of small,¹⁶ on the supply side. But when we consider the consumer data and technologies like natural language processing that may enable us to process and, subsequently, predict consumer demand, things get *really large*. Think of running complex scenario analyses of multiple consumer searches and social data to derive consumer intent. Today this is quite impossible. But with smarter thinking machines—software/data science and those quantum computers—many things may be possible.¹⁷

4. Unprecedented Management Challenge of Our Century

If we look across history, in ancient times managers were the nobility and military officers. The royals concerned themselves with tax collection to feed their armies, and military officers were really the only ones who thought about logistics, work distribution, and motivation.

Along comes the industrial revolution. Management initially was more about organizing the work for productivity/efficiency. The evils of industrialization—workplace disasters and abuse—spawned the labor movement, which eked out some concessions to minimize abuses. It wasn't until after World War II that employee well-being and care took on a modern meaning. Pension plans (an innovation from the depression era/FDR's time) and health insurance became

¹⁴ Heisenberg, Max Born, and Pascual Jordan collaborated together and published key papers on Quantum Mechanics. This collaboration was shattered at the start of WWII. For those who are interested, there was a Tony Award winning play, [Copenhagen](#), about the relationship between Niels Bohr and Heisenberg.

¹⁵ For some cool viewing, see [Everything and Nothing](#) on Amazon Prime with Professor Jim Al-Khalili, and [Einstein's Big Idea](#) on PBS's Nova.

¹⁶ Some of the biggest big data analyses include: the study of genes, space exploration defense and weather.

¹⁷ We are assuming the biggest tech firms will continue to invest in artificial general intelligence, AGI, and although fully human intelligent machines may not be achievable in the near future, the work that will come from these investments will surely improve AI/machine learning technologies such as natural language processing, neural networks, and so on.

commonplace. Most people who worked for big companies could expect these benefits, and companies competed on benefit packages to attract the best, most productive workforce.

But we also had a large part of the economy engaged in small business. In the town I grew up in, most of my friends' parents had such businesses—small auto or TV repair shops; candy stores, bakeries, restaurants, and pizza; the art supply store, and a fabric/sewing shop; the dry cleaner, hardware store, and many other small retailers. These people had homes, cars, paid their bills and had aspirations for their children—take over the families' thriving business, go to college, and so on.

Today, the landscape looks very different. The divide between the haves and have-nots is considerable. And the benefits resulting from the productivity gains in industrialization and manufacturing the U.S. has made (generally far more than any other nation), have not been shared with most of the people who helped make them—the workers. In fact, many of labor's historic gains have been lost.

Work is no longer the same. And it is changing more with technology and other value and societal shifts. Contract work and the so-called gig economy creates a different kind of relationship between managers and workers, but it is still a huge and important issue which requires newer management skills.

Issues of immigration, gender equality and so on, are also big issues in the workplace. And, beyond the extreme outsourcing which has decimated the landscape in reliable, industrialized societies, we now have the issue of robotics and other AI technologies' impacts, which are surely being felt and are taking on greater force as these technologies are refined and made more affordable.

Technology is perceived as either a friend or a foe. Not only does it displace or change jobs, it has become a surveillance tool in the hands of many large companies. This brings profound questions not only about the role of technology, in general, but to the point here, the structure of the so-called management/employee relationship, which has been deteriorating for many years.

Managers are faced with the biggest challenges in our epoch. How should they organize work with humans and robots working side by side? What value does each provide? Unfortunately, reductionist thinking is most often applied to people. This is a sad truth. Executives are thinking about how the introduction of technology will impact the bottom line rather than how they can enrich the workplace experience for the workers. This issue exists across all industries and job classifications.

Are We Going to a Gig Economy?

The so-called gig economy today is commonplace. But it is a tough road for those who work in it. For example, ecommerce/home shopping has skyrocketed as consumers have turned to home delivery for just about everything. Grocery, previously a laggard in the e-commerce shopping area, exploded with various gig-staffed organizations like Instacart, Uber Eats, Grubhub, and so on who hired thousands upon thousands of shopper/delivery folks. Their compensation, well, stinks. No benefits, and they lose out big time when an item is out of stock—an order placed for, say \$150, which would provide \$20 to \$30 of pay (tips) is reduced by out-of-stocks. The order is now, say, \$90. The worker's time is the same, but the take is now \$10. And transportation expenses are incurred by them—not the company. Recent legislation in California changes this *somewhat*.

For Supply Chainers, Change Is Our Stock in Trade!

Compounding issues in society, national politics/global relationships and the pandemic have transformed the landscape of supply chains and, therefore, the supply chain profession. The pandemic has merely exposed, in many ways, a lot of fragility we already had. So, we will put the pandemic and the recovery in a broader context.

What are some of the short-term changes/investment that should happen in 2021? And what are the strategies for important changes in our supply chains?

Short term we will see a lot of price/cost uncertainties and supply variability, since we just don't know what the recovery will actually look like. However, the simple facts are that the world population continues to grow, so the short-term economic outlook (if you are still standing) is fairly good. People need to eat, sleep, drive, buy washers, dryers, and other appliances, clothe themselves, clean, and so on.

