

# #SMARTer Together

## Webinar Series





# **Enabling Together Smarter Pandemic Supply Chain Readiness and Response**

**Professor Benoit Montreuil**



# Presenting Teamwork

- Turgay Ayer
- Frederick Benaben
- Natasha Boland
- Tim Brown
- Rachel Cummings
- Mathieu Dahan
- Alan Erera
- Markus Gerschberger
- Swati Gupta
- Pinar Keskinocak
- Anton Kleyweigt
- Matthieu Luras
- Nancey Leigh
- Leon McGinnis
- Benoit Montreuil
- Edwin Romeijn
- Martin Savelsbergh
- Nicoleta Serban
- Lauren Steimle
- Valerie Thomas
- Alejandro Toriello
- Pascal Van Hentenryck
- He Wang
- Chip White
- Yao Xie
- Enlu Zhou



# Impacting Pandemic Life Cycle and Mitigating its Toll on Society and Economy

## Medico-Pharmaceutical Innovation



## Socio-Sanitary Performance



## Political Governance



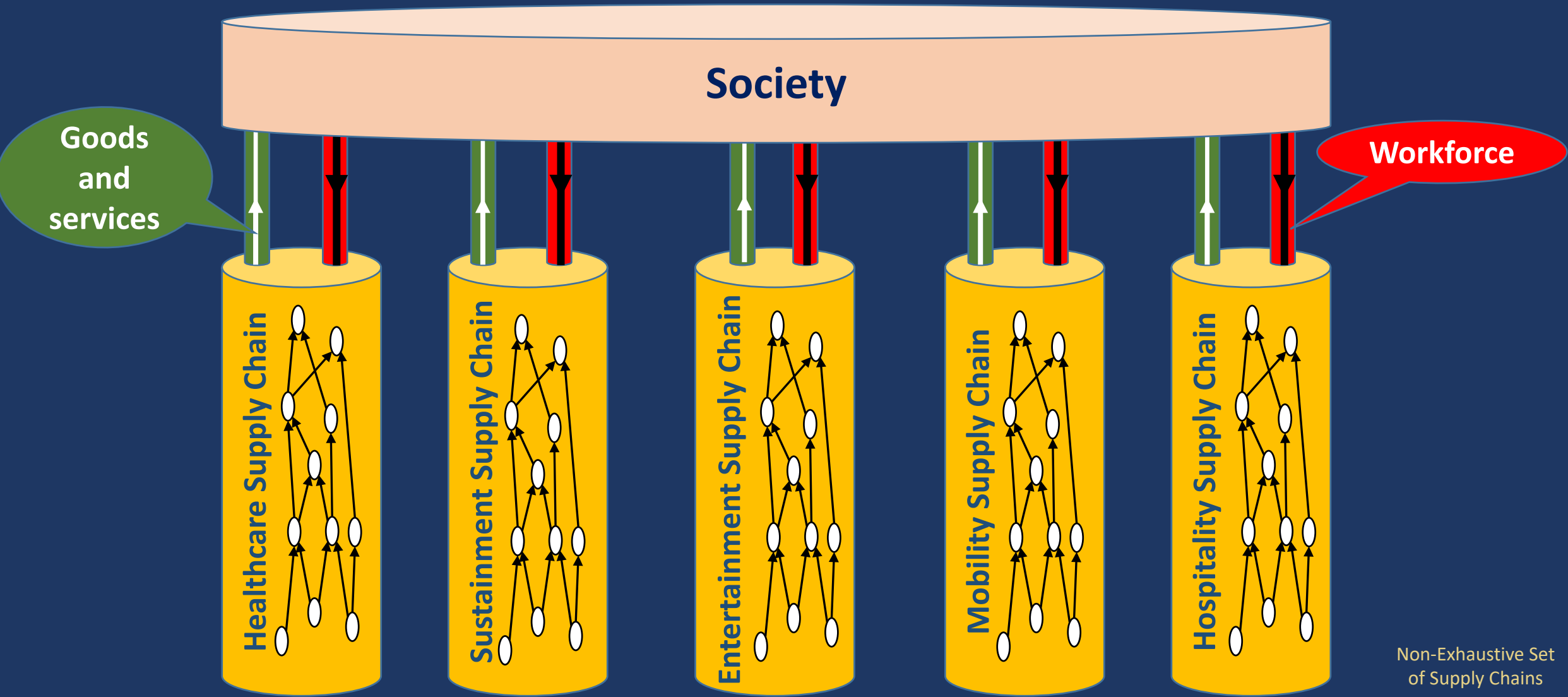
## Collective People Behavior



## Supply Chain Performance



# Society Provides Workforce to Supply Chains That Fulfill its Demands



Non-Exhaustive Set  
of Supply Chains

# Key Pandemic Roles of the World's Supply Chains



Support *Healthcare* efforts to fight the pandemic,  
facilitating people diagnosis, treatment and vaccination

Enhance *Economic* continuity and recovery capability

Secure population's *Life* quality

Facilitate *Political* measures,  
notably for mitigation and containment

## Supply Chain Readiness

Ensuring that the world's supply chain is well poised to effectively, efficiently, equitably, and persistently respond to pandemic-induced demands and disruptions, whenever a pandemic is to occur in the future



