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Slido Poll #X061

MIT Center for Transportation & Logistics  
Supply Chain Resilience: Before and After C19

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You have the chance to be the hero...

Assume you are forced to close your operations.

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Slido Poll #X061

What are the top two actions you would take?

All are important, some are urgent → action and tradeoffs are required.....

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To make tradeoffs, understand the challenge.

What's different about COVID-19?

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What's Different about COVID?

MIT SCALE COVID Resources

It is a tale of two supply chains  
- If "Essential" → go time!  
- If "Non-essential" → go home!

Loss of all operational capacity  
- All at once  
- With little (EU, US) to no warning (China)  
- Affecting everyone on earth

1<sup>st</sup> time for widespread loss of demand  
- 1<sup>st</sup> time for loss of ..... distribution

It has multiple names  
- Coronavirus, COVID-19, Pandemic, COVID, C19

<https://ctl.mit.edu/>

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Before and After C19

Before	After
<ul style="list-style-type: none"> <li>You decide about operating</li> <li>All core capacities available</li> <li>Supply</li> <li>Transportation</li> <li>Converting/Internal Operations</li> <li>Human Resources</li> <li>Communications</li> <li>Financial Resources</li> <li>Predictable demand</li> <li>All channels open</li> </ul>	<ul style="list-style-type: none"> <li>Government decides</li> <li>Whether you are Essential ... or not</li> <li>And whether you operate or not</li> <li>Most core capacities are constrained</li> <li>Supply possibly dead stop</li> <li>Transportation, Human Resources constrained</li> <li>Your internal operations??</li> <li>Communications - audio, digital only</li> <li>Financial Resources running out</li> <li>Unpredictable demand - extreme high or low</li> <li>Loss of distribution</li> <li>Retail closed</li> <li>Online open but constrained (Amazon)</li> <li>New channels required</li> <li><b>Inventories Depleted</b></li> </ul>

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Why a run on Toilet Paper (TP)? Three Reasons

- Reason #1: Panic buying.
- Reason #2: Demand shift and mismatch.
  - Usage shifted from Office/Home to 100% Home.
  - Home usage → ~2x, Office usage → zero.
  - Mismatch for Commercial TP producers:
    - Don't ship in consumer buying units (pallets only)
    - Don't sell through consumer channels.
    - Don't all have consumer-grade TP.
    - Commercial TP quality ≠ Consumer TP quality
- Reason #3: Tight Capacity-Demand Ratio.
  - Consumer TP providers run tight Capacity-to-Demand → high capacity utilization
  - High capacity utilization → very little additional consumer TP production capacity available → Little chance to 'catch up'

**DEMAND SHIFT AND MISMATCH**  
This is true for food supply chains as well:  
- Shift from 50/50 distributor/consumer to 100% consumer  
- limited food going to restaurants, most food going to consumers

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Not all inventories were depleted...

- Some inventory ran short
- Lots of penne liscce remained on the shelf

Images from: <https://www.fox.com/2020/03/23/2020-coronavirus-supply-chain-issues-what-happens-after-the-shock-of-covid-19/>

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Most were caught by surprise by COVID.

How can we deal with all these possible disruption?

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Most people focus on Risk Events

General Motors counted over 120 different high-level financial, strategic, operational and hazard risks....

And you cannot mitigate every source of risk

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But...there are only 7 disruption outcomes!

All disruptions result in a loss of one or more of these capacities:

- Capacity to acquire materials (supply)
- Capacity to ship/transport
- Capacity to communicate
- Capacity to convert (internal operations)
- Human resources (personnel)
- Financial flows
- Capacity to distribute to customer & consumer

**The 7 Core Capabilities of Resilient Supply Chains**

And you CAN create continuity plans for these outcomes

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### C19 Compared to Other Disruptions

