

COVID 19: Future Implications and Lessons Learned from COVID-19



EXECUTIVE SUMMARY

In the decade ahead, growing geo-political tensions, economic fluctuations, social unrest, and the adoption of emerging technologies by consumers, industry, and governments will give rise to a range of existing and novel threats to global supply chains and organizations. In 2020 these threats were accelerated by the global COVID-19 pandemic, corresponding economic recession, and resulting social clashes. The ongoing effects of climate change combined with localized and global destabilizing events will only amplify the impact of these threats for the foreseeable future.

SUPPLY CHAIN THREATS

Technology Perils and Promises

Artificial Intelligence (AI):

AI will be a solution to multiple threats and problems, but it will also bring novel complications.

Increasing Digitization:

An inevitable push for efficiencies and mitigation tactics will expose supply chains to greater security risks and failure points.

Economic and Geo-political Threats

Cost of Ownership Ignorance:

There is an increasing need for C-suite executives to rethink total cost of ownership in a highly-volatile, but still relatively low-cost world.

The Stability Premium:

Mounting complexities and volatility will place high value on localities with economic, political and cultural stability, but will also breed complacency.

Supply Chain Awareness:

The global pandemic increased visibility of supply chains, but has it increased awareness as well?

Coming Destabilization Events

The pandemic was not the first, nor will it be the last epic shock to the system. These types of threats are destabilization events and can be modeled using both the magnitude and nature of the destabilization.

Special Highlight: China

China is a persistent, complex and dynamic set of threats requiring constant exploration and monitoring — with the acceptance that it will never be solved.

Special Highlight: Industry Blind Spots

Climate change and workforce talent shortage are substantial future threats that saw little industry discussion, exposing specific blind spots in supply chain strategies and planning.

To prepare for the coming decade, supply chains will need to explore their vulnerabilities to these threats, gauge their organizational resiliency, and investigate the implications to their relationships. A successful organization will actively work to disrupt and mitigate threats with solid plans for their recovery as well.

THREATCASTING AT ARIZONA STATE UNIVERSITY

Arizona State University is a new model for American higher education, an unprecedented combination of academic excellence, entrepreneurial energy and broad access. This New American University is a single, unified institution comprising four differentiated campuses positively impacting the economic, social, cultural and environmental health of the communities it serves. Its research is inspired by real world application blurring the boundaries that traditionally separate academic disciplines. ASU serves more than 90,000 students in metropolitan Phoenix, Arizona, the nation's fifth largest city. ASU champions intellectual and cultural diversity and welcomes students from all fifty states and more than one hundred nations across the globe.

The School for the Future of Innovation in Society recognizes that:

- Innovation is a complex system in which both social and technical elements and their interactions are crucial in creating desired outcomes;
- Knowledge – its creation, its dissemination, and its validation – is an essential component to addressing contemporary challenges; and
- Future-making needs to be a more interdisciplinary, more anticipatory, and more democratic practice.

The mission of SFIS will be to develop and extend these ideas. We will bring these ideas and the content, skills and dispositions that surround them to new audiences, through new modes of instruction, and at a larger scale. In particular, the SFIS will refine its instruction to address the needs of particular audiences in particular careers and career stages. SFIS houses a set of graduate degree programs, including the PhD in Human and Social Dimensions of Science and Technology (HSD), the Master of Science and Technology Policy (MSTP), the Master of Science in Global Technology and Development (GTD), and the Master of Arts in Applied Ethics and the Professions (AEP), as well as the BS/BA/minor in Innovation in Society. Within a few years, we plan to introduce additional graduate and undergraduate programs.

The mission of the Threatcasting Lab at Arizona State University is to serve as the premier resource for strategic insight, teaching materials, and exceptional subject matter expertise on threatcasting, envisioning possible threats ten years in the future. The Lab strives to provide a wide range of organizations and institutions actionable models to not only comprehend these possible futures but to a means to identify, track, disrupt, mitigate and recover from them as well. Its reports, programming and materials will bridge gaps and prompt information exchange and learning across military, academia, industrial and governmental communities.

The ASU Applied Research Lab, School for the Future of Innovation in Society (SFIS) and the ASU Threatcasting Lab are well-versed in planning and supporting workshops of various sizes. SFIS has staff dedicated to event design and management and the Threatcasting Lab has hosted numerous workshops on threatcasting designed for experts from the military, government, academia, and industry. Previous Threatcasting Workshops were held in August 2016 at West Point, September 2017 at George Washington University, and multiple events at Arizona State University (2017, 2019, and 2020).