## Supply Chain Response

All live decisions and actions taken to address pandemic-induced demands and disruptions, from early pandemic threat signal to pandemic recovery, so as to achieve goals in line with the four HELP roles



# Pandemic Demand Critical and Essential Products, Components and Materials

Core to fighting  
the pandemic disease

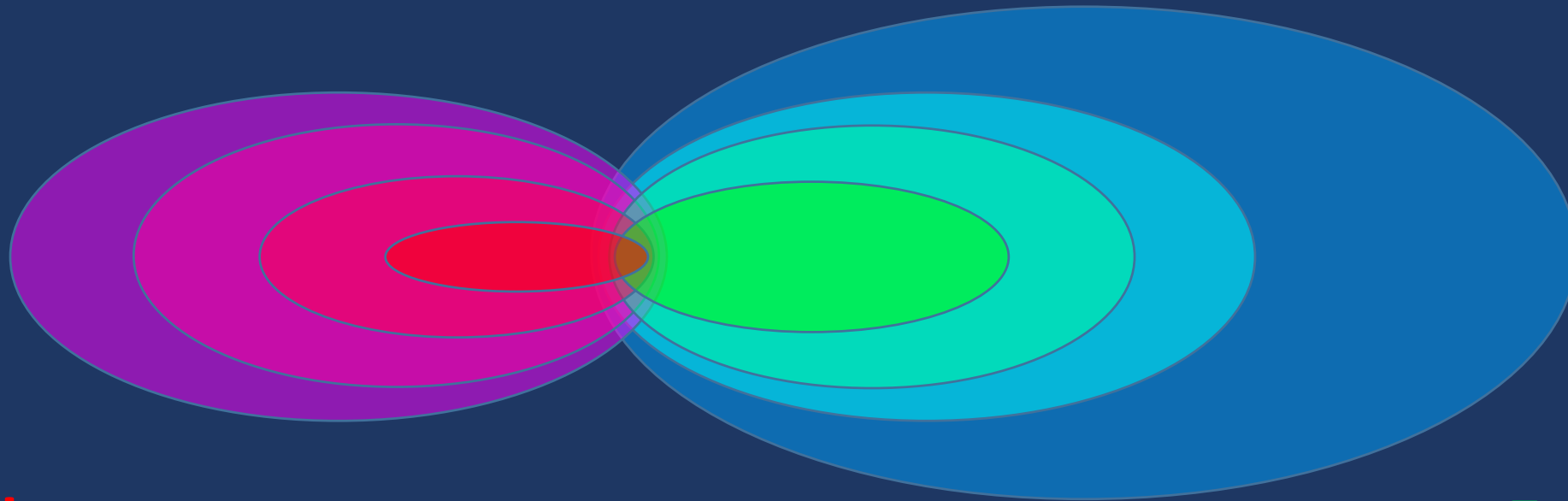


Criticals

Core to society and economy  
survival and continuity



Essentials



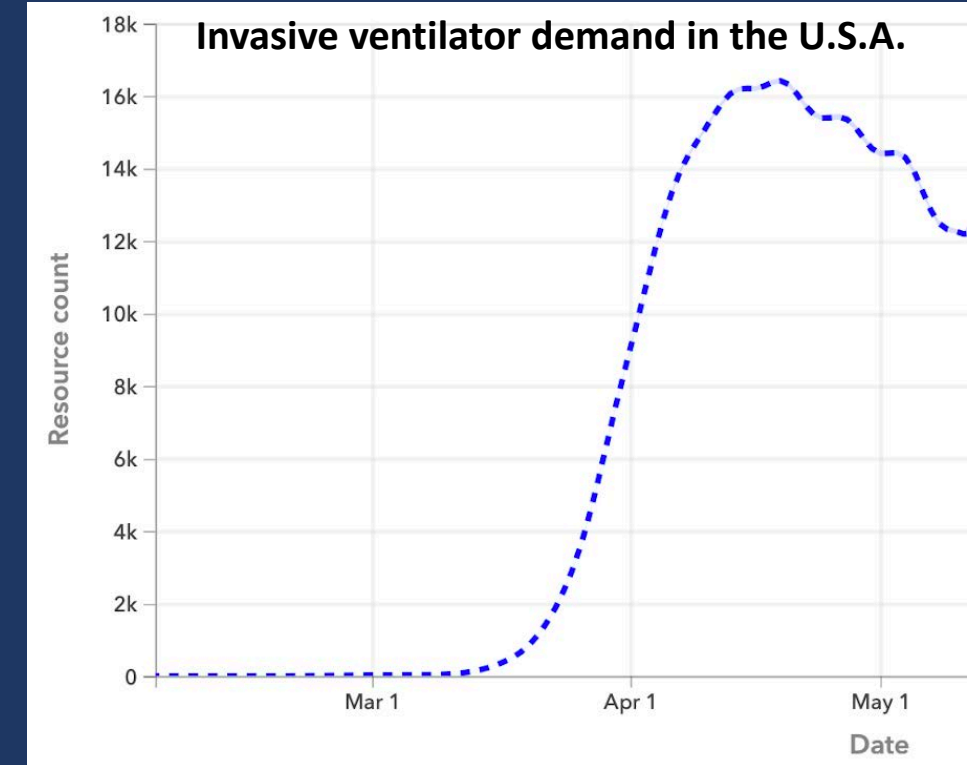
Worldwide set of products and services



# Disruptive Pandemic Demand for Criticals

For the COVID-19 pandemic, there is, as of now:

