

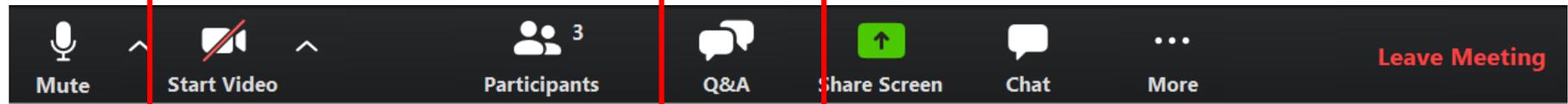
TRANSPORTATION RESEARCH BOARD

# TRB Webinar: The supply chain and COVID-19

**#TRBwebinar**  
**#COVID19**

# Questions and Answers

Please type your questions into your webinar control panel



We will read your questions out loud, and answer as many as time allows

**#TRBwebinar**  
**#COVID19**

# Panelists Presentations

<http://onlinepubs.trb.org/onlinepubs/webinars/200408.pdf>

*After the webinar, you will receive a follow-up email containing a link to the recording*

**Livetweet  
@NASEMTRB**

**#TRBwebinar  
#COVID19**

# Today's Panelists

- Mike Meyer, [mm39prof@gmail.com](mailto:mm39prof@gmail.com)
- Anne Strauss-Wieder, [Strauss-Wieder@njtpa.org](mailto:Strauss-Wieder@njtpa.org)
- Paul Bingham, [Paul.Bingham@ihsmarkit.com](mailto:Paul.Bingham@ihsmarkit.com)

**#TRBwebinar**  
**#COVID19**

# THE SUPPLY CHAIN AND COVID-19

Michael Meyer, WSP, Moderator

- „ *Preparing and Planning for Supply Chain Disruptions: The Supply Chain and COVID-19*, Anne Strauss-Wieder, North Jersey Transportation Planning Authority
  - „ *The Global Supply Chain and COVID-19*, Paul Bingham, IHS Markit
  - „ *Guidance from Freight Transportation Resilience in Response to Supply Chain Disruptions*, NCFRP Report 39. (2019), Michael Meyer, WSP
- 

# COVID-19—Some Introductory Comments

Although there have been disruptions in global supply chains before (such as during world wars), there has been nothing like the impact of COVID-19 .....

- Truly global in nature
- Includes all phases of emergency/disaster response.....anticipating (or planning)/responding/recovering
- Impacts on producers, consumers, and those providing the interaction ---- such as transportation and logistics

## Institute for Supply Management survey on March 11

- Nearly 75% of companies --- supply chain disruptions due to coronavirus-related transportation restrictions.
  - 16% had adjusted revenue targets down by an average of 5.6%.
  - 57% -- longer lead times for tier 1-sourced components from China, with the average lead times more than doubling compared with the end of 2019.
  - 44% do not have a plan in place to address supply disruption from China.
  - 62% of respondents are experiencing delays in receiving orders from China.
  - 53% are having difficulty getting supply chain information from China.
  - 48% are experiencing delays moving goods within China.
  - 46% report delays loading goods at Chinese ports.
- 

“The story the data tells is that companies are faced with a lengthy recovery to normal operations in the wake of the virus outbreak.....For a majority of U.S. businesses, lead times have doubled, and that shortage is compounded by the shortage of air and ocean freight options to move product to the United States — even if they can get orders filled.”



# COVID-19—Some Introductory Comments

- Includes all phases of emergency/disaster response.....anticipating (or planning)/responding/recovering
  - Multiple supply chains----obviously medical supplies and equipment, and food (e.g., toilet paper). However, will clearly affect others as well as supply and demand centers shut down.
  - Includes all aspects of a disruption that is of concern--  
-access to facilities and markets, labor availability and safety, financial impacts, public/private sector interaction, etc.
- 

**Never before have supply chains been so much in the public eye.**

**Headlines.....**

“The Modern Supply Chain Is Snapping; The coronavirus exposes the fragility of an economy built on outsourcing and just-in-time inventory”

“Coronavirus Is a Wake-Up Call for Supply Chain Management”

“Coronavirus has disrupted supply chains for nearly 75% of U.S. companies”

“Global airline carriers, including United, Delta and American, have suspended flights and cut down on routes. And some of the world's busiest airports have turned into ghost towns.”

“Small businesses in hard-hit areas like Seattle are reporting a drop in customers as big tech companies tell their employees to stay home. Others are facing dwindling inventory with less good shipping from China.”

“With Coronavirus, Disruptions to U.S. Energy Storage Supply Chain Come Home”

## Some Questions....

- How has the supply chain industry responded to past disruptions?
  - How are supply chain and logistics managers responding to disruptions from COVID-19?
  - What are some lessons learned from past disruptions and best practices for a resilient supply chain?
  - Your questions
- 

# Presentations

- „ *Preparing and Planning for Supply Chain Disruptions: The Supply Chain and COVID-19*, Anne Strauss-Wieder, North Jersey Transportation Planning Authority
  - „ *The Global Supply Chain and COVID-19*, Paul Bingham, IHS Markit
  - „ *Guidance from Freight Transportation Resilience in Response to Supply Chain Disruptions*, NCFRP Report 39. (2019), Michael Meyer, WSP
- 

# Preparing and Responding for Supply Chain Disruptions

The Supply Chain and COVID-19

TRB Webinar

April 8, 2020



Anne Strauss-Wieder  
Director, Freight Planning  
North Jersey Transportation Planning Authority



# What are Supply Chains?

How goods move starting from materials sourcing to where production occurs and then to where they are consumed.

*Business continuity refers to the capacity to continue to delivery products or services after a disruptive event.*



# Freight Movement Activities

Activities	Definitions and Examples
Physical Flows	<ul style="list-style-type: none"><li>• Any physical activity directly needed for freight movement</li><li>• Vessels, terminals, railroads, trucks, pipelines, aircraft, warehouses and distribution centers</li></ul>
Communication & Information Flows	<ul style="list-style-type: none"><li>• Any information and transactional exchange needed for freight movement</li><li>• Bills of lading, financial flows, customer notifications, delivery appointments, warehouse management systems, inter-agency communications, etc.</li></ul>
Regulatory Considerations	<ul style="list-style-type: none"><li>• Any gov't regulations, rules, and agency activities needed for or shaping freight movement</li><li>• USCG, CBP, truck driver credentials, Jones Act</li></ul>