	Global Financial Crisis 2008	9-11 Terrorist Attacks	Hurricane Katrina 2005	Sendai Disaster 2011	Iceland Volcano 2010	C19 2020
LOSS Of Core Capabilities of Resilient Supply Chain:						
Supply	If financially constrained	Yes	If from SE US	Major	No	Yes
Transportation	No	Temporary	Yes, in SE US	Major in Japan	Major in EU	Major Non-Eurozone
Converting/Internal Operations	If financially constrained	No	Yes, in SE US	Major in Japan	Not in EU	Major Non-Eurozone
Human Resources	No	No	Yes, in SE US	Major in Japan	No	Minor
Communications	No	Not on 9-11	Yes, in SE US	on the day	No	No
Financial Resources	No	No	Yes, in SE US	Not impact	No	Major
Distribution	No	No	Yes, in SE US	Yes in Japan	No	Minor
Duration	Slow roll -> 2+ years	~1 month	1 month -> 1+ years	3 months -> 1+ years	1 month	4+ months -> X years
	High Global Impact					Limited, Regional Impact

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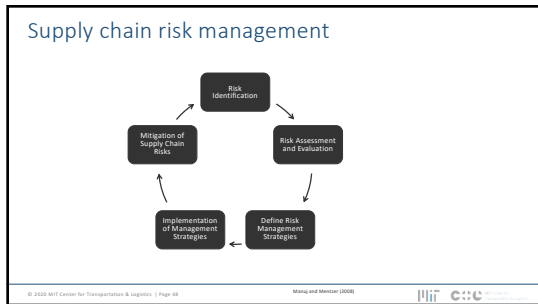
While we know the path to resilience, most companies are not resilient.

Why not?

SC Risk Management Is Broken

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### Supply chain risk management is broken

- We are short sighted - we only recall most recent disruption
- Most only consider known risks... And we do that poorly (C19 was predictable - SARS, AIDS, MERS, Avian Bird Flu, Swine Flu)
- Scenario planning helps. But sometimes we don't want to know what might happen...
- And we focus on sources of risk, not outcomes
- Resilience measurements are lacking
  - If score, SCRAM, SPICE, Financial health - all limited in scope
  - Resilience not seen as a growth enabler
  - Cost of lost franchise not considered
- The process for investing in resilience is disconnected
  - Not connected to capital budgeting, daily operational decision making
  - It needs to consider impact on the franchise - value at risk useful
  - Expected value and scenario assessments are primary methods for identifying funding levels
- Tradeoffs poorly defined for different options to achieve resilience
  - Through responsiveness or robustness?
  - At which stages of the supply chain?

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### Some Solutions

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### Some Solutions

- Resilient S&OP
- Resilience Investment Level (RIL) Setting
- Scenario Analysis to Select Mitigation Policies
- Visualizations
- Redesigned Supply Chains

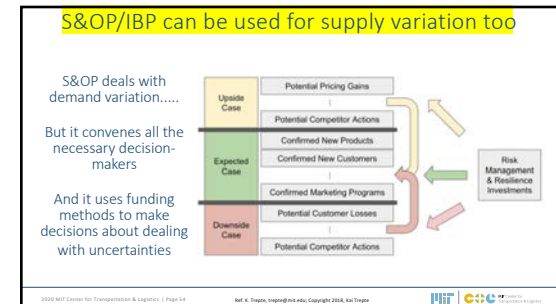
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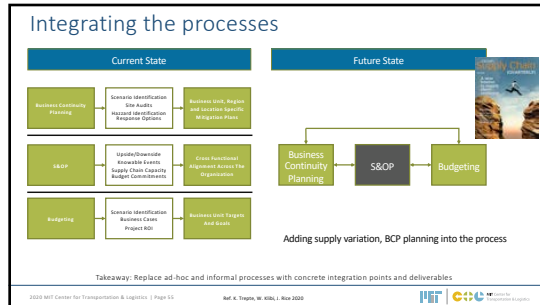
### Resilient S&OP