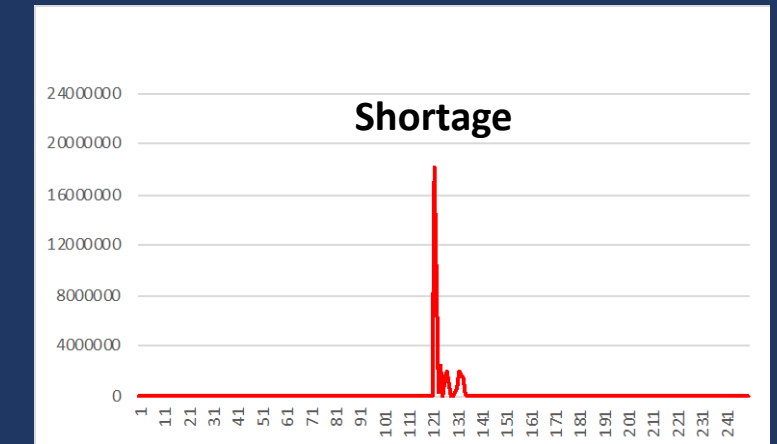
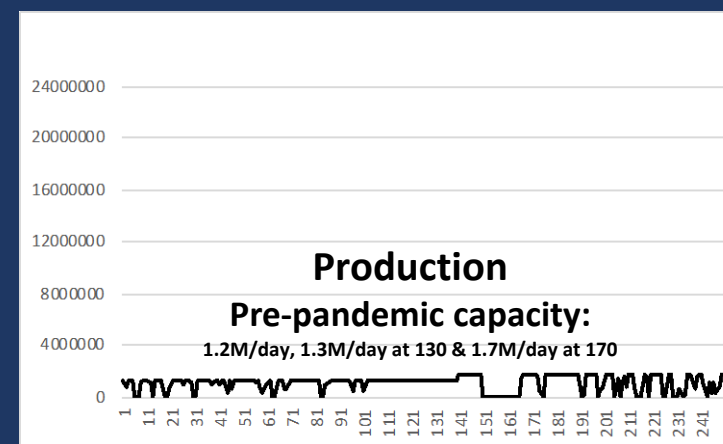
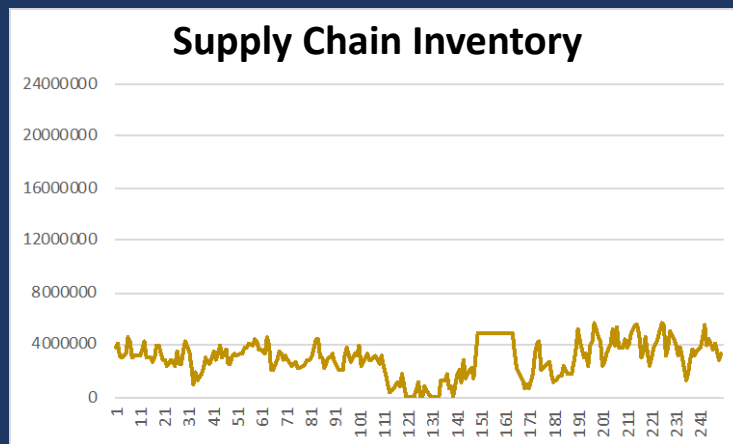
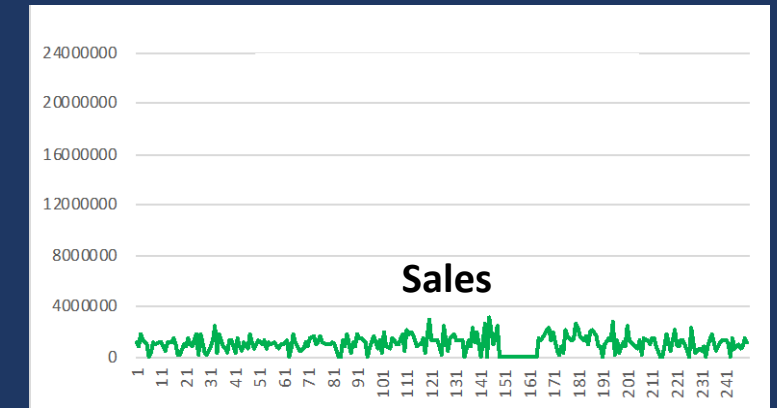
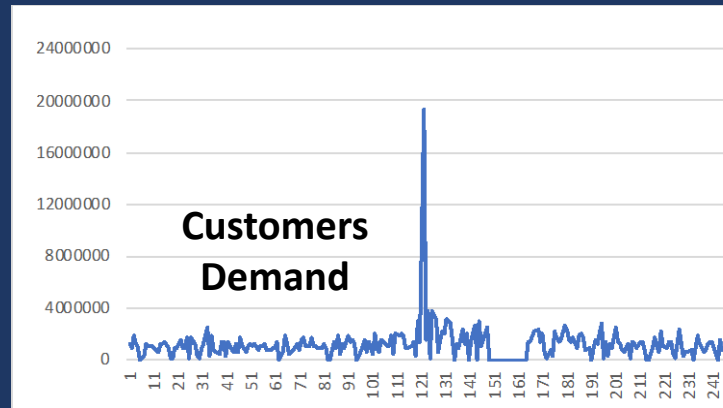
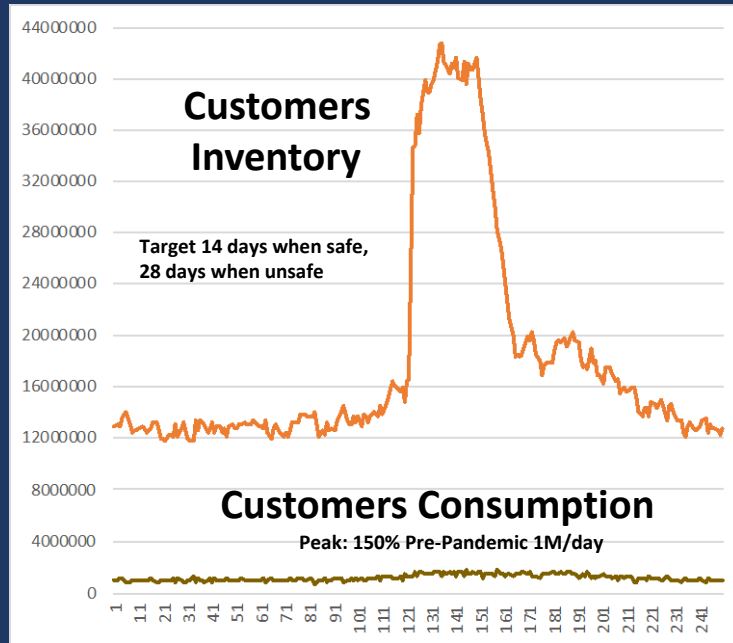
- Unmet demand for over seven billion units of a vaccine that has yet to be discovered, tested, produced, and distributed.
- Very partially met demand for pandemic masks, one per person if reusable, or X per not-isolated person per day if single-usage
- Highest PPE demand during the height of the pandemic and during early recovery
- Demand for PPE inversely related to the availability and exploitation of effective testing kits