# The Disruption Spectrum

**Planned  
Disruptions**

**Predictable  
Disruptions**

**Rapid  
Disruptions**

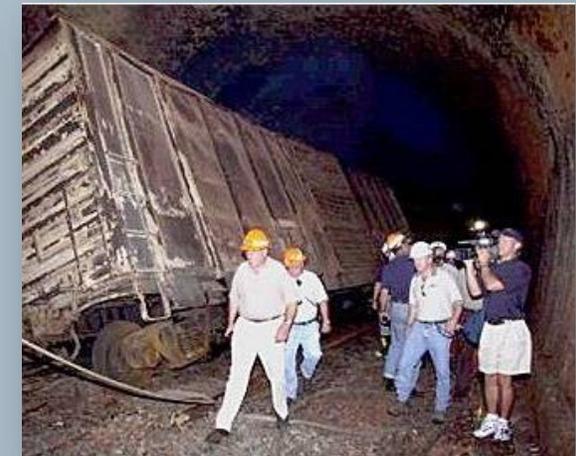
**Abrupt  
Disruptions**

**Columbia  
River Closure**

**Winter  
Weather,  
Labor Actions**

**Hurricane Katrina,  
Superstorm Sandy**

**9/11, Howard Street  
Tunnel Fire, 2017  
Maersk Cyberattack**



# Supply Chain Disruption: Superstorm Sandy

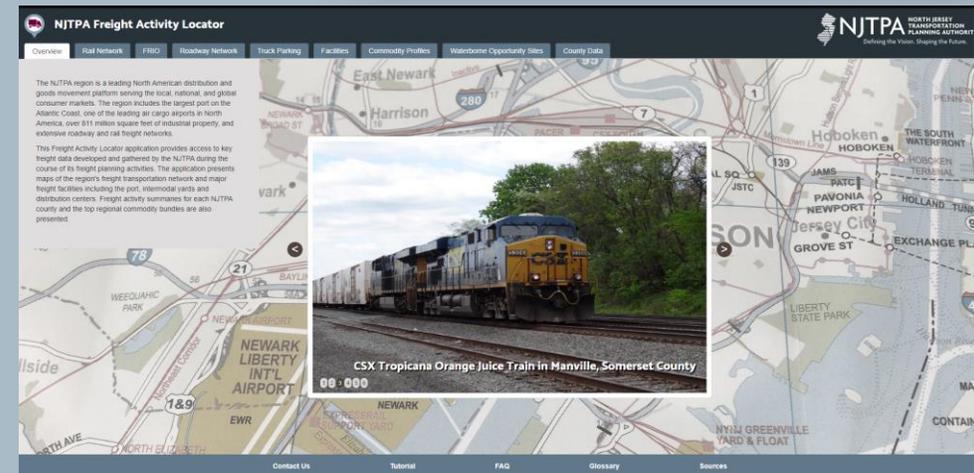
Characteristics	Superstorm Sandy
Geographical Scope Affected	<ul style="list-style-type: none"> <li>• Extensive – the entire East Coast</li> <li>• At landfall – the New York-New Jersey Region</li> </ul>
Freight Facilities Affected	<ul style="list-style-type: none"> <li>• All</li> <li>• Ports closed along the East Coast in the storm’s path</li> <li>• Railroads, trucking lines, airports and air cargo, pipelines (power outages, flooding, damage)</li> </ul>
Commodities and Shipments Affected	<ul style="list-style-type: none"> <li>• Occurred during peak delivery week</li> <li>• Multiple commodities and shipments affected</li> </ul>
Recovery Time from Disruption	<ul style="list-style-type: none"> <li>• Port of New York-New Jersey closed for nearly a week</li> <li>• Physical repairs to facilities took years</li> </ul>

# NJTPA Freight Initiatives

- NJTPA Freight Initiatives Committee
- Freight Rail Industrial Opportunity Corridors Program
- Goods Movement Strategies for Communities
- Truck Parking
- Freight Concept Development Program
- Subregion Outreach and Field Visits
- Member, MAP Forum
- Member of the Council on Port Performance



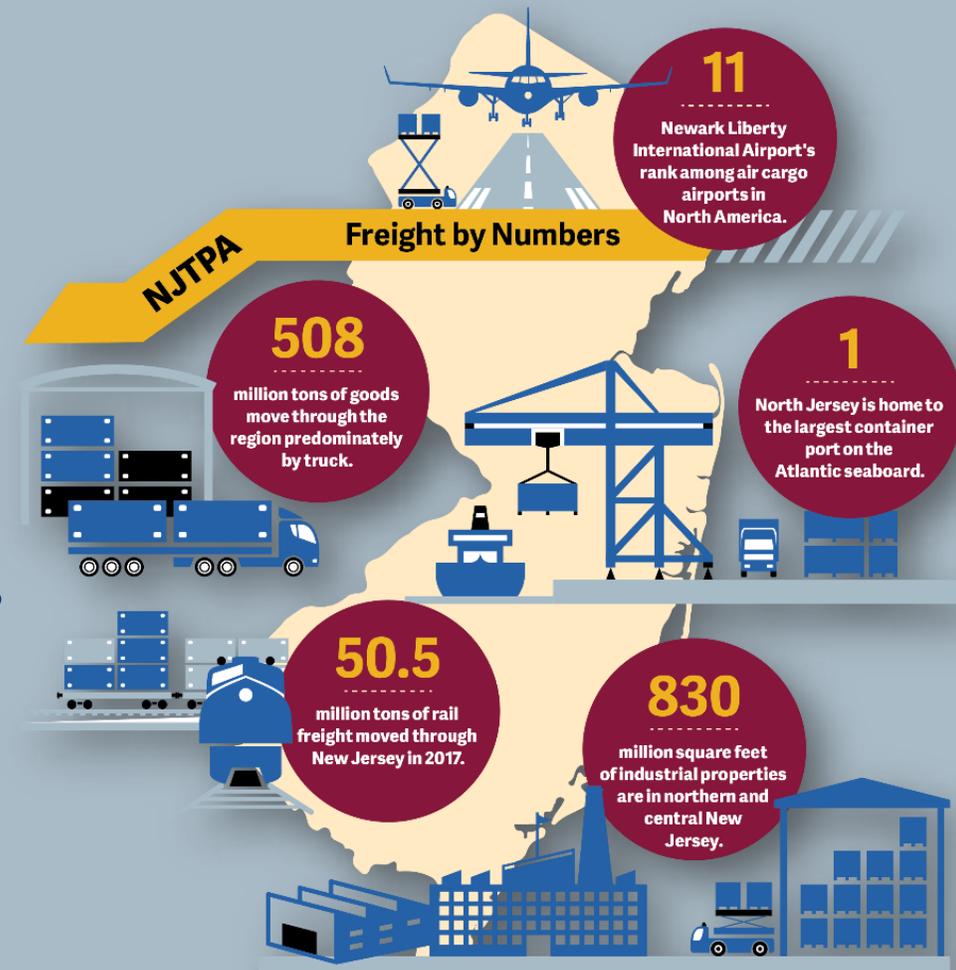
Learn more at [www.njtpa.org/freight](http://www.njtpa.org/freight)



# New Jersey: The Supply Chain State

- Over 500,000 workers employed in transportation, logistics and distribution
- Over 1 billion SF of industrial space
  - 830 million SF in NJTPA region, with over 10 million under construction
- Largest Port on the East Coast – nearly 7.5 million TEUs in 2019
- Robust Rail Freight Network –
- Extensive Roadway Network