Threatcasting Analysts:

- Greg Lindsay: Futurist. Non-Resident Senior Fellow at the Atlantic Council's Foresight, Strategy, and Risks Initiative within the Scowcroft Center on Strategy and Security.
- Brian David Johnson: Futurist. Professor of Practice SFIS and Futurist in Residence at ASU's Center for Science and the Imagination. Director of the ASU Threatcasting Lab.

Subject Matter Expert Interviews:

- Mike Bunge, director of global sourcing & material planning, Libbey
- Bob Collins, senior director of learning and development, ASCM
- Sean Culey, transformation advisor, ASCM; author, Transition Point
- Parag Khanna, managing partner, FutureMap; author, Connectography
- Gary Kilponen, vice president procurement, Celeros Flow Technology
- Clark Ponthier, treasurer-secretary, Union Pacific Railroad

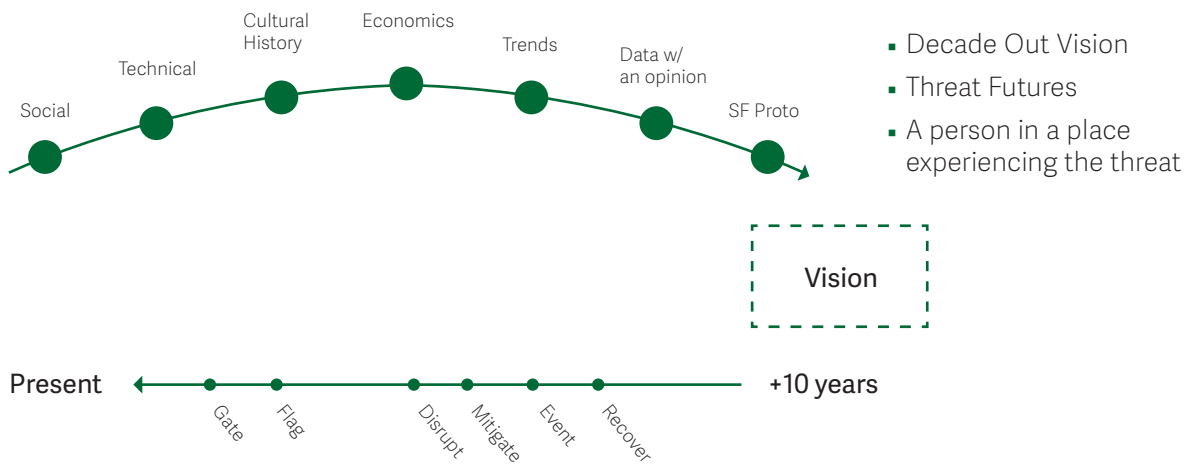
THREATCASTING METHODOLOGY OVERVIEW

Threatcasting is a conceptual methodology (Figure 1) that enables multidisciplinary groups to envision and plan systematically against threats ten years in the future. Analysts explore how to transform the future they desire into reality while avoiding an undesired future.

Threatcasting uses inputs from social science, technical research, cultural history, economics, trends and subject matter expert interviews. These various inputs allow the creation of potential futures. Some of these futures are desirable while others are to be avoided.

The results of the threatcasting process and workshop will provide the a new and innovative perspective on the broad range of possible and potential threats at the intersection of technology, culture and economics. The methodology also identifies what flags, or warning events, could appear that indicate progress toward the threat future.

Threatcasting Framework



Threatcasting Findings:

INTRODUCTION

In 2020 the ASU Threatcasting Lab in partnership with ASCM conducted a series of subject matter expert interviews and threatcasting research to explore the next decade's threat landscape. The following outlines the findings of that work with indicators, implications and direct subject matter expert quotes.

NOTE:

The quotes have been kept anonymous to allow for honesty and frankness without negative attribution

TECHNOLOGY PERILS AND PROMISE

Artificial Intelligence (AI):

AI will be a solution to multiple threats and problems, but it will also bring about novel complications.

One solution to mounting complexity is to build faster, more responsive tools trained on uncertainty. Practically speaking, this means an increasing reliance on forms of AI.

"AI-driven computers are better than planning, forecasting, and scheduling than we are."

- Some AI experts such as Kai-Fu Lee are skeptical, noting that AI decision-making models must be trained on existing datasets (e.g. airline demand forecasting tools have been rendered all-but-useless).
- A lack of accurate data, handing over increased decision-making abilities to AI introduces the risk of biased inputs or even sabotage.