**Change in demand type and magnitude occurs dynamically, geographically and over time, as the disease spreads across the globe.**

# Disruptive Pandemic Demand for Essentials

- Consumption of essentials is stable or boosted during pandemic
- Demand is strongly affected by pre-cautious hoarding when mistrust in supply chain persistence



# Pandemic Supply Chain Persistence: A perpetual Endeavour across 5 World States

## Healthy

Localities and people around the world are essentially healthy, yet endure an evolving mix of illnesses, chronic diseases, and endemics;

## Outbreak

Epidemiological threat signals in a locality

## Epidemic

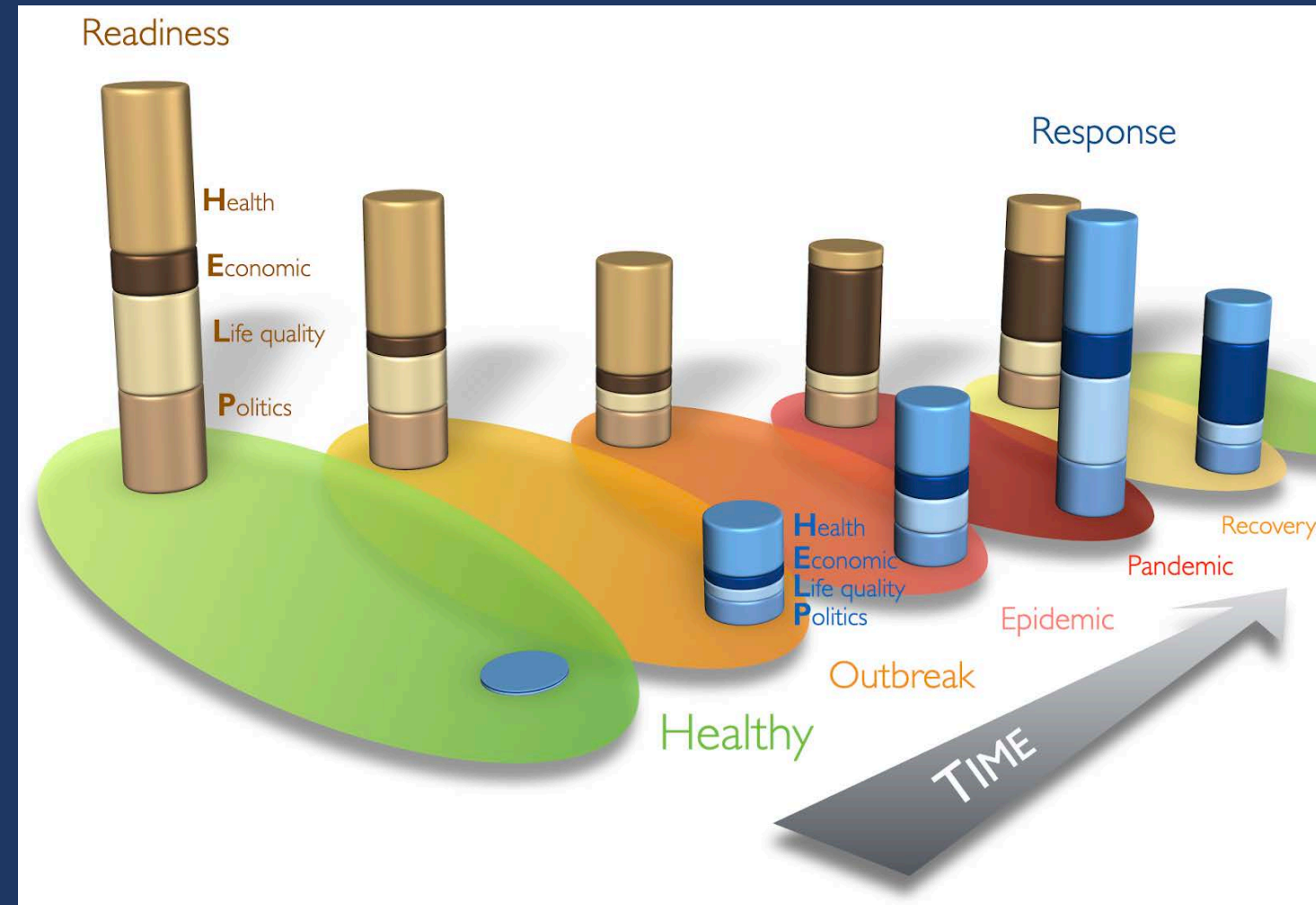
Fast large-scale widespread propagation of disease across regions & countries

