Supply Chain Risk and Resiliency in the Age of Uncertainty

How to Adapt Your Supply Chain to New Realities
Supply Chain New & Evolving Risks

“Every major disaster shakes loose the old order.” – Rebecca Solnit, NYT

Bruce McIndoe | President of McIndoe Risk Advisory LLC | August 2020
“The most massive, and disruptive global event since World War II.”

- Angela Merkel
Most Important Problems for Humankind

1. Global Shock – Nuclear War, Biological, Natural
2. Climate Change
3. Technological Disruption

*These problems require global cooperation and governance.*
Future Megatrends: Drivers and Disruptors

- Globalization/Nationalism
- Demographic Dynamics
- Climate Change
- Resource Scarcity
- Technology Innovation
Globalization/Nationalism

- De-Globalization
- Un-Coupling from China
- Supply Chain – On/Nearshoring, Sureshoring
- Asian Slump
- Aggressive China
Demographic Dynamics

- 7.6B Today to 10B in 2050
- **Developed World**: Lower Growth Rates and Aging Populations
- **Developing World**: High Growth Rates and “Youth Bulge”
- **Rapid Hyper-Urbanization** (Megacities)
- **Urban vs. Rural Experience**
- **Mass Migration** – Driven by conflict or economic realities
Climate Change

- Increasingly Complex Weather Patterns
- More Severe Weather Incidents Shifts in Arable Land – crop failures, abandoned farms, migration
- Shrinking Coastlines - Compounded by immigration and assimilation pressures
- Climate Change - Slowing
Resource Scarcity

- Increased conflict & political tension
- Securing resources domestically and internationally
- More Regulation & Protectionism
Vulnerabilities Driven by Shortages – Water 2040
Vulnerabilities Driven by Shortages - Food
Resource Scarcity – Reasons for Hope

- **Water Technology** – Solar Desalination, Moisture Conversion, Urban Design, Conservation/Demand
- **Advanced Farming** – Aeroponics, Protein Production, etc.
- **Power Gen/Storage Technology** – Move from fossil fuels, battery advances, distribute production/storage
- **Materials Advancement** – Alternative Supply, Parts on Demand (3D Printing)
- **Modular Recyclable Materials** - Reuse/Reduce
Technology Innovation

- Advanced Materials and 3-D Printing
- Robotics and Genetic Manipulation (Hacking the Human)
- Ubiquity – IoT and “Universal Access” Broadband by 2027
- Artificial Intelligence (AI) and Machine Learning (ML)
- Biofuels and Energy Storage
- Quantum & Nanotechnology
Global Realignment & Entrenchment

United Federation of the Americas?
United Federation of the Americas

- **Wealth** - US 8X GDP/P $64,767 vs China $8,033
- **Demographics** – 1.1B - Labor force blending
- **Resources** – South America, Canada, Artic
- **Innovation** – Best schools, track record
- **Technology** – On par with China
- **Protected** – Military and Natural (2 oceans)
- **Climate Resiliency** – Summer/Winter balance
Building Supply Chains for an Uncertain Age

Technology, Process, and People

Michael Hugos | Co-Founder of SCM Globe Corporation | August 2020
## Should We be Responsive or Efficient?

<table>
<thead>
<tr>
<th>Supply Chain Drivers</th>
<th>Responsiveness</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PRODUCTION</td>
<td>- Excess capacity</td>
<td>- Little excess capacity</td>
</tr>
<tr>
<td></td>
<td>- Flexible manufacturing</td>
<td>- Narrow focus</td>
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<tr>
<td></td>
<td>- Many smaller plants</td>
<td>- Few central plants</td>
</tr>
<tr>
<td>2. INVENTORY</td>
<td>- High inventory levels</td>
<td>- Low inventory levels</td>
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<tr>
<td></td>
<td>- Wide range of items</td>
<td>- Fewer items</td>
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<tr>
<td>3. LOCATION</td>
<td>- Many locations close to customers</td>
<td>- Few central locations serve wide areas</td>
</tr>
<tr>
<td>4. TRANSPORTATION</td>
<td>- Frequent shipments</td>
<td>- Few large shipments</td>
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<tr>
<td></td>
<td>- Fast &amp; Flexible modes</td>
<td>- Slower and cheaper modes</td>
</tr>
<tr>
<td>5. INFORMATION</td>
<td>- Collect &amp; share timely and accurate data</td>
<td>- Cost of information drops while other costs rise</td>
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</table>
New Technology Offers Many New Opportunities