2 Class



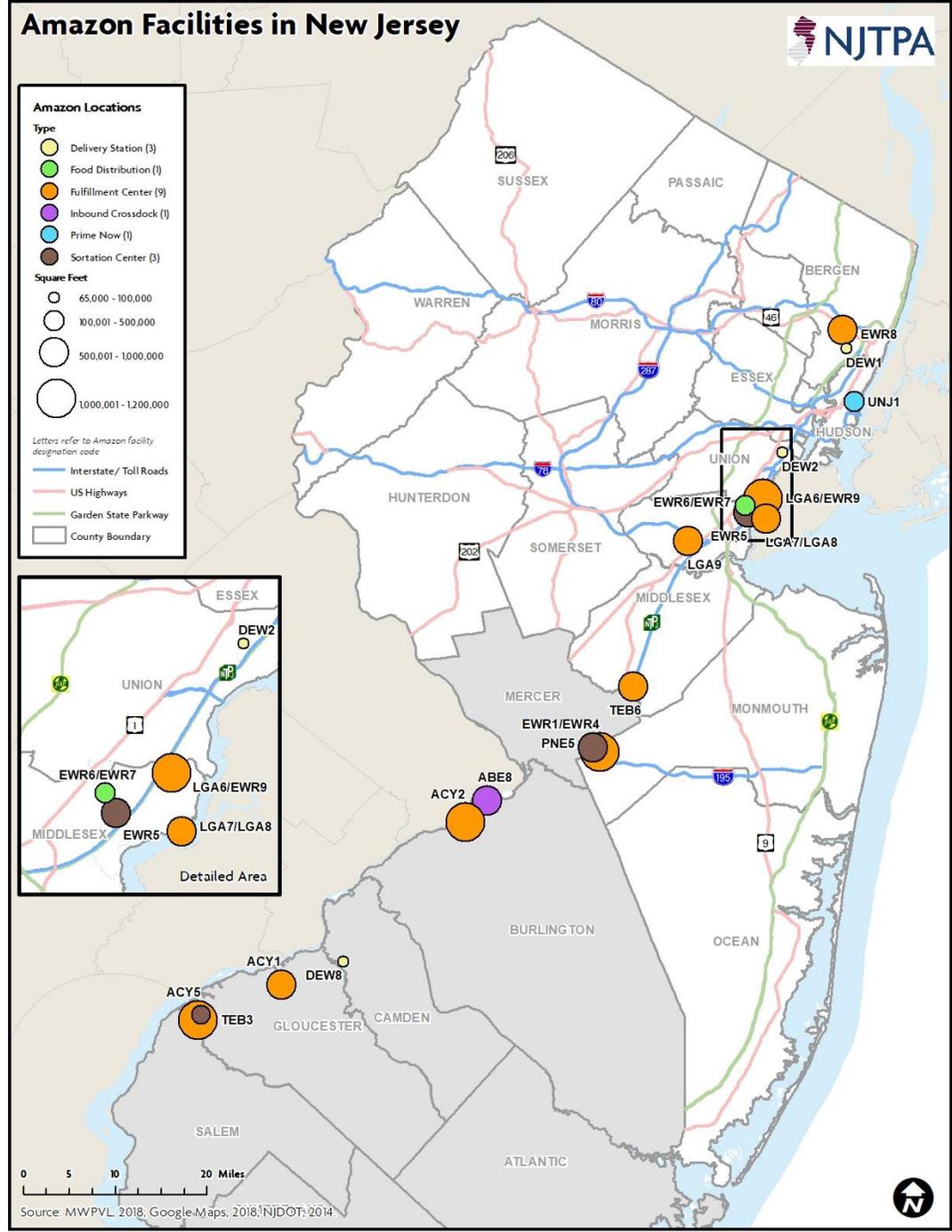
# Example of Evolving Supply Chains: Ecommerce

18 facilities in NJ:

- 9 fulfillment centers (four over 1M sq ft)
- 3 sortation facilities
- 1 food distribution facility complex
- 3 delivery stations
- 1 inbound cross dock
- 1 Amazon Prime Now (one hour delivery service)



Source: Google Maps.



# Focus on Immediate Needs First

- Ensure key supplies continue to flow for area residents and critical businesses.
- Build on existing relationships, collaborations and knowledge.
- Identify the range of resident and business needs.
- Understand and address the multi-state considerations and issues.
- Communicate frequently and concisely.



# Community and Business Supply Chain Considerations

- Consider all freight elements in the critical supply chains:
  - Long distance movements
  - Movements between facilities
  - Last mile movements
- Factor in the varying needs within critical supply chains:
  - Example: Food program recipients
- Bring together public and private partners and experts to quickly identify and address needs and issues.
- Communicate precisely and consistently.

# Supply Chain and Freight Operational Considerations

- Ensure facilities needed for continual operations remain in place
  - Example: Truck rest areas
- Identify and address current and potential bottlenecks
  - Example: Can businesses receive shipments already in process?
- Address workforce needs
  - Clearly identify critical workforce members
  - Ensure a deep bench of workers
  - Keep your workers safe

# Getting Key Information Out

## STATE OF NEW JERSEY COVID-19 JOBS AND HIRING PORTAL

The State of New Jersey has developed a centralized resource to match talent with opportunities in industries on the front lines of serving New Jerseyans during the outbreak. Did you lose your job or have your hours reduced as a result of COVID-19? Businesses across New Jersey need thousands of workers for immediate hire. Learn more about who is hiring in your community. Employers in critical industries should submit information about openings with urgent hiring needs related to COVID19 at [jobs.covid19.nj.gov/intake](https://jobs.covid19.nj.gov/intake).

 <b>Amazon</b> SHIPPING, LOGISTICS AND TRANSPORTATION	 <b>UPS</b> SHIPPING, LOGISTICS AND TRANSPORTATION	 <b>Shop-Rite</b> GROCERY STORES AND FOOD DELIVERY
<b>Locations</b> Avenel Bellmawr Burlington Carteret Cherry Hill Closter Cranbury Edison Logan Township Marlton Moonachie Princeton Robbinsville West Deptford	<b>Locations</b> Bound Brook Edison Mount Olive Parsippany Saddlebrook Secaucus South Brunswick	<b>Locations</b> 145 locations across New Jersey see full list at <a href="https://shop.shoprite.com/Store-Locator">https://shop.shoprite.com/Store-Locator</a>
<b>Positions</b> Warehouse Team Member, Shopper Team Member	<b>Positions</b> Package Handler - Various part-time shifts starting from 10AM until 11PM	<b>Positions</b> Priority positions are Grocery Clerk Cashier Health and Beauty Clerk Dairy Clerk Nonfoods Clerk Produce Clerk
<b>Approximate Number of Jobs</b> 1,696 across all sites in NJ	<b>Approximate Number of Jobs</b> 1,450 estimated - average of 10 per store	<b>Approximate Number of Jobs</b> 1,450 estimated - average of 10 per store
<b>Shifts</b> <b>Wages</b>		<b>Requirements</b>

 North Jersey Transportation Planning Authority (NJTPA) ...  
March 24 at 8:21 AM · 🌐

Looking for employment? Logistics and transportation companies and supermarkets are hiring. The state has launched a dedicated website with available positions: [jobs.covid19.nj.gov](https://jobs.covid19.nj.gov)

### STATE OF NEW JERSEY COVID-19 JOBS AND HIRING PORTAL

The State of New Jersey has developed a centralized resource to match talent with opportunities in industries on the front lines of serving New Jerseyans during the outbreak. Did you lose your job or have your hours reduced as a result of COVID-19? Businesses across New Jersey need thousands of workers for immediate hire. Learn more about who is hiring in your community. Employers in critical industries should submit information about openings with urgent hiring needs related to COVID19 at [jobs.covid19.nj.gov/intake](https://jobs.covid19.nj.gov/intake).

