Strategic Agility and Absorbing Supply Chain Shocks

Evolving Beyond Extraordinary Reaction to Ordinary Response

Aera

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A Humanitarian Crisis Transitioning to Response and Recovery

The coronavirus (COVID-19) is not only impacting organizations around the world, but is deeply affecting many of us on a personal level--from our families to our peers to the employees whose welfare we have a responsibility for. Fortunately, protective measures are being implemented to safeguard our communities and our workers. Business owners and leaders have to begin thinking ahead as we craft strategic plans to guide our companies through this crisis. Many of us are dusting off playbooks and response plans from previous events. But it's worth taking a moment to determine if we can learn some lessons from the past and improve on them now. What should supply chain leaders do to prepare for the mid- and long-term? How should we think and act differently?

Time to Think Differently

While COVID-19 represents a unique global crisis, so far the effects and supply chain responses look a lot like the operational responses to past supply chain events going back well over a decade. Historically, supply chains have relied on 'crisis management' and 'resilience programs,' executing standardized playbook responses and assembling ad hoc crisis teams to respond to disasters. Such approaches have not fared well over the years, given the model's organizational chaos, manual overhead, and inherently slow reaction times. We believe it is time to completely rethink the model, centered around the ability of supply chains to self-heal and be resilient. Here we will look at a different model that focuses on capabilities that build everyday agility that can handle crises systematically. It focuses on building systems that have a real-time understanding of the entire operation, that anticipate and advise proactively, and that augment human decision-making seamlessly across the supply chains.

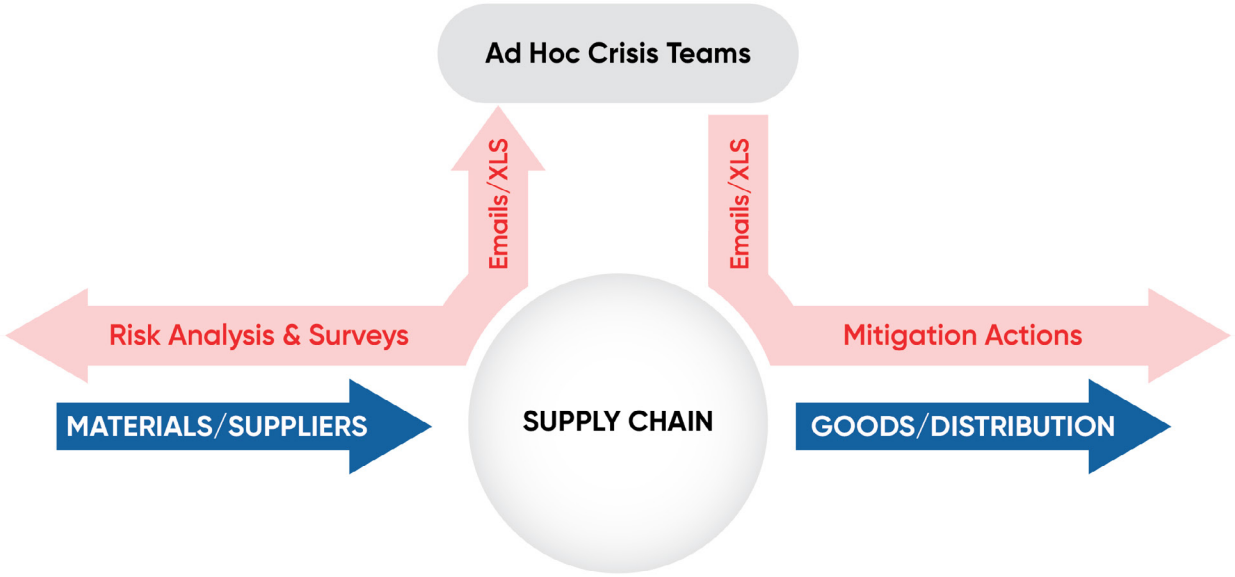
Groundhog Day and a Broken Model

As of March 2020, a look at current events already shows response patterns similar to previous supply chain events like the 2010 Eyjafjallajökull eruption, 2011 Tsunami, 2011 Thailand Floods, 2015 Tianjin Explosion, and numerous smaller events like the 2016 Hanjin Bankruptcy. All were considered extraordinary events managed by supply chains acting in crisis mode.