Two Basic Options:
- **Efficient**: Improve existing operations
- **Responsive**: Always changing to deliver new products and services
Responsiveness Combines Products with Services

Manufacturer & Distributor

Product Bundle

- Product delivery options
- Product usage data
- Cyber security
- Warehousing & logistics
- Credit, financing and billing
- Product training & support
- Other customer services

Customer A

Customer B

Customer C

Responsive supply chains deliver value by wrapping products with tailored blanket of value-added services to address ever changing customer needs over time.
Real-Time Data for Continuous Response to Change

**Real-Time Data:** Forecasts, Sales, Inventory, Customer Feedback

**Flow of products and services**

- Robust electronic connections (EDI, XML etc.) to share data
- Continuous data collection, validation and loading into common databases visible to all parties

*Connect – Communicate – Collaborate – *fix* problems and seize opportunities!*
Collect & Share Data to Attract Customers

**KPI PERFORMANCE SCORE CARD**

- **Order Fill Rate**
  - Plan vs Actual
  - Wk 1, Wk 2, Wk 3, Wk 4

- **Supplier On Time Delivery Rate**
  - %
  - A, B, C, D, E

- **Perfect Order Rate**
  - 60%, 70%, 80%, 90%, 100%
  - Wk 1, Wk 2, Wk 3, Wk 4

**Purchase Reports**

<table>
<thead>
<tr>
<th>Item Nbr.</th>
<th>Description</th>
<th>UOM</th>
<th>Purchases</th>
<th>%</th>
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<tbody>
<tr>
<td>A1234</td>
<td>Glvax dape</td>
<td>Case</td>
<td>24,358.39</td>
<td>14.2</td>
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<tr>
<td>12A45</td>
<td>Bevidx Qrt</td>
<td>Roll</td>
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<tr>
<td>U1234a</td>
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<tr>
<td>BAC121</td>
<td>Rea nonrtq</td>
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<td>34ZZa12</td>
<td>Eog vramx</td>
<td>Roll</td>
<td>15,878.13</td>
<td>5.3</td>
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*Sales budget and IT budget merge!*

Easy to use – Updated every day
Combine Strengths of People and Computers

- Let computers do routine tasks – **EFFICIENCY**
- Empower people to be creative – **RESPONSIVE**
- “Combine the swelling numbers of mid-skilled workers with ever-cheaper technology to create value.” **Erik Brynjolfsson and Andrew McAfee**
  *MIT, Race Against the Machine*

**Freestyle Chess Example**

- Talented amateurs using simple apps to explore moves
- Beat chess grandmasters and other players with more powerful and complex apps
- “Human strategic guidance combined with the tactical acuity of a computer was overwhelming.” **Gary Kasparov**

- Continually improve skills & technology based on experience – **EVOLVE!**
Three Requirements of Responsiveness

1. Information Sharing
   OBSERVE (TECHNOLOGY)

2. Authority to Act
   ACT (PROCESS)

3. Stake in the Outcome
   WIN (PEOPLE)

Responsive supply chains need people to act **quickly** and **collaboratively**

Without waiting to be told what to do... how might this be done?

Are there useful examples to learn from?
Case Study: Responsive Retail Supply Chain

40 Manufacturers and 26 Distribution Centers

1. Real-Time Visibility
   OBSERVE (TECHNOLOGY)

2. Authority to Act
   ACT (PROCESS)

3. Stake in the Outcome
   WIN (PEOPLE)

4,500 Stores

Daily deliveries

If everyone can see what is happening, has authority to act, and a stake in the outcome...

They will collaborate to forecast, produce, and deliver products when and where needed!
Reinventing the Supply Chain

Supply Chains are a Team Sport

- Running supply chains calls for people from Operations, Procurement, Transportation, IT...
- AND supply chains include people from Sales, Finance, Marketing, R&D, Customers
- Each person has a specific function yet people must see across functions and play as a team
- Give people visibility, authority to act, and stake in the outcome – work toward common goals!
Supply Chain Insight for this Decade

- **Best profits exist in tailored bundle** – products and services combined to meet specific needs of individual customers (bundle always evolving to respond to ever changing needs)

- **Efficiency alone is not enough** – must also be responsive to evolving risks and changing customer needs and desires (efficiency requires predictability which is hard to find)

- **Combine strengths of people and computers** – use real intelligence to guide artificial intelligence, keep people in the loop (Boeing 737 MAX autopilot example)