## Pandemic

Large-scale worldwide disease propagation

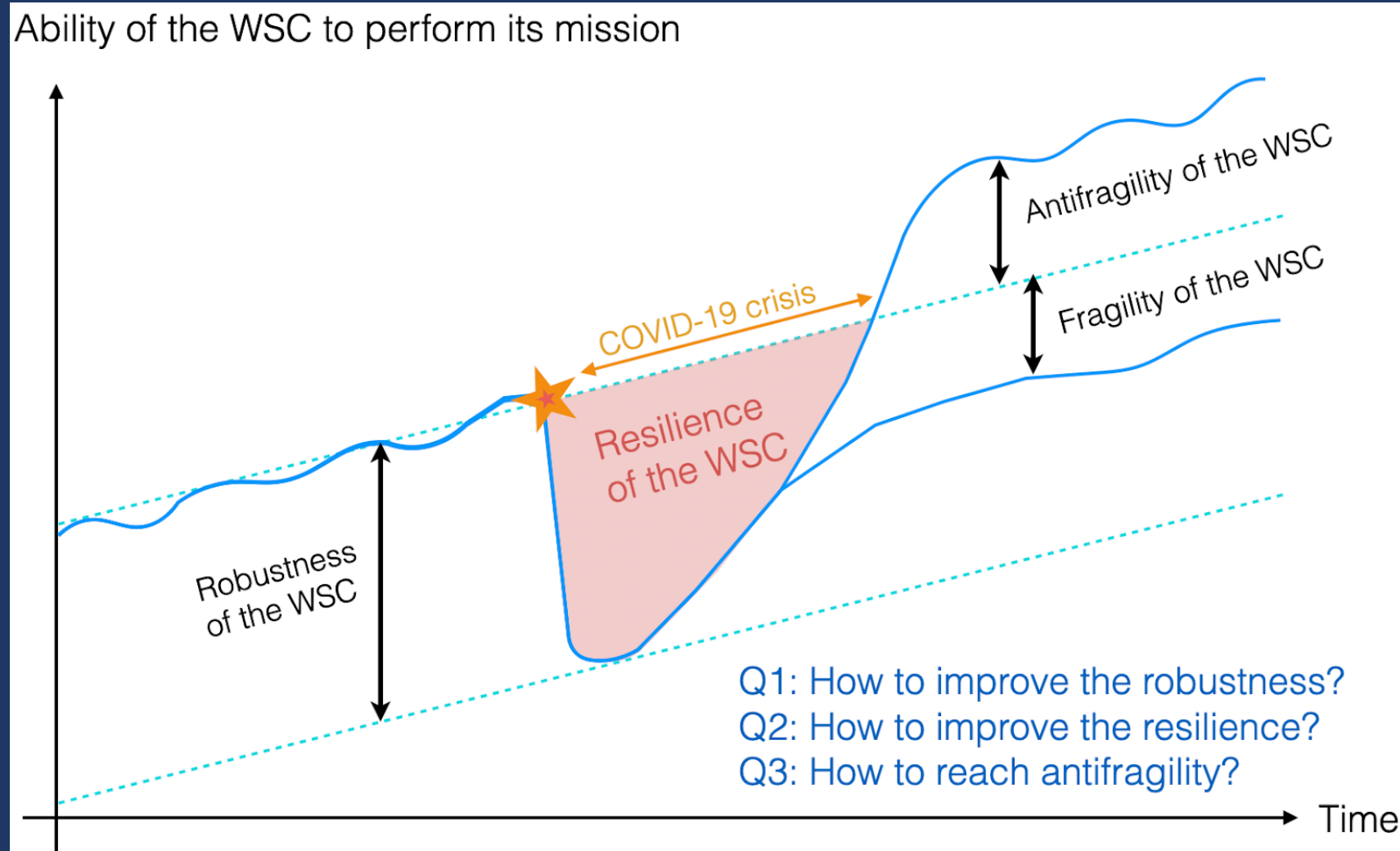
## Recovery

Post-pandemic gradual yet bumpy return toward a healthy state



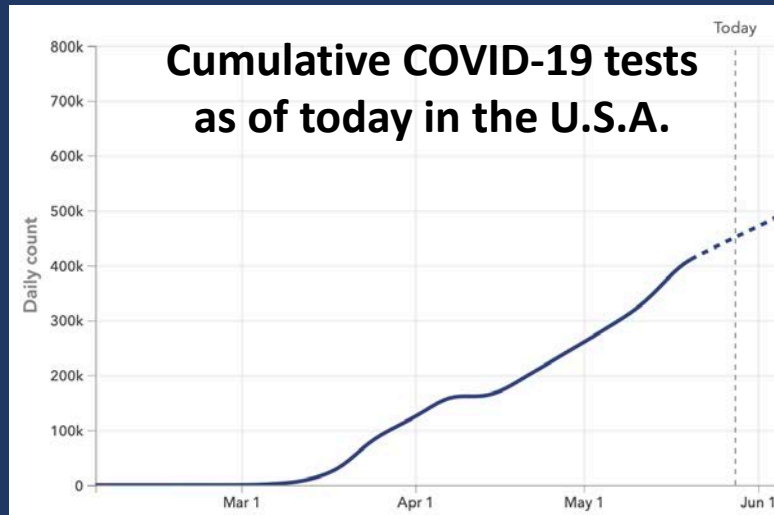


# Robustness, Resilience and Antifragility of Critical & Essential Supply Chains



# Causes of Critical and Essential Supply Chain Disruptions

Inability to scale enough  
to meet demand



Only 0.14% of the US population  
has been tested (once)

Uncertainty forces authorities  
to enforce preventive measures

Disease-affected  
workforce

Measures blocking flow  
of workforce & goods



One Canadian plant had to close,  
with 900+ affected workers: one of two  
plant producing 70% of Canada's beef meat

Domino effect on farmers and the population

# Securing Healthy Critical and Essential Supply Chain Workforce

## Keep Workers Healthy

- Provide PPEs to all workers
- Lay out, equip and operate to minimize disease contagion while being efficient
- Leverage tele-work
- Enforce pandemic protocols and procedures
- Put in place contagion detection and response methods
- Implement rapid-testing when risk is identified
- Exploit contact tracing, disease zone avoidance technologies

## Need Less Workers

- Exploit automation, robotization, augmented reality