Global supply chains are already opaque; what if unsupervised machine learning makes them totally inscrutable to human managers?

Increasing Digitization:

An inevitable push for efficiencies and mitigation tactics will expose supply chains to greater security risks and failure points.

Increased digitization of supply chains mitigate one kind of risk, but creates others. One response from the pandemic has been to digitize everything that can be digitized, from video conferencing replacing face-to-face work to just-in-time additive manufacturing plugging gaps in supply chains.

- The increasing adoption of emerging technologies by consumers, industry and governments (e.g. Smart Infrastructure and connected Buildings, Global Distributed Artificial Intelligence Systems, Autonomous Vehicles, Transport Systems and Drones, Robotic assisted workforce, Personal and Industrial IoT, Wearables and Implantables) will increase the efficiencies and effects of digitization while at the same time multiply the security risks.
- As these technologies become imbedded in global supply chain infrastructures, the inherent complexity of these interconnected nodes and international business relationships will put stress on existing agreements, treaties and the rule of law.

“Any hack that affects the design of goods or performance of software is going to be massively damaging to physical supply chains. If you get hit there and you put everything online, then what?”

By increasing digitization, supply chains and organizations introduce new risk in the form of increased vulnerability to cyberattacks and ransomware.

ECONOMIC AND GEO-POLITICAL THREATS

Cost of Ownership Ignorance

Rethinking total cost of ownership in a highly-volatile but still relatively low-cost world. There is a failure of C-suite executives to understand total cost of ownership, leading many manufacturers to optimize for one- or two inputs (e.g. cost of labor, cost of shipping) at the expense of others (e.g. geography, politics, fragmentation).

“All of a sudden, if you’re buying something from China and saved 25% on the cost in exchange for a lead time of eight weeks, you could lose 20% of that in a tariff. For that cost, I could get it in a week from Mexico. You’ve got to have the data available to make those kinds of decisions.”

- Unlike the financial crisis a decade ago — when an oil price spike placed considerable pressure on logistics costs — more recent volatility has been driven by tariffs and the pandemic, while transportation costs have remained quite low.
- Ignorance of the cost of ownership represents a vulnerability in an organizations’ long term planning, resiliency, and ability to weather coming destabilizations.

Long leads, the potential for rapid escalation, and an overreliance on Chinese sourcing should have supply chain managers rethinking their calculus.

The Stability Premium

Given mounting complexity and political volatility, locations with a high degree of stability and predictability begin to command higher and higher premiums in spite of lower-cost options.

“Governments that are stable, political systems that are stable, and populations that behave in a relatively predictable way.”

Premium locations will contain:

- High degrees of transparency
- Strong social norms
- Strong political establishments
- Highly effective technocracies

There is a danger of growing complacency in places (e.g. Singapore, Japan) where risk is locally insulated... until it isn’t.

Supply Chain Awareness?

The global pandemic increased the visibility of supply chains, but has it increased awareness?

Threats and Opportunities

Everyone now knows what a supply chain is, but few organizations think about them strategically. The pandemic and resulting high-profile product shortages (e.g. hand sanitizer and toilet paper) had elevated supply chains within the public’s consciousness, but few organizations see sourcing as a strategic capability and situate it accordingly.

“As a profession, we’ve grown a lot over the last 20 years, and we’ve moved up in the organization, but it’s not there holistically.”

Organizations will need supply chain to move from visibility to awareness as a strategic differentiator and a competitive advantage.

COMING DESTABILIZATION EVENTS

The COVID-19 pandemic was not the first, nor will it be the last epic shock to the system. These types of threats are destabilization events and can be modeled using both the magnitude and nature of the destabilization.

While some doomsday scenarios are truly exogenous — meteors, solar flares, magnetic pole reversal — others are just probable enough to deserve their own scenarios (e.g. a deadly pandemic). COVID-19 has been a global event, but the nature of the destabilization comes from the virus. To oversimplify, when the virus is solved then we recover from the event. We can examine a range of these possible and potential threats.

Example: The collapse of Three Gorges Dam on the Yangtze due to unprecedented floods and/or seismic activity would disable or destroy nearly half of China's manufacturing capability.

These types of threats are destabilization events and can be modeled using both the magnitude and nature of the destabilization.

SPECIAL HIGHLIGHT: CHINA

Cost of Ownership Ignorance

China is a persistent, complex and dynamic set of threats requiring constant exploration and monitoring — with the acceptance that it will never be solved.