 <b>Amazon</b> SHIPPING, LOGISTICS AND TRANSPORTATION	 <b>UPS</b> SHIPPING, LOGISTICS AND TRANSPORTATION	 <b>Shop-Rite</b> GROCERY STORES AND FOOD DELIVERY
<b>Locations</b> Avenel Bellmawr Burlington Carteret Cherry Hill Closter Cranbury Edison Logan Township Marlton Moonachie Princeton Robbinsville West Deptford	<b>Locations</b> Bound Brook Edison Mount Olive Parsippany Saddlebrook Secaucus South Brunswick	<b>Locations</b> 145 locations across New Jersey see full list at <a href="https://shop.shoprite.com/Store-Locator">https://shop.shoprite.com/Store-Locator</a>
<b>Positions</b> Warehouse Team Member, Shopper Team Member	<b>Positions</b> Package Handler - Various part-time shifts starting from 10AM until 11PM	<b>Positions</b> Priority positions are Grocery Clerk Cashier Health and Beauty Clerk Dairy Clerk Nonfoods Clerk Produce Clerk
<b>Approximate Number of Jobs</b> 1,696 across all sites in NJ	<b>Approximate Number of Jobs</b> 1,450 estimated - average of 10 per store	<b>Approximate Number of Jobs</b> 1,450 estimated - average of 10 per store
<b>Shifts</b> <b>Wages</b>		<b>Requirements</b>

**Governor Phil Murphy** ✓  
March 23 at 12:28 PM · 🌐

NEW: Businesses across New Jersey are looking to hire THOUSANDS OF WORKERS, including those who lost their jobs or have had hours reduced as a result of #COVID1... See More



# Takeaways

- Identify potential risks, consequences and mitigation strategies.
- Build on existing relationships & expertise.
- Manage and respond quickly and adapt when the unexpected happens.
- Use visibility, flexibility, collaboration and control.
- Keep the communications flowing.
- Consider long-term business and community continuity.



# Thank You



*Defining the Vision. Shaping the Future.*



# NJTPA

**NORTH JERSEY  
TRANSPORTATION  
PLANNING AUTHORITY**

**Anne Strauss-Wieder**

Director, Freight Planning

(973) 639-8404

Strauss-Wieder@njtpa.org

**Transportation Research Board**  
**Webinar**

---

**The Supply Chain and COVID-19**

---

April 8, 2020

**Paul Bingham**

[paul.bingham@ihsmarkit.com](mailto:paul.bingham@ihsmarkit.com)



## At 1.3 million COVID-19 cases worldwide (April 6), a historic pandemic

### Key impact outlook assumptions

- Global spread of the coronavirus pandemic fast became the biggest shock to supply chains since WWII; Peak health impact in 2020 Q2
- **World real GDP growth of -2.6% for 2020**, a “real” recession, on sharp reduction in near-term demand/supply followed by recovery starting 2021
- **U.S. real GDP growth forecast now -5.4% for 2020**
- North America, Asia and Europe all in recession already; Historic job loss

### Key uncertainties

- Forecasting in this environment is extremely difficult
- This historic disruption to trade and freight likely to be greatest across the next 6-9 months, on all continents. Supply & demand down record levels.
- Forecast risks are overwhelmingly on the downside & depend on how governments respond (health / containment / economic relief and stimulus)

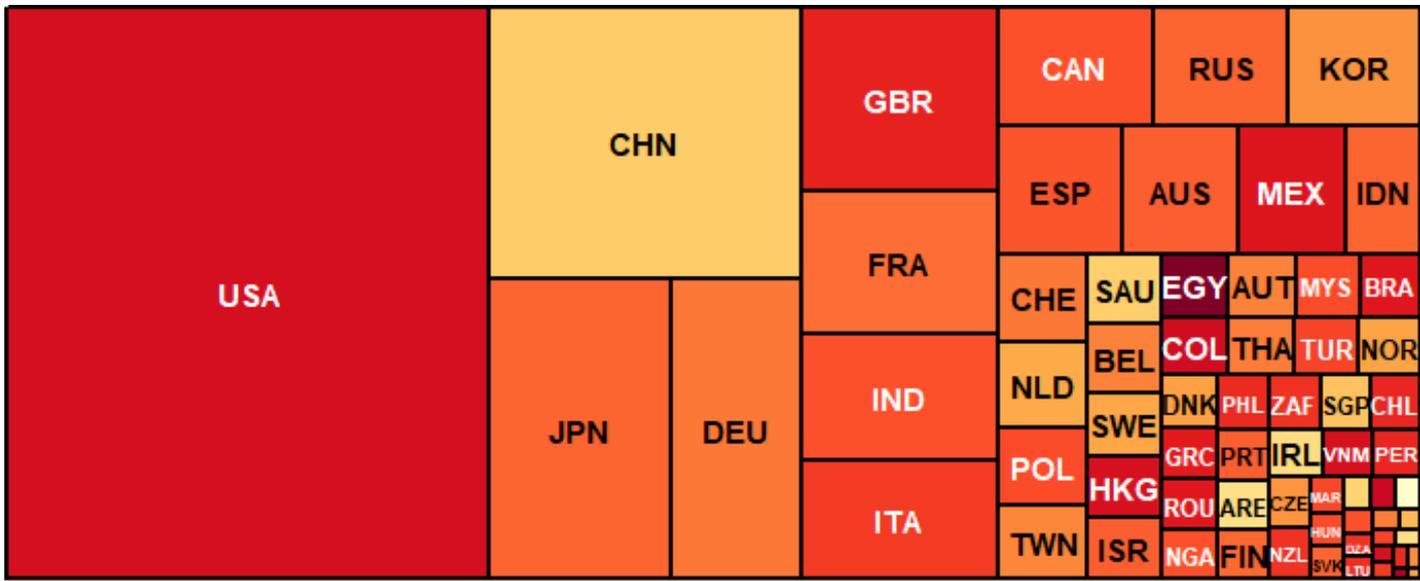
Source: IHS Markit Economics and Country Risk

## Global 2020 recession outlook worse than Great Recession in 2009; Recovery in 2021 with pent-up demand and government stimulus



# Supply chain impacts more severe in countries such as #1 USA where household consumption accounts for a high share of GDP

Household consumption – amount vs share of GDP



**Reading:**

**Size of rectangle:** total amount of country's domestic household consumption (real USD)

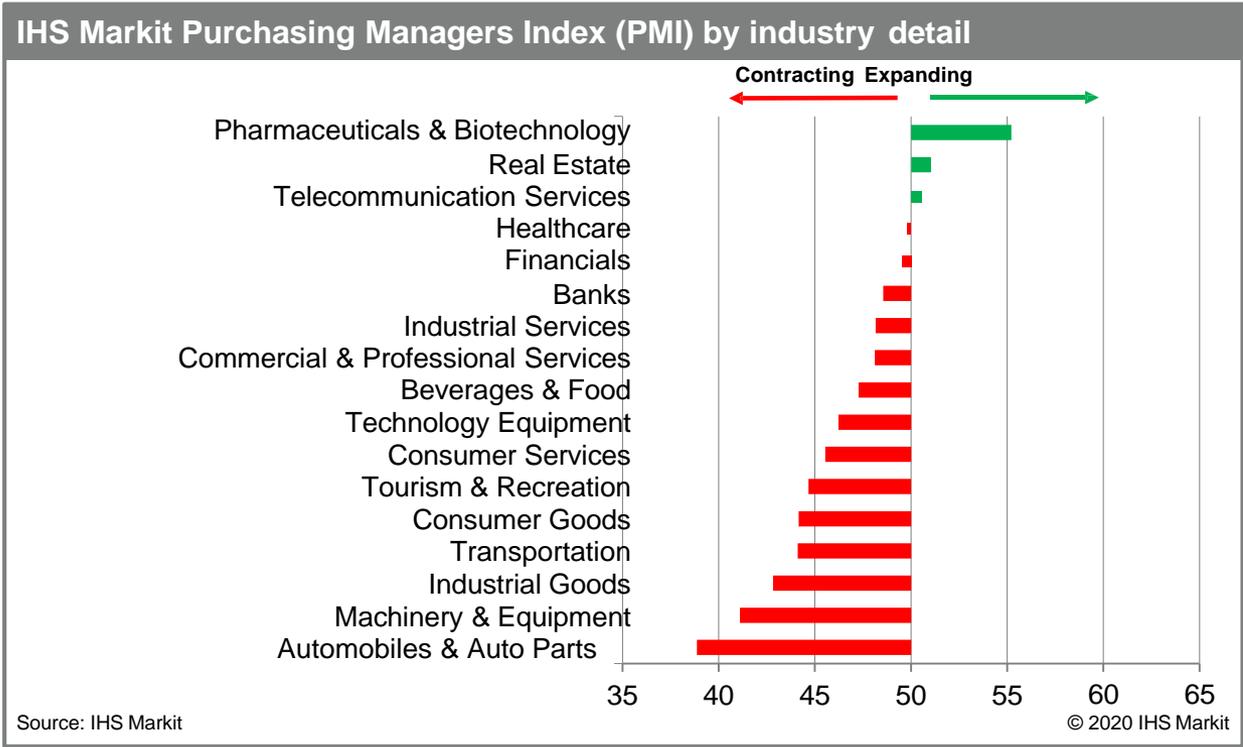
**Color of rectangle:** share of household consumption in country's GDP (100% = 1)