## Develop & Leverage Healthy Reserve Workers

Ultimately, every work-capable person should:

- Have a portfolio of supply chain knowledge, skills and experience
- Have mapped roles she/he can take whenever her/his usual role becomes non-critical and non-essential,
- Be connected to a matching optimization platform where supply chain organizations express their need for workers



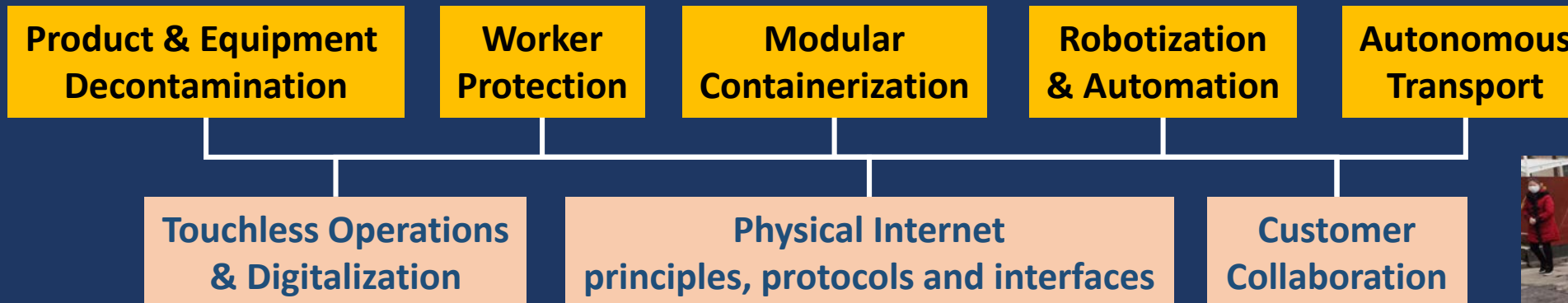


# Enabling Pandemic Vector-Free Logistics

Logistics receives, unpacks, sorts, moves, stores, picks, packs, ships, transports, and delivers goods

At each step, the people, the equipment, the products can become vectors propagating the pandemic

A key challenge is to shift toward vector-free logistics, whereas the overall multi-party logistics system in a large territory, and ultimately all around the world, is designed, engineered, implemented, operated and managed to be vector-free while not being encumbered into inefficiency, rigidity and unsustainability



# Sustaining Transportation of Pandemic Critical and Essential Freight

## Two major challenges

1. The transport system may have to operate with reduced capacity (vehicles and/or hubs)
2. The transportation system has to adjust to and handle huge changes and fluctuations in demand.