- **Use KPIs and real-time scorecards** – everyone knows the score and can see what needs to be done (Transparency / Authority to Act / Stake in the Outcome)

- **Electronic connections and personal connections** – both required to deliver top notch service (people do the thinking, computers do the calculating)

- **Money is made in many small adjustments** – every hour, every day, every week

- **Supply chains become a team sport** – successful companies seek each other out
Supply Chain Risk and Resiliency in an Age of Uncertainty

Paul Kaeley | CEO Siemens Advanta US | August 2020
Covid-19 is re-shaping operations

Building a **resilient Supply Chain** for the digital age is key!
COVID 19 revealed weaknesses in all supply chains

<table>
<thead>
<tr>
<th>Magnitude of shock (USD)</th>
<th>Ability to anticipate (lead time)</th>
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<tbody>
<tr>
<td>Trillions</td>
<td>No lead time</td>
</tr>
<tr>
<td>100s of billions</td>
<td>Days</td>
</tr>
<tr>
<td>10s of billions</td>
<td>Weeks</td>
</tr>
<tr>
<td>Millions</td>
<td>Months or more</td>
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</tbody>
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**DISRUPTIONS of operations are often impossible to predict, but HAPPEN with REGULARITY**
Several trends will stay to shape how operations grow

GLOBALIZATION …
… has reached its peak

GOVERNMENT INTERVENTION …
… and protectionism will strongly impact the economy

RESILIENCE …
… will become more important for individuals and companies

LESS URBAN, MORE REMOTE …
… will impact the way we live and work

BUSINESS GROWTH …
towards verticals and regions

DIGITALIZATION …
… will accelerate and gain traction

SOCIAL RESPONSIBILITY AND SUSTAINABILITY …
get more in focus

CONSUMPTION PATTERNS …
… will change and boost new alternative business models

Source: Siemens Advanta US
Supply Chain Leaders expect ongoing transformation of value chains

Trend GLOBALIZATION

- 73% Encountered problems in the supplier footprint that require changes in the future.
- 75% Faced issues in the production and distribution footprint that require changes in the future.

Trend RESILIENCE

- 93% Plan to increase the level of resilience across their supply chain.

Trend DIGITALIZATION

- 85% Struggled with insufficient digital technologies in the supply chain.
Key elements for a future supply chain

1. ... to become more resilient
2. ... to be ready for the digital age
3. ... to stay sustainably profitable
Our concept of a Connected Supply Chain

Key questions
• How can I leverage the information generated by all systems and tools in my supply chain?
• What benefit brings data to my supply chain?

Level of impact

Data sources

Functional maturity levels

Process automation
Who takes action?
- Real-time reaction to unanticipated events
- Reduction of manual labor

Predictive analysis
What will happen?
- Proactive process optimization
- Recommendations for real-time optimization

Data analytics
Why did it happen?
- Understand sources or irregularities
- Process-performance exception warnings

Data visualization
What happened?
- Operational transparency
- (Real-time) visualization of current performance
Project reference Connected Supply Chain

GLOBAL TRUCK MANUFACTURER

CUSTOMER CHALLENGES

- Multi-faceted system environment & limited visibility
- Mass customization & delay in parts supply
- Siloed organization

Key Activities
- Digital Quick Check
- Development of Connected Supply Chain concept
- Business case calculation (ROI)

Results & next steps
- Baseline, evaluation of business impact, future-state and roadmap
- Proof of concept
- Fast implementation in an agile manner

SIEMENS ADVANTA

Source: Siemens Advanta US
How to get you started with our Digital Supply Chain Quick Check

1. Scan digital topic fields
   Baselining and positioning on Functional Maturity Level

2. Identify digital/automation potentials
   Benefit/Impact for your Supply Chain

3. Evaluate action fields
   Design of key elements for a future Supply Chain

4. Plan actions and implementation
   Roadmap and implementation support
**Key Take-Aways**

| Disruptions happen with regularity – prepare your supply chain for the next! | Existing trends - De-Globalization, Digitalization and Resilience - are accelerated by Covid-19 |
| Supply Chain Leaders see an immediate need to become more resilient | Elements of a future supply chain enable a smooth interaction of all the supply chain players by leveraging digitalization |
| The modular Connected Supply Chain approach integrates process partners via one common source of information | Start small and scale big, e.g. with the Digital Supply Chain Quick Check |
Thank You