Source: IHS Markit

© 2020 IHS Markit

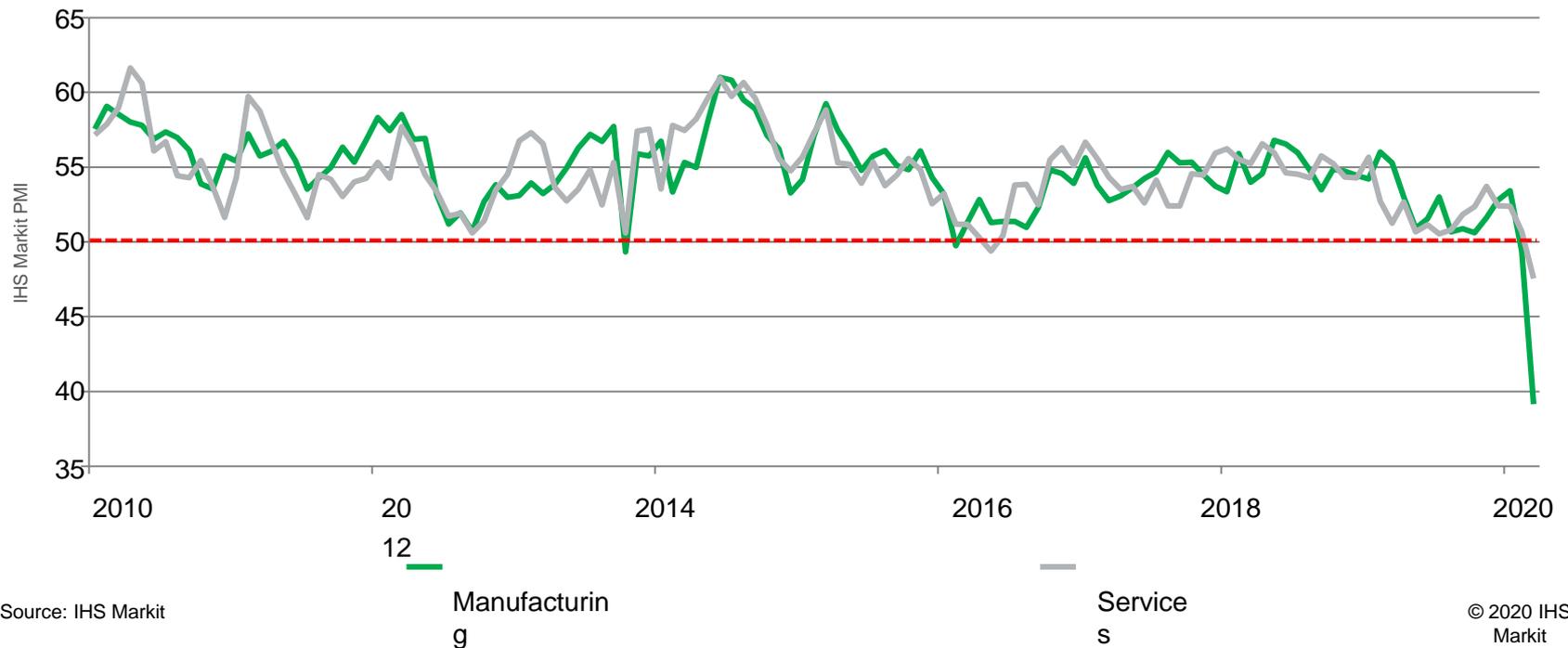
# IHS Markit PMIs® were showing a broad-based decline already in February

## Sharpest contractions in freight-intensive U.S. manufacturing industries



## U.S. recession outlook worse for manufacturing than services

IHS Markit Purchasing Managers Indexes foreshadow steep economic decline (i.e. index below 50)



Source: IHS Markit

Confidential. © 2020 IHS Markit®. All rights reserved.

© 2020 IHS Markit

# World trade decline worst since 2009; Export orders signal worse to come

## Global manufacturing exports



Sources: IHS Markit, CPB World Trade Monitor.

## Ocean container trade down sharply each month in 2020 so far



## Air cargo trade transformed since January

Freighter aircraft capacity / operations increased < 10%

Passenger airline air cargo operating capacity decreased > 75%

- Pre-crisis air cargo shares were about 50% belly / 50% freighters
- Net global change is > 30% reduction in overall air cargo capacity
- China passenger flight cancellations Jan. – Feb. were initially to reduce virus spread
  - side effect was reduced air cargo capacity in mostly widebody aircraft belly space
- Subsequent global reductions in passenger airline flight operations due to sharp drop in demand
- PPE, pharmaceutical and medical device urgent shipments replace pre-crisis air cargo commodity shares of flowers, electronics, fashion and food. **World air cargo volume down 23% in March.**
- With capacity expensive and limited, managers should secure needed space fast and minimize use of air cargo, with integrated carrier (DHL, FedEx, UPS) operations least disrupted so far.



Photo: Amazon

## Divergent freight / trade patterns: Slowing down & Speeding up

Changes in retail and manufacturing demand has split shipment velocity needs:

- Most shippers of retail or manufacturing plant goods want slower deliveries or a halt altogether.
- Shippers of personal protective equipment (PPE) and essential consumer goods want speed.

Seaport and intermodal terminals risk congestion if customers fail to pick up shipments, slowing productivity and potentially leading to inland equipment shortages.

Managers can use carrier service options to reduce demurrage / detention charges, with storage overseas, delay-in-transit options or off-terminal storage in the US.

Managers needing faster overseas shipments can pay for expensive air cargo or work with ocean carriers to ensure preferred vessel stowage, to enable faster unloading and pick-up.