The common thread in all these responses was a heavy reliance on emergency crisis management teams, large group conference calls, and endless spreadsheets and powerpoints to manage critical event decision making. While each event was unique when considered individually, a deeper look at these events yields a set of repeating patterns. In particular, it exposes an inherent weaknesses in our supply chains:

- The underlying assumption of homeostasis, with spikes (demand, supply, ramp-up/down) handled outside of the regular process (SOPs)
- The inflexibility of monolithic transactional systems to respond to rapid operational changes, requiring heavy manual intervention
- The inability to re-task data lakes and BI projects for unforeseen problems

The bottom line is that systems are almost entirely disassociated with the "questions" humans are trying to find answers for, and built to define pre-programmed answers. The underlying enterprise structure and slow batch-orientation of supply chain systems supporting this have largely remained unchanged since the 1990s despite major advances in cloud architectures and database scalability.



Crisis management for the past two decades centered around conducting surveys, risk analysis, playbooks, and ad-hoc crisis teams around the supply chain. It assumed rare black swan events and accepted the chaos as the cost of doing business.

This exposes the core major problem -- an orientation toward the wrong goal.

Build for Questions, Not Answers

Whether soldiers performing regular PT and exercises, musicians practicing scales and etudes, or footwork drills in boxing, some of the most agile examples of our human experience shows the importance of fundamentals to enable professionals to react to unforeseen enemies, pieces, or hits with alacrity. Rather than focusing on endless situational possibilities, they focus on ingrained capabilities.

For at least the past 15 years, major IT and supply chain technology projects have been oriented around building for specific goals, KPIs and measurements. Such task-specific efforts are not unlike the mechanical calculators of the computer science eras, from 1800's Babbage Engines to 1940's Bombe Calculators. But progressively, we built modern computer systems with generalized processing that could respond and adapt to a wide range of tasks. Instead of building machines for specific tasks, we built machines with dynamic capabilities to which we could apply different questions.

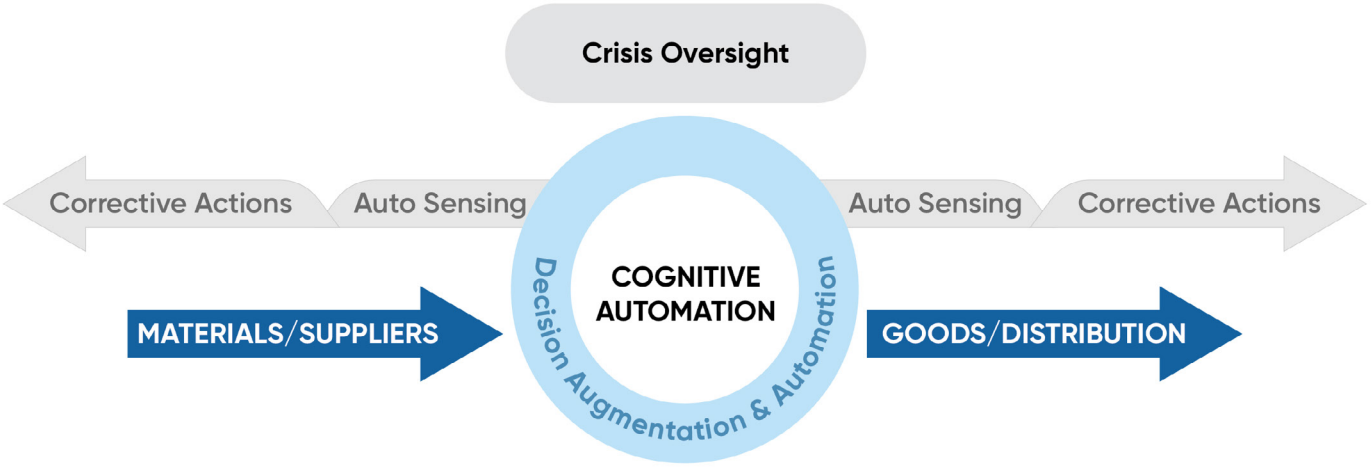
Transit from the Age of Visibility to Cognitive Automation

Cognitive automation is the process of digitizing, augmenting and automating enterprise-wide decision-making processes. If we could redesign our supply chain with this model, we would build it as a series of skills and capabilities that could be re-used and constantly re-ordered to perform more general tasks. Very much like how our supply chain professionals learn fundamental scientific, operational, and management skills in the supply chain and reapply them everyday for ever changing problems and scenarios.

Let's take a moment to make this more tangible using a real-world example: inventory stockout prediction. If you had a professional dedicated to this problem, you would essentially write the job description as:

1. Monitor inventory measurements in finished goods, on-hand and in-transit. Monitor production output and raw material availability for monitored products. Understand sale orders, work orders, shipment orders, and supply purchase orders in order to understand potential distressed orders.
2. Predict future inventory requirements based on experience and observed material flow history of elements listed above. Predict real demand, considering consensus forecast and actual demand via orders. Predict inventory at future dates based on material lead times and expected levels, including customer allocation. Have an understanding of data modeling, statistical analysis, and machine learning algorithms and be able to implement in large scale transactions and fine scale granularity.
3. Immediately identify over-sell (and undersell) situations and mitigating actions to correct for predicted shortages early in material flows. Recommend optimal mitigation actions given company service, cost, and revenue goals.
4. Ability to directly act on recommendations below certain thresholds and/or escalated to appropriate management as needed. Must have experience working with carrier systems and TMS, sales order systems, production systems, and internal stock transfers.