### Short haul / last-mile

Shelter-in-place measures induce more home delivery  
Delivery is for small quantities to many different locations  
Fewer opportunities for consolidation  
Need for sizeable numbers of small vehicles

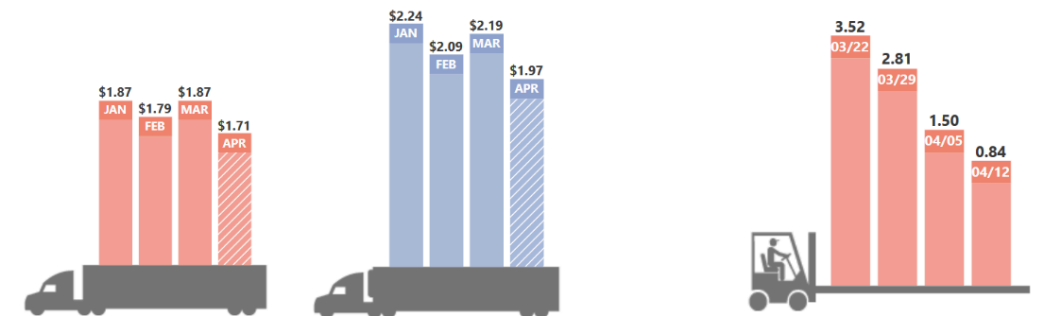
### Long-Haul

Crippling capacity drops induces setting pandemic lanes and hubs and ensuring they will be persistently open  
Passenger aircrafts are repurposed for cargo, adding fast capacity

### International

Crucial to remain active, as few countries can operate more than a few weeks without imports of some essentials and criticals  
The drop in container shipments affects the clockwork lanes and ports

Load-to-Truck Ratio	MAR 2020 VS. MAR 2019	MAR 2020 VS. FEB 2020	APR 2020 VS. MAR 2020
Dry Van	+83.7%	+55.9%	-65.9%
Reefer	+91.1%	+45.3%	-69.4%



National Spot Rates: Dry van (left), Reefer (right)

Load-to-truck Ratio: Dry van

# Enhancing Pandemic Demand Management

## Authoritative Approaches

### Rationing

Limiting each client to a maximum purchasing rate of a product

### Allocation

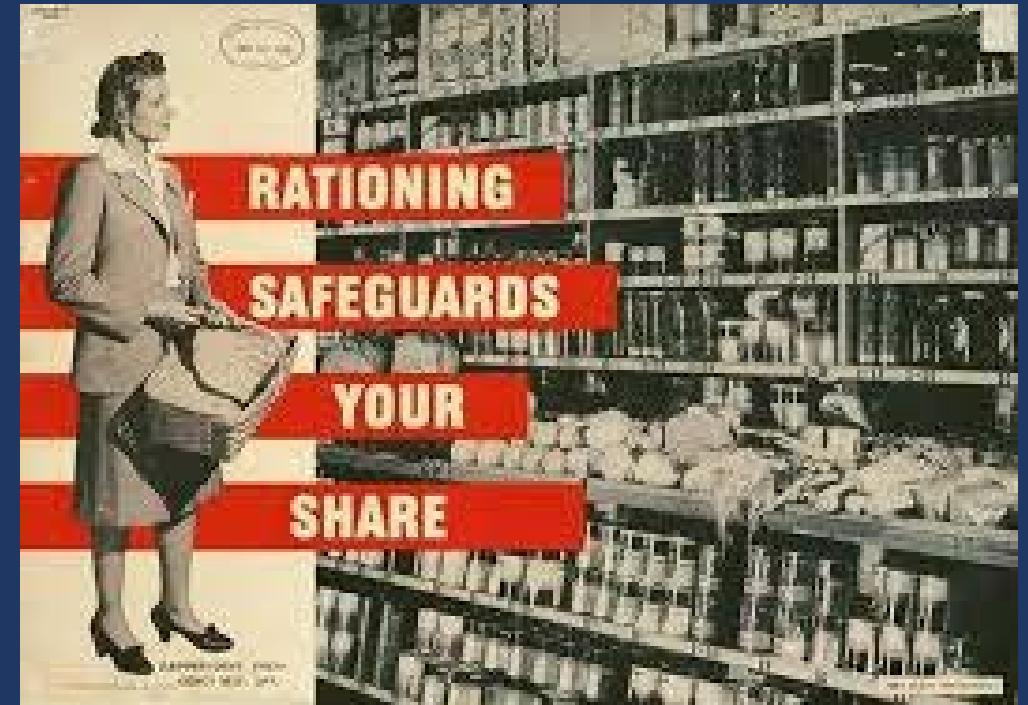
Limiting each store or fulfillment center, to a supply function of its served market