*Source: IHS Markit Maritime and Trade Journal of Commerce; IHS Markit Economics and Country Risk*

## New country-specific health-driven trade restrictions

- A rush to widespread commodity export limits is not widespread so far.
- The U.S. has limited exports of PPE. Past U.S. trade policy moves have resulted in retaliation which may now expose the U.S. dependency on imports for supplies of certain goods.
- India restricted exports of some pharmaceutical ingredients and medicines in March.
- Vietnam is stockpiling rice and has suspended new export contracts.
- Fortunately for now, such protectionism isn't the norm, but the US and India are criticized by other countries for restricting “essential” goods exports.
- With supply sources for some key products concentrated, restrictions risk prompting other countries to restrict food or other essential goods trade.
- Managers should identify alternative country sources and monitor countries' trade policies.

*Source: IHS Markit Economics and Country Risk*

# New supply chain consumption patterns reflect Stay-At-Home impacts

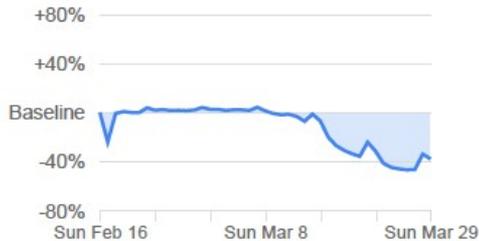
## Some may never revert fully to 2019 levels, affecting freight

Google Maps Cell Phone Location Tracking of Customers By Place Type: Jan.-Feb. avg. vs. March 2020

Workplaces

**-38%**

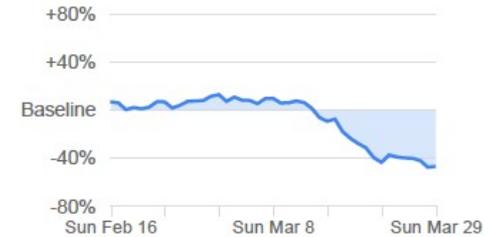
compared to baseline



Retail & recreation

**-47%**

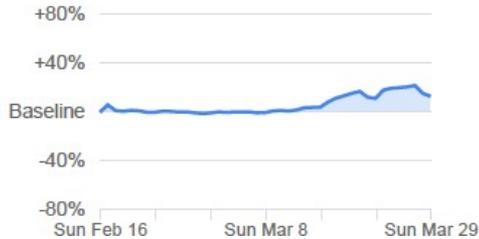
compared to baseline



Residential

**+12%**

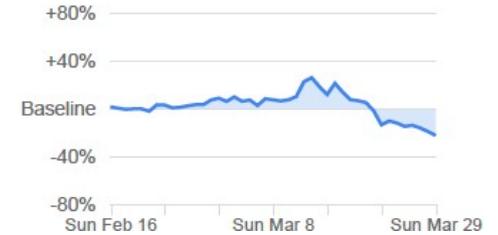
compared to baseline



Grocery & pharmacy

**-22%**

compared to baseline



Source: Google

## Country supply chain geography and distribution channels

- Global COVID-19 Spread Timeline Has Affected Supply Chain Geography Sequentially
  - Ø Initially Wuhan metro area on Yangtze River in Hubei Province in Mid-January
  - Ø Rest of China and Hong Kong by End-January
  - Ø S. Korea, Japan, Italy, Iran, Spain, rest of Europe and US followed February into March.
  - Ø April sees over 200 countries with diagnosed COVID-19 cases, some recovered and past the peak
- Supply chain impact response agility depends in part on pre-crisis digitalization / tech adoption
- Distribution network changes may not revert to 2019 patterns later; fuel price drop factor too
- Omni channel retailers and wholesalers now focus on e-commerce, not brick and mortar sales (e.g. Nike online sales up 30% as in-store sales drop close to zero.)  
Except essential product vendors, Amazon fulfillment-dependent shippers now squeezed
- Companies with mobility-enabled, geographically distributed workers and suppliers less affected (work-from home shift affects some firms much more than others.)

Source: IHS Markit Economics and Country Risk

# Geography of impacts in U.S. not uniform: auto sales decline example

## 41% drop in national weekly vehicle registrations; sales fell most in NY, CA

**-85% NY**

WoW decline

Highest confirmed COVID-19 cases, at 3,046/M

Dealerships limited to Service only

**-78% CA**

WoW decline

Confirmed cases, at 145/M

Dealerships limited to Service only

**-43% TX**

WoW decline

Confirmed cases, at 88/M

No statewide restrictions on dealership operations

**-16% FL**

WoW decline

593 confirmed cases, equating to 222/M

No statewide restrictions on dealership operations

### COVID-19 Impact Analysis

Data as of: 04-13-2020

Vehicle Type  
Multiple values

GVW  
Multiple values

State  
Multiple values

Segment  
All

Week over Week  
-85% 0%



Source: IHS Markit Autos

\*Based on data received through March 31, 2020

Source: IHS Markit Autos

## Supply Chain Management COVID-19 Disruption Responses

1. Accelerate decisions to secure shipment space where capacity is reduced
2. Map supplier geography and their supplier networks, if not done already
3. Improve supplier communications and transparency, if not done already
4. Identify alternative transport service options and their characteristics
5. Identify suppliers in alternate locations, and associated freight transport options
6. Monitor governments' trade / freight-operating restrictions
7. Assess continued e-commerce transportation costs, including costs of returns
8. Start or advance assessment of potential supply chain automation
9. Investigate potential for collaborative shipping to lower cost and disruption risk

Source: IHS Markit Economics and Country Risk

# Q & A

Paul Bingham, IHS Markit

[CustomerCare@ihsmarkit.com](mailto:CustomerCare@ihsmarkit.com)

Americas: +1 800 IHS CARE (+1 800 447 2273)

---

## Disclaimer

The information contained in this presentation is confidential. Any unauthorized use, disclosure, reproduction, or dissemination, in full or in part, in any media or by any means, without the prior written permission of IHS Markit or any of its affiliates ("IHS Markit") is strictly prohibited. IHS Markit owns all IHS Markit logos and trade names contained in this presentation that are subject to license. Opinions, statements, estimates, and projections in this presentation (including other media) are solely those of the individual author(s) at the time of writing and do not necessarily reflect the opinions of IHS Markit. Neither IHS Markit nor the author(s) has any obligation to update this presentation in the event that any content, opinion, statement, estimate, or projection (collectively, "information") changes or subsequently becomes inaccurate. IHS Markit makes no warranty, expressed or implied, as to the accuracy, completeness, or timeliness of any information in this presentation, and shall not in any way be liable to any recipient for any inaccuracies or omissions. Without limiting the foregoing, IHS Markit shall have no liability whatsoever to any recipient, whether in contract, in tort (including negligence), under warranty, under statute or otherwise, in respect of any loss or damage suffered by any recipient as a result of or in connection with any information provided, or any course of action determined, by it or any third party, whether or not based on any information provided. The inclusion of a link to an external website by IHS Markit should not be understood to be an endorsement of that website or the site's owners (or their products/services). IHS Markit is not responsible for either the content or output of external websites. Copyright © 2020, IHS Markit®. All rights reserved and all intellectual property rights are retained by IHS Markit.



FREIGHT TRANSPORTATION RESILIENCE IN  
RESPONSE  
TO SUPPLY CHAIN DISRUPTIONS

NCFRP REPORT 39



“In a world of just-in-time delivery, supply chains and the manufacturing processes they support are vulnerable to natural and manmade disruptions that could result in major delays and disrupted freight flows.”