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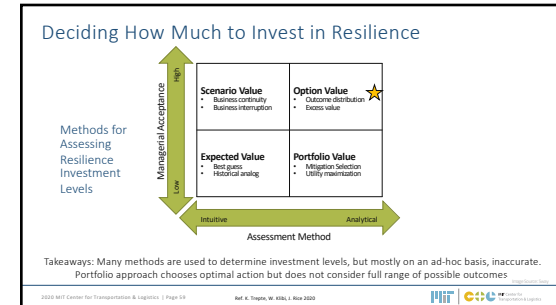
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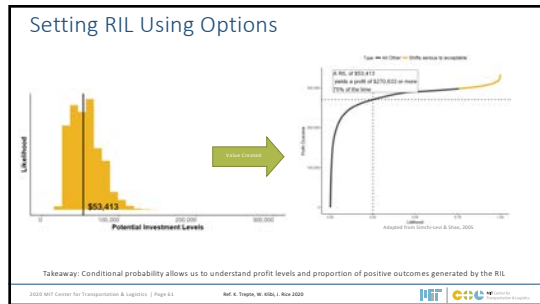
### Resilience Investment Levels (RIL): Deciding How Much to Invest in Resilience

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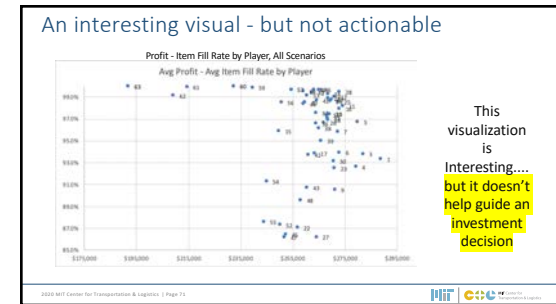


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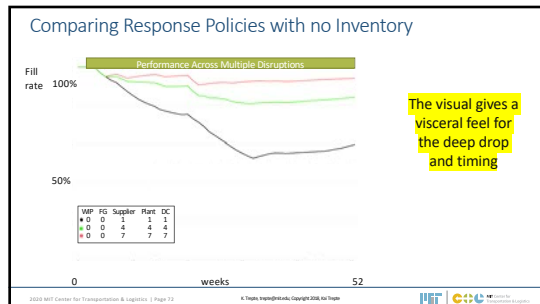
### Visualizations Change Decision-Maker's Perspective

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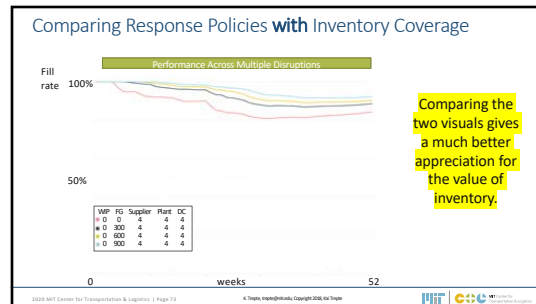
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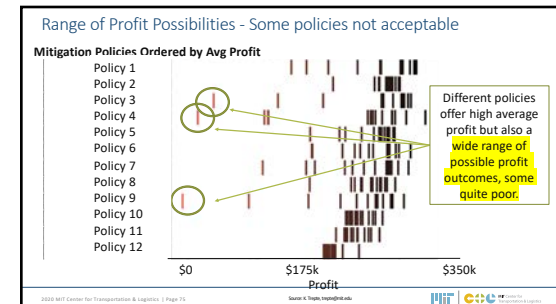
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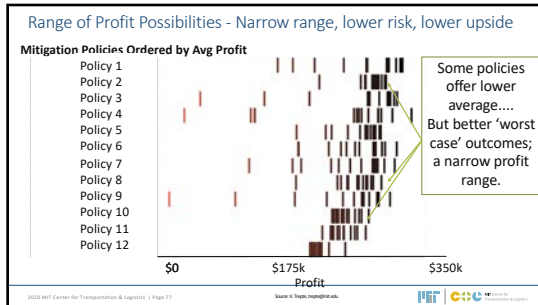
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Redesigned Supply Chains

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New Supply Chain Designs

These supply chain designs are not really new, just like old fashions that come back in style

- Fear of dependency on one regional source (e.g. China)
  - Shift towards regional/local supply chains
  - Building in additional sources outside of the region
- Recognition for the need to increasingly be able to change
  - Will companies redesign their operations away from fixed automation towards reconfigurable ops
  - E.g. 'My Pillow' shifted from making pillows to masks, 3-day change-over
  - E.g. Auto OEMs shifted towards making some ventilators.....

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Will you be a hero?

Thank you.....Questions, Comments?

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