To be done over an entire territory

To be done encompassing multi-companies

To be supported by systems ensuring transparent fairness

To be dynamically managed taking into account product demand & availability





# Enhancing Pandemic Demand Management

## People-Centric Participative Approaches

Supply chain visibility accessible to the population

Easier to find needed products

Proactive in seeking substitutions

Personalized household inventory management tools

Avoid hoarding essentials and criticals unnecessarily

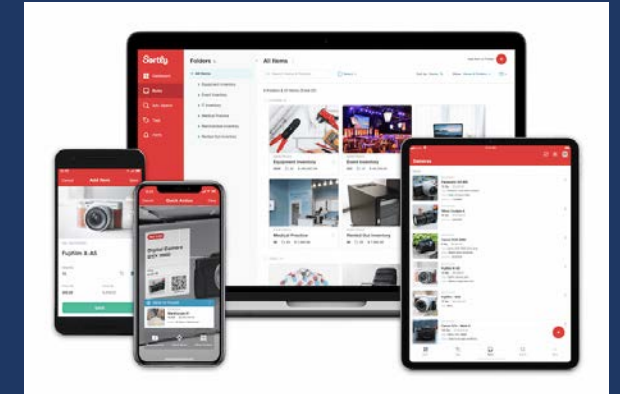
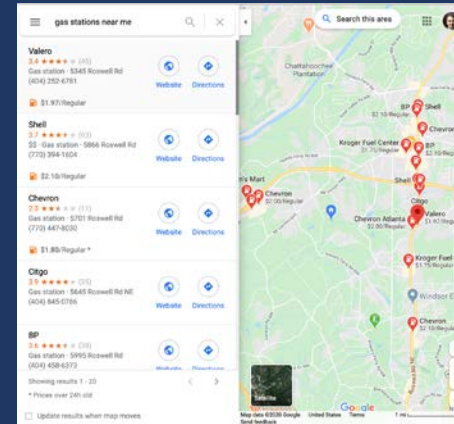
Better planning of needed demand

Automated replenishment from online vendors

Stimulating incentives for people contained at home to self-make products

Improving cooking skills and to experiment with new web sourced recipes

Switch demand from finished products to components and materials



# Pandemic Supply Chain Visibility, Predictive and Prescriptive Modeling



Supply Chain & Logistics Institute  
Physical Internet Center

Provide live, reliable broad-scope, large-scale, deep visibility, prediction and prescription capabilities to essential and critical supply chains

Highly valuable: helps take better decisions, with facts and not only presumptions and argumentations

Complex to set up and maintain

Legislation

Confidentiality, Anonymity, Trustability

Competitive protectionism

Data exchange and repository

Digital system interoperability

Distributed access and interface

Visualization and analytics

Artificial intelligence, Optimization, Simulation Modeling

Readied in advance, should be easy to plug and use



# Pandemic Supply Chain: Autonomy and Availability Mindsets

## Seeking autonomy

How much of the demand can be fulfilled persistently by supply chains contained within the territory, and for how long, through a combination of stockpiled inventory and production capacity?

## Seeking availability

How much of the demand in a territory can be robustly fulfilled, and for how long, by smartly leveraging all reliable worldwide sources capable of producing them and/or providing them from stockpiles, and delivering them reliably

### Ways to enhance both autonomy and availability

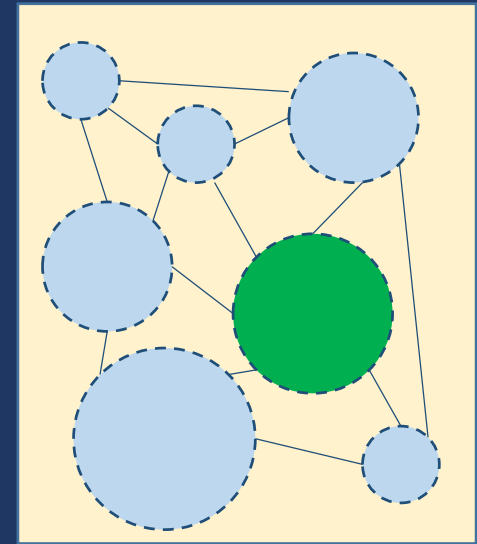
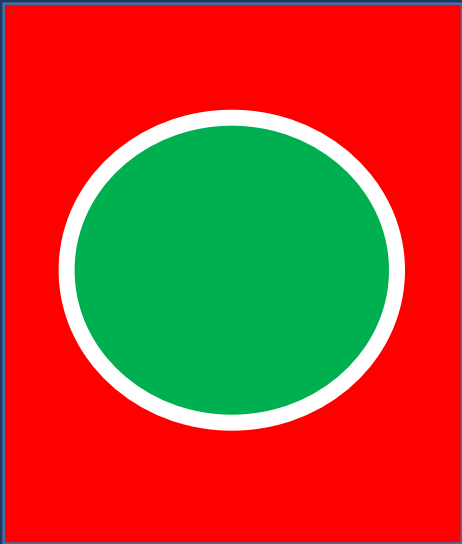
Increase readiness by adding production capacity within the territory and/or buying in advance and stockpiling essential and critical products

Accept satisfactory yet not preferred product substitutions

Encourage and incentivize far greater local production of essential and critical products, near locations where they are to be needed

smart dynamic deployment of critical and essential products within territory

### Smartly balancing autonomy and availability





**Let us open the discussion!**

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