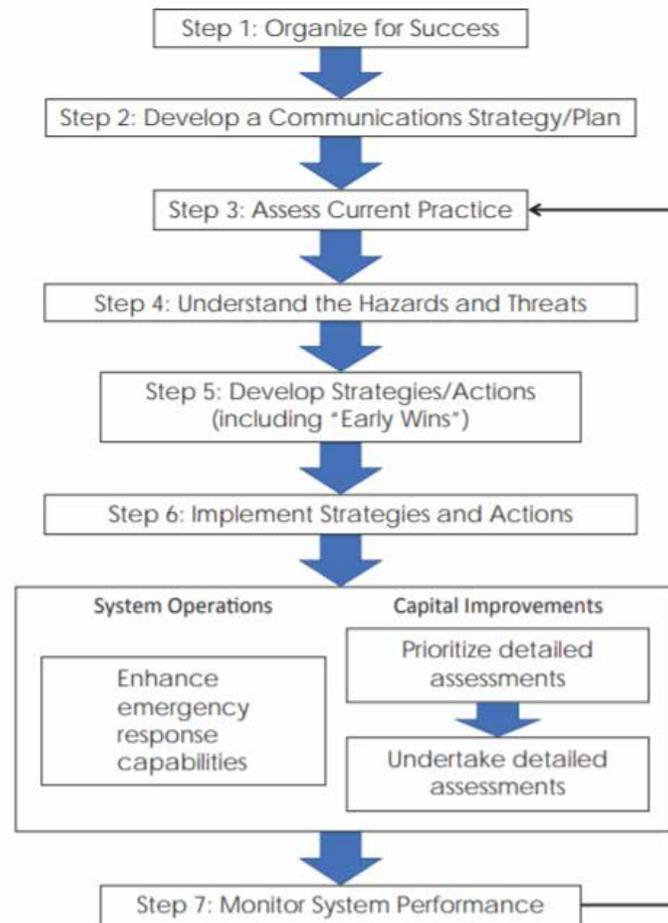
## **Purpose**

Develop guidance for supply chain stakeholders to help plan for, mitigate, and adapt to supply chain disruptions with the aim of enhancing freight transportation system resilience.

A decorative graphic consisting of several parallel white lines of varying lengths, slanted upwards from left to right, located in the bottom right corner of the slide.



Figure 1-3. Commodity corridors analyzed.



**Figure 2-6. Resilient supply chain assessment process.**

# Strategies for Enhancing Supply Chain/Transportation System Resilience

## STEP 1: ORGANIZE FOR SUCCESS...for example

Establish clear responsibilities for responding to disruptions to the supply chain or to disruptions to components of the transportation system that would have a major impact on supply chains (if your organization is a public agency).

Establish role-playing exercises with key partners for a range of possible types of disruptions; assess and understand the motivations and responsibilities of those involved with dealing with supply chain disruptions.

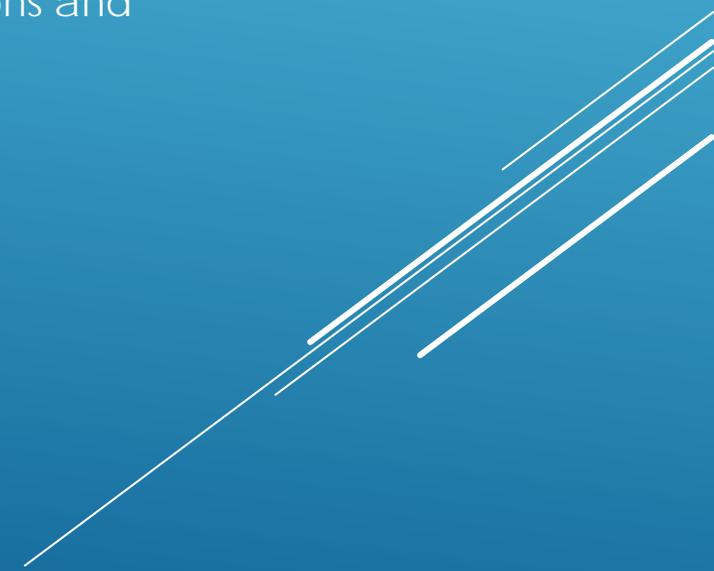
Monitor the performance of your organization in response to incidents and examine how it could be better positioned to respond in the future.



## STEP 2: DEVELOP A COMMUNICATIONS /INFORMATION EXCHANGE STRATEGY...for example

Meet with external stakeholders, system users, customers, etc., to discuss the most effective way of communicating information about supply chain disruptions. For private firms, position your organization's resilience efforts as a market differentiator. For public agencies, portray your agency's resilience efforts as a part of transportation system stewardship.

In anticipation of major system disruptions that will involve more than one group or organization, develop a protocol that establishes lines of communications and responsibilities for disseminating and exchanging information.



### STEP 3: ASSESS CURRENT PRACTICE...for example

Examine past supply chain/transportation system disruptions to identify where improvements to organizational capacity can be made. To what extent would different types of strategies (e.g., putting in place system redundancy, diversifying resource suppliers, stockpiling in key locations the materials needed for response, etc.) have made a difference? This examination should occur immediately following an incident in formal debriefings.

Examine the strategic and systems planning approaches for the physical infrastructure and service operations that are part of your responsibility in the supply chain for their sensitivity to system resilience.



## STEP 4: UNDERSTAND HAZARDS AND THREATS AND THEIR IMPACTS/ CONSEQUENCES...for example

Examine your supply chain/markets/transportation system to identify possible vulnerabilities and risks to your networks and systems. To what extent does your organization have control over these vulnerabilities? What other infrastructure networks or systems does your infrastructure or service rely on that if disrupted would affect your organization's operations?

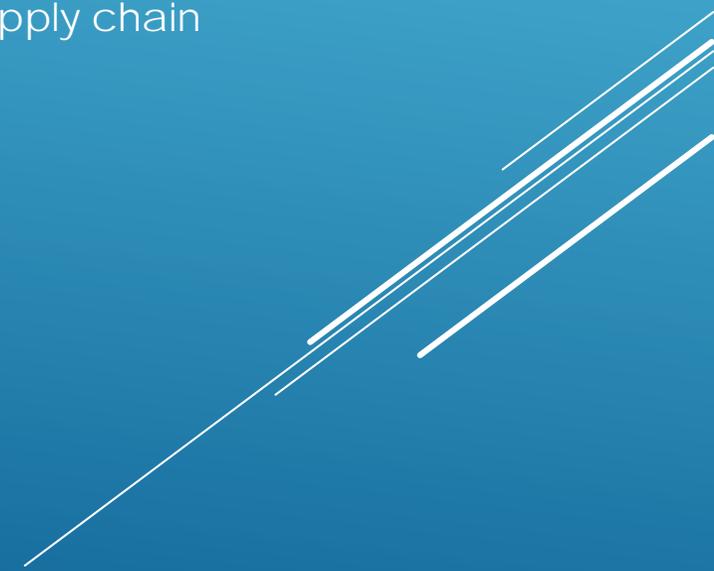
Reassess (internally and/or with outside participants) on a periodic basis your organization's threat assessment related to enhancing supply chain resilience (perhaps conduct a threat assessment with supply chain partners on a periodic basis).



## STEPS 5/6: DEVELOP AND IMPLEMENT STRATEGIES, ACTIONS, AND PLANS...for example

For key bottleneck/chokepoints in your supply chain or network that will become even more congested if disrupted, create location-specific preplanned recovery strategies and plans in coordination with relevant agencies (e.g., designated alternate truck routes that will be automatically conveyed to truckers via a DOT's traffic operations control center).

Reassess (internally and/or with outside participants) on a periodic basis your organization's capital program and network operations strategy to determine whether the recommended actions are still important for enhancing supply chain resilience.