In this role, we just 'built' a supply chain capability that solves for inventory shortages. But we also gained an asset that could do much, much, more if we just asked it different questions. It wasn't an algorithm for calculating inventory for a specific SKU/Location based on a series of fixed formulas. It was a system designed to answer a questions: "If you see an inventory shortage, what should we do about it?"



A supply chain powered by cognitive automation is capable of adjusting to changes around it. In times of extreme crisis, it automates minor and moderate corrective actions, and augments decision-making that requires humans to make the tough choices.

Developing the Skills of Agility

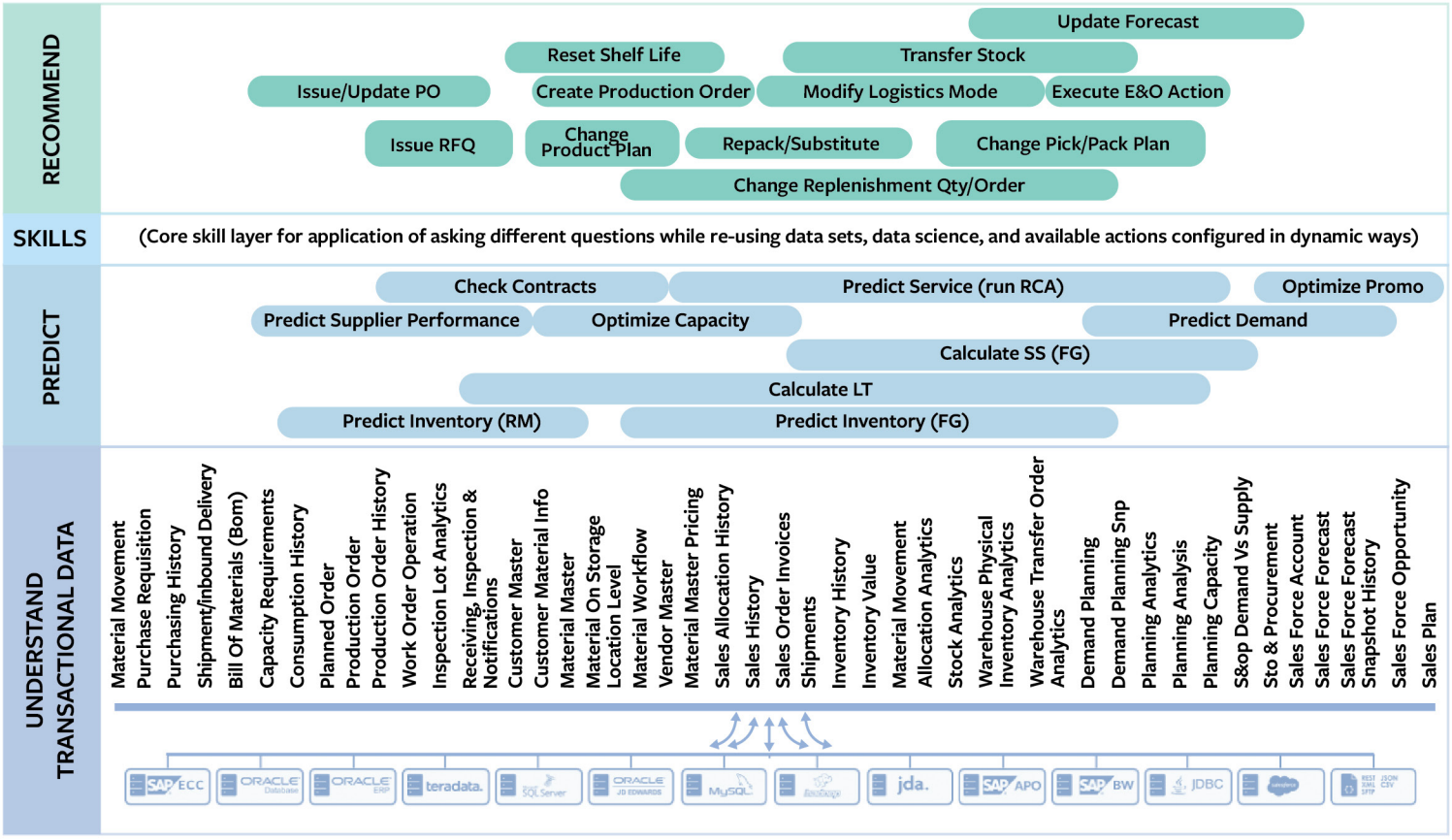
Much like our soldier, musician, and boxer analogy, the new supply chain model is built on foundational skills that can be called upon in different ways. Like a musician who masters chromatic scales and seamlessly sight-reads a Shostakovich piece, so our supply chain can adapt to different conditions with an existing set of skills.