China and the eternal tension between single-sourcing risks and fragmentation. Whether tariffs, the potential for open conflict with the U.S., the opacity and potential instability within the regime of Xi Jinping, and the use of Uighur slave labor in many supply chains, there was near-unanimous consensus that a pivot away from China is critical. But this carries its own risks and complications, as there is no single replacement for China.

"We're not able to just say, 'Okay, we're going to pull out of China and go to India,' because that same infrastructure doesn't exist in India."

- With decentralization and diversification comes the costs of multiple regulatory regimes, currencies, and risks.
- Need for double- and triple-sourcing components along with on- and nearshoring, it remains to be seen if the lessons will be forgotten once shareholders adjust to post-COVID margins.

- Potential solutions to sourcing debates about China vs. on-shoring, etc. is a two-track model in which commodity products with long leads remain overseas, but on-shoring is performed with additive manufacturing techniques for critical components.

“IP theft within China and by Chinese interests remains a real and underrated threat.”

The biggest risks remain shareholder value, laziness, and inertia. Organizations will need to maintain a level of diligence and agility for which many are not prepared.

SPECIAL HIGHLIGHT: INDUSTRY BLIND SPOTS

Two areas where our research and modeling indicate substantial future threats not discussed:

- **Climate Change:** Banks have now begun stress testing for climate resilience. Is it now time for the supply chain to do the same?
- **The Workforce Problem:** A shortage of talent and loss of institutional memory is a long-term risk facing all supply chains.

“The number one concern I have with regards to talent is that we’re going to lose key people and won’t have enough talent to backfill them.”

COVID 19: Lessons and Future Implications

INTRODUCTION

In 2020, the ASU Threatcasting Lab in partnership with ASCM conducted a series of subject matter expert interviews and threatcasting research to explore the lessons of COVID-19 and its possible future implications. The following outlines the findings of that work with indicators, implications and direct subject matter expert quotes.

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FINDINGS

The COVID-19 pandemic did not follow the pattern of previous supply chain crises. It was first a supply shock in China and then a total, global demand shock.

Unlike past supply shocks, in which a natural- and/or political disaster created localized bottlenecks (e.g. 9/11, Fukushima, 2011 Thai floods), COVID-19 delivered a one-two punch to supply chains. First, the Wuhan outbreak and resulting lockdown led to disruptions of Chinese suppliers in January/February. Then, after the outbreak had spread to Western Europe and the United States, quarantines and lockdowns created an unprecedented level of temporary demand destruction many industries simply weren't prepared for.

“We sell into food service and hospitality industries, primarily. We weren't prepared for those industries to basically be demolished, you know?”

Question:

What else would cause total suspension of daily norms and disrupt typical economic activity? (e.g. nuclear fallout)

COVID-19 revealed previously hidden or underestimated correlations between industries that chose suppliers in the same countries.

For example, a valve manufacturer choosing suppliers in China and Italy assumed — based on an analysis of its own supply chain and the industry's — that there was a low risk of cascading disruptions. But it did not anticipate how the close linkages between the two countries' textile trades would provide a path of contagion.

“When I'm buying castings and forgings, how would I connect that demand, that supply chain's impact, on my supply chain in Italy?”

Lesson:

Understanding risks will not only require geographic analysis of one's own supply chain, but also other industries. Real redundancy may be even more difficult than expected.

COVID-19 also prompted the largest wave of border closures in the modern era of globalization. Open borders should no longer be taken as a given.

Prior to the pandemic, the number one concern of most supply chain experts geopolitics, especially ongoing tensions between the United States and China. But beyond tariffs, the pandemic has also demonstrated that open borders are no longer a given. Travel bans, borders closures, and other measures have not only temporarily severed links between countries, but has done so in a way that is constantly and confusingly in flux from month to month. Discussions of travel bubbles between selected countries (e.g. New Zealand-Australia) and secondary outbreaks have complicated this situation further. The obvious response (and prediction) is to onshore (or “nearshore”) suppliers to mitigate risk.

“Do you want to put all of your eggs in one basket in Asia, for example?”

But this comes with its own risks if local responses to the pandemic and future events is also fragmented.

The pandemic has also prompted several countries to take “supply chain sovereignty” into their own hands.

The scramble for personal protective equipment (PPE) during the pandemic also revealed cracks in international contracts, treaties, and agreements assumed to prevent supply chains from being caught in political disputes. But the United States’ seizure in April of 200,000 masks in one country (Thailand) bound for another (Germany) drew condemnation as “modern-day piracy” and underscored the potential for nation-state-driven disruptions in the name of national security.