## STEP 7: MONITOR PERFORMANCE AND INCORPORATE INTO ASSESSING CURRENT PRACTICE...for example

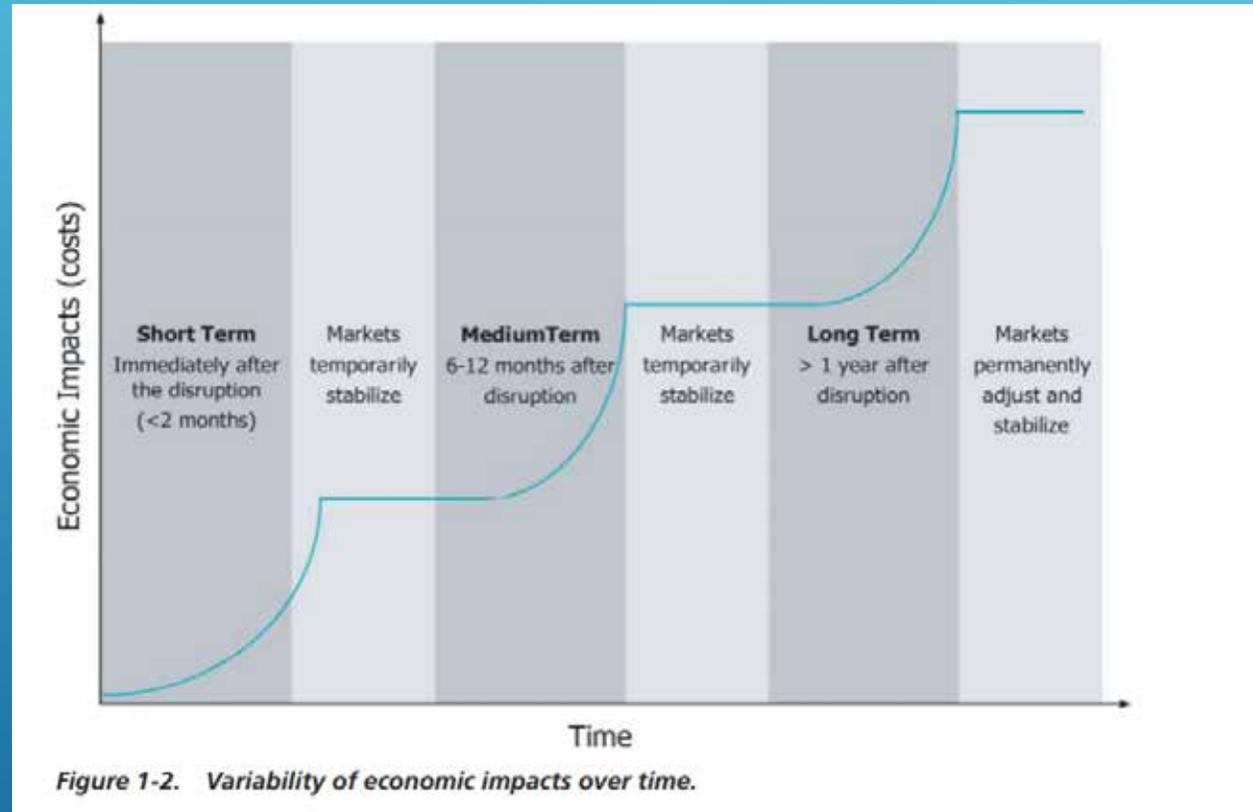
Develop and use system metrics to monitor the resilience of the supply/chain transportation system (outcome measures) for short-term actions (e.g., incident/emergency response).

Develop and use system metrics to monitor the resilience of the supply/chain transportation system (outcome measures) for long-term actions (e.g., reliability measures for roads or rail corridors).

Discuss with key stakeholders (e.g., key customers or partner agencies) which performance characteristics of your system/service are most important to them with respect to their own business/operations.



## Methodologies to Estimate the Economic Impacts of Disruptions to the Goods Movement System, NCHRP Report 32



I would argue COVID-19 represents a transformational movement in time for our society that will have significant consequences to how we live, work, and play.....this will importantly affect transportation and in particular supply chains.



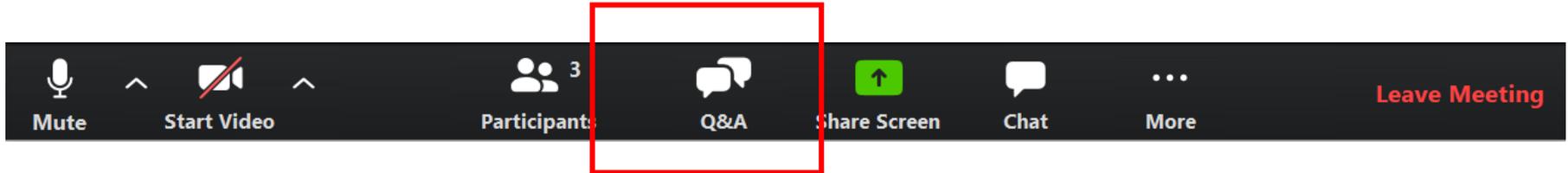
# GUIDANCE ON THE ESSENTIAL CRITICAL INFRASTRUCTURE WORKFORCE

Cybersecurity and Infrastructure Security Agency (CISA)—March 28, 2020

- Employees supporting or enabling transportation functions, including truck drivers, bus drivers, dispatchers, etc.
- Workers supporting the distribution of food, pharmaceuticals, etc.
- Employees of firms providing services, supplies, and equipment that enable warehouse and operations, etc.
- Etc.

# Questions and Answers

Please type your questions into your webinar control panel



We will read your questions out loud, and answer as many as time allows

**#TRBwebinar**  
**#COVID19**

# Freight Transportation Resilience in Response to Supply Chain Disruptions



**#TRBwebinar**  
**#COVID19**

# TRB Resources - Communicable Disease and Pandemics



Available reports and webinars  
that TRB has produced.

<http://bit.ly/TRBcoronavirus>

**#TRBwebinar**  
**#COVID19**

# Today's Panelists

- Mike Meyer, [mm39prof@gmail.com](mailto:mm39prof@gmail.com)
- Anne Strauss-Wieder, [Strauss-Wieder@njtpa.org](mailto:Strauss-Wieder@njtpa.org)
- Paul Bingham, [Paul.Bingham@ihsmarkit.com](mailto:Paul.Bingham@ihsmarkit.com)

**#TRBwebinar**  
**#COVID19**

# Get Involved with TRB

- Getting involved is free!
- Join a Standing Committee (<http://bit.ly/TRBstandingcommittee>)
- Become a Friend of a Committee (<http://bit.ly/TRBcommittees>)
  - Networking opportunities
  - May provide a path to become a Standing Committee member
- For more information: [www.mytrb.org](http://www.mytrb.org)
  - Create your account
  - Update your profile



@NASEMTRB



@NASEMTRB



Transportation  
Research  
Board

**#TRBwebinar**  
**#COVID19**

**TRB turns 100 on November 11, 2020**



***Help TRB:***

- Promote the value of transportation research;
- Recognize, honor, and celebrate the TRB community; and
- Highlight 100 years of accomplishments.

Learn more at

[www.TRB.org/Centennial](http://www.TRB.org/Centennial)

#TRB100

**MOVING IDEAS: ADVANCING SOCIETY—100 YEARS OF TRANSPORTATION RESEARCH**