But the big strategic issues mentioned above should force us to confront the long-term changes we need to make in our supply chain and how we manage it.

Change #1—Agility/Resilience! Stability Is Not the Goal

The struggle with most of our process and system implementation in the past has been the crafting of stability. This is good, because it forces us to invest in a foundation—skilled employees, good communications with partners and customers, and information systems that are data rich and institute our policies.

But the world around us is one of constant change. Thus, built upon a solid infrastructure we need resilience abilities—ones that understand and can leverage change. A few capabilities to deploy include:

- Risk assessment and strategic scenarios development
- Cyber and physical security
- Product integrity and tracing methods
- Alternative or even redundant supply chains
- Building flexible deployment capabilities—almost “pop-up” manufacturing and logistics capabilities¹⁸
- In-shoring strategic assets—surely engineering and design to protect IP; but also manufacturing to ensure continuity and quality
- Not just *what if* analyses, but *practicing* those potential scenarios
- Machine learning mentality—not just the tools, but the curiosity/discovery mindset that is constantly searching, seeking, and learning
- Extensible computing capacity with tech providers to allow a flexible infrastructure

¹⁸ During the 80s, the computer industry was growing so fast that many manufacturers worked to have rapid speed to go live for new lines or plants.

Change #2—Sustainability: Environmental and Community Values

Risks are reduced and change is easier to implement in an environment of mutual trust and values. Many companies have created an ethical framework—principles which are being enacted as policy foundation. If we are true to our word—our principles—a good company reputation will allow us to set up operations, reduce waste and crime in our supply lines, and create a company people want to work at and buy from. In addition, over the long run, the cost of managing supply chains is reduced as waste is reduced. And, of course, this is planet friendly.

Change #3—Investing in Human Resources and Improved Employee Relationships

Companies who placed a premium on employee development and benefits saw their employees come through for them during the pandemic. Industries and jobs in which working from home was possible had an added double benefit—reduced company costs, and reduced stress on employees.

But not everyone can work from home. Smart companies have learned to accommodate the high levels of stress employees are experiencing and have put in place services and opportunities for their employees to deal with their new realities. Conversely, the horror stories about bad, high-risk workplaces and companies that fired employees due to attendance during the pandemic has further weakened those companies financially.

Longer term, companies who do not have and have not invested in women and minority executive inclusion/promotions will suffer as their customers and communities judge them on their values and whether or not they reflect the market and their customers. These changes—listening to the voices of gender and culture—are reflected in products and services. It is interesting to note the sprouting of thousands of new companies across the consumer landscape, started by frustrated consumers who had the gumption to go design a new product to accommodate those neglected needs. Many of these small companies have become quite successful, to the loss for many a big company that had myopia.

Change #4—Upgrades and Investments in Digital Supply Chain

This one is easy to explain and many are already on this journey.

- Integration with customers, trading partners, and information services
- Supply-chain technology backed by AI/machine learning. Learning more and more about customers and the environment. We will be able to read the digital tea leaves to see a better future.
- Extensible computing power for large machine learning analysis as well as contingency/backup
- Supply-chain network and control tower implementations to bring the end-to-end supply chain closer and more visible

Conclusions—Not Missiles, but Microbes

This phrase from Bill Gates, “*not missiles, but microbes,*” has struck a chord with many around the globe. Though in many parts of the world there is war and violence—and yes, that is a huge problem for humanity to address—the current pandemic crisis we face is just as huge. Major disease, social change, and protecting the environment are as impactful, if not more so, than a war (and are often the cause of war due to water and other resource shortages). We are rapidly depleting the planet of our forest lands, polluting our oceans, and our coastal cities around the world may be under water sooner than we anticipate. And yes, there will be more major outbreaks of viruses.

Whether we are on the front lines of research and innovation or learning to adapt our products and services to a different world, investing in both technical and human solutions to those issues should be part of our thinking and implementation in 2021. As always, those who understand, plan and implement forward thinking strategies are well positioned to thrive even through *interesting times*.

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Additional Reading and Research

Conflict Minerals [Compliance](#)

[*CBP Issues Detention Order on Cotton Products Made by Xinjiang Production and Construction Corps Using Prison Labor*](#) [Press release]

[Uyghur Forced Labor Prevention](#) [Press release]

[Bill Gates interview on as.com](#)

Energy, Oil and Gas [December 2020 issue](#)

[“Our Oceans Our Future,”](#) by Fabien Cousteau

[“Alone and Ridiculed, She Wages a Lonesome Climate Crusade,”](#) Ou Hongyi,
The New York Times.

[MIT Work of the Future](#)

[Navigator—Resilience: Building Back Better.](#) HSBC

Human Resource Executive, [“7 best practices for supporting employees during COVID-19”](#)

[“The Future of Offices When Workers Have a Choice,”](#) *The New York Times*

[Thinking Machines or People](#)

AI and ML for Supply Chain—[Into the Future](#) and [AI Series](#)

ChainLink’s: [Artificial Intelligence / Machine Learning Collection](#)

You may find many of the old classics at the [Project Gutenberg site](#)