“Governments realized, specifically around PPE, that we don't have full control of the supply chain any more. Secondly, some of our partners are behaving in a very self-interested way.”

Going forward, industries designated “essential” during the crisis — or involved in national defense or other critical areas — must take a more comprehensive look at the risks of national intervention.

COVID and climate are two examples of how mounting complexity threatens supplies chains — with few tools to manage it.

While hardly a black swan, the pandemic nonetheless required the combination of massively complex phenomena — epidemiological, cultural, political, economic, and so on. We barely have the tools to explain the interlocking causes of the crisis — or to take another example, of the climate change-driven food security issues that sparked the Syrian Civil War and waves of European migration in 2015 — much less to predict them.

“You can reverse-engineer every narrative around what the downstream tail risks and effects were, the supply chain disruptions, but can you play forward these kinds of situations or not?”

How do we build new tools to manage these issues? And how can traditional instruments for mitigating risk (e.g. insurance) keep up?

Does force majeure apply in a post-COVID world?

As noted above, mounting complexity among poorly understood or unknown correlated variables makes it difficult to even map the risks facing supply chains, let alone account for them through traditional contracts and insurance products.

Did you have the right proper contracts in place throughout your whole supply chain? And does force majeure even apply in a pandemic?

What tools do we need to insure against compounding risks? (And conversely, how could these legal and contractual risks be weaponized to paralyze suppliers?)

About the Analysts:

Greg Lindsay:

He is the director of applied research at NewCities and director of strategy at its mobility offshoot CoMotion. He is also a non-resident senior fellow of the Atlantic Council's Foresight, Strategy, and Risks Initiative, a senior fellow of MIT's Future Urban Collectives Lab, and a visiting scholar at New York University's Rudin Center for Transportation Policy & Management.

He's been cited as an expert on the future of cities, technology, and globalization by The New York Times, The Washington Post, The Wall Street Journal, The Guardian, USA Today, CNN, NPR, and the BBC. He's a partner at FutureMap, a geo-strategic advisory firm based in Singapore, and has advised Intel, Samsung, Starbucks, IKEA, Audi, Chrysler, and Hyundai, among many other organizations. He was the inaugural urbanist-in-residence at URBAN-X — BMW MINI's urban tech accelerator.

Brian David Johnson:

The future is Brian David Johnson's business. As a futurist he works with organizations to develop an actionable 10-15 year vision and what it will feel like to live in the future. His work is called futurecasting, using ethnographic field studies, technology research, cultural history, trend data, global interviews and even science fiction to provide a pragmatic road map of the future. As an applied futurist Johnson has worked with governments, trade organizations, start-ups and multinational corporations to not only help envision their future but specify the steps needed to get there. Johnson is currently the futurist in residence at Arizona State University's Center for Science and the Imagination, a professor in the School for the Future of Innovation in Society and the Director of the ASU Threatcasting Lab. He is also a Futurist and Fellow at Frost and Sullivan.

Johnson speaks and writes extensively in ongoing columns for IEEE Computer Magazine and Successful Farming where he is the "Farm Futurist". He has contributed articles to publications like The Wall Street Journal, Slate, and Wired Magazine. Johnson holds over 40 patents and is the best-selling author of both science fiction and fact books (WaR: Wizards and Robots, 21st Century Robot and Science Fiction Prototyping). He was appointed first futurist ever at the Intel Corporation in 2009 where he worked for over a decade helping to design over 2 billion microprocessors. Johnson appears regularly on Bloomberg TV, PBS, FOX News, and the Discovery Channel and has been featured in Scientific American, The Technology Review, Forbes, INC, and Popular Science. He has directed two feature films and is an illustrator and commissioned painter. In 2016 Samuel Goldwyn released "Vintage Tomorrows" a documentary based upon Johnson's book of the same name.

ABOUT ASCM

The Association for Supply Chain Management (ASCM) is the global leader in supply chain organizational transformation, innovation and leadership. As the largest nonprofit association for supply chain, ASCM is an unbiased partner, connecting companies around the world to the newest thought leadership on all aspects of supply chain. ASCM is built on a foundation of APICS certification and training spanning 60 years. Now, ASCM is driving innovation in the industry with new products, services and partnerships that enable companies to further optimize their supply chains, secure their competitive advantage and positively influence their bottom lines.

For more information, visit [ascm.org](https://www.ascm.org).