Here is how cognitive automation builds these capabilities in our example listed above, asking, "Do you foresee any inventory shortages, and, if so, how can we resolve it before it's a crisis?"

1. Understands: Integrates with existing transactional systems with system-specific communication protocols and target-specific extraction rules. Integrate with ERPs, MRPs, TMS, and other source systems for inventory monitoring.
2. Predicts: Employs continuous data science analysis to predict future inventory levels, timing, and allocation. Predict demand deviations against plan and shortages or excesses. Model various response scenarios and optimize for product specific business goals.
3. Recommends: Proposes one or more solutions to issues, with full transparency to logic used.
4. Acts: Automatically executes actions within allowable rules, escalate exceptions according to business rules. Automatically creates/updates required actions in transactional systems in #1 above.

But guess what? While we've answered our original question, we also built a system that could answer a lot of other interesting questions:

1. What is my current available-to-promise/capable-to-promise data for my products?
2. What is the optimal safety stock given my service levels, lead times, and cost trade-offs?
3. What would happen if my demand goes to zero? What raw material purchase, production runs, etc. can I cancel to minimize my exposure?
4. What actions would I need to take if I re-optimized for cash flow rather than revenue growth?
5. What substitutions, orders, and actions do I need to take to shorten the lead time and increase the volume for Y products?



Cognitive automation employs a re-usable and re-wireable set of capabilities across data, analytics, and action capabilities.

Applying the Skills of Agility: The COVID-19 Sequence of Questions

Phase 1: Pre-Incident Operations

1. Are there any products currently experiencing a demand spike (negative and/or positive)?
2. What would happen if my demand goes to zero? What raw material purchase, production runs, etc. can I cancel to minimize my exposure?
3. Are there products at risk from possible supply shortages, and what are mitigation options?

Phase 2: Post-Incident Operations

1. What actions would I need to take if I re-optimized for cash flow rather than revenue growth?
2. What substitutions, orders, and actions do I need to take to shorten the lead time and increase the volume for Y products?
3. Do I have supplier contracts to cover my material needs and ability to quickly adjust POs for it?
4. What logistics and inventory options do I have available to stage the right material during ramp-up times to meet surges?
5. What disruptions can I anticipate for non-essential products given shifts of material and production for critical materials?

Phase 3: Recovery

1. What changes to orders and schedules do I need to unwind my emergency measures?
2. Can I reallocate excess inventory or prevent obsolescence as we wind down activities?
3. How is the market returning to normal post-incident and what is the new demand?
4. What do I need to do to continuously fine-tune my supply chain as it returns back to normal?
5. What promotional activities can I implement to accelerate revenue recovery?

Each one of the questions above could have been a project unto itself in the traditional, purpose-built model. But in a model designed around questions, the same set of skills is applied toward different queries. That is what cognitive automation can mean when we need to turn to our supply chains for help.

In Conclusion

COVID-19's effects are going to affect supply chains for a significant amount of 2020. But the ripple effects of single-sourced material, supplier force majeure and insolvency, and likely uneven demand resumption patterns are likely to last even longer. Let's get ahead of this one. Let's out-think this one. And let's build a model where systems gain cognitive abilities and serve us solutions this time. Then we can not only survive this crisis but ensure we thrive when we emerge from the other side.

About the Company

Aera Technology delivers the Cognitive Operating System™ that enables the Self-Driving Enterprise™. Aera understands how businesses work; makes real-time recommendations; predicts outcomes; and acts autonomously. Using proprietary data crawling, industry models, machine learning and artificial intelligence, Aera is revolutionizing how people relate to data and how organizations function.

Understand.

Continuously crawls enterprise systems and provides end-to-end visibility

Secure, low impact, and programmable Crawlers

Internet-scale data management and processing

Data indexed for search

Recommend.

Suggests ways to improve financial and operational performance

Opportunity and risk analytics

Analysis at any granularity

Predict.

Leverages real-time data and AI to accurately predict business outcomes, risks, and opportunities

Embedded AI and machine learning

Act.

Proactively engages relevant users and drives the execution of their decisions

Autonomously take action

Pre-defined process library

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