

# Supply Chain Theory and Projections for COVID-19 Spell Volatility Ahead

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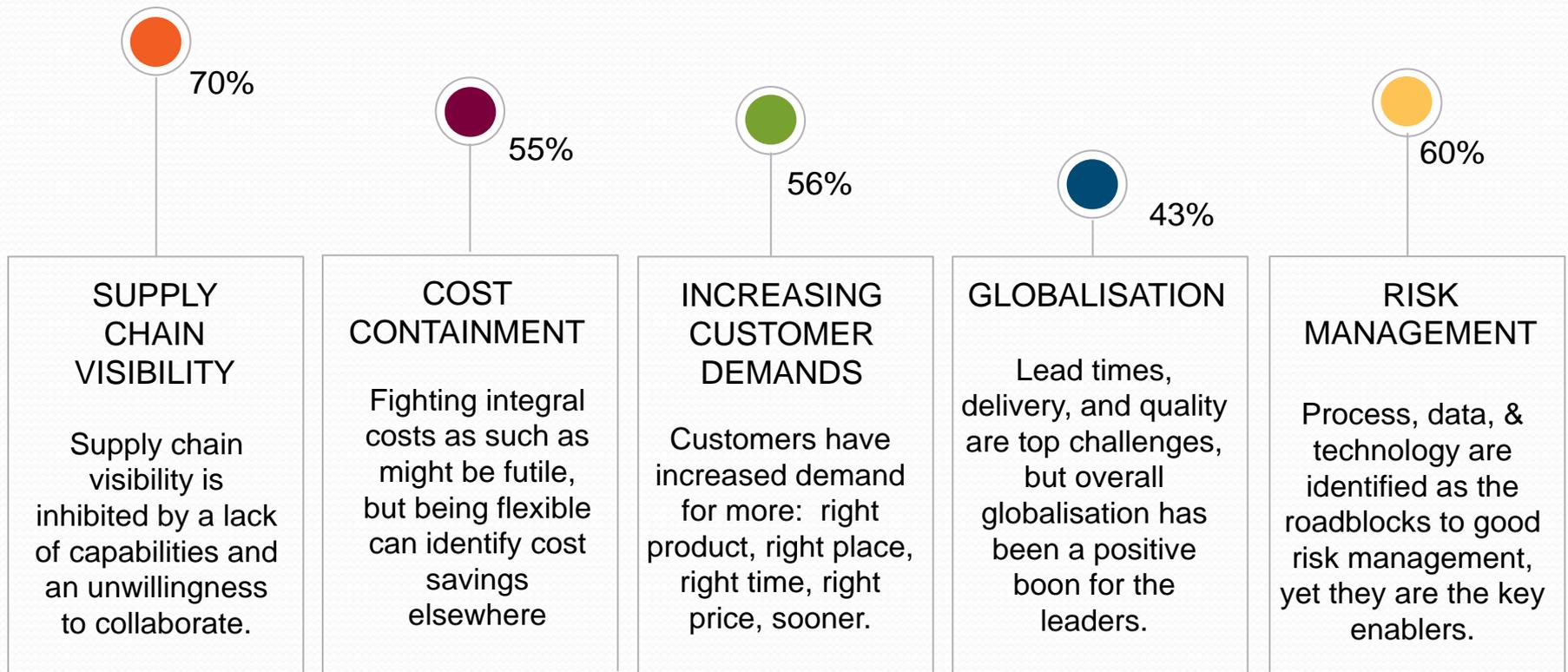
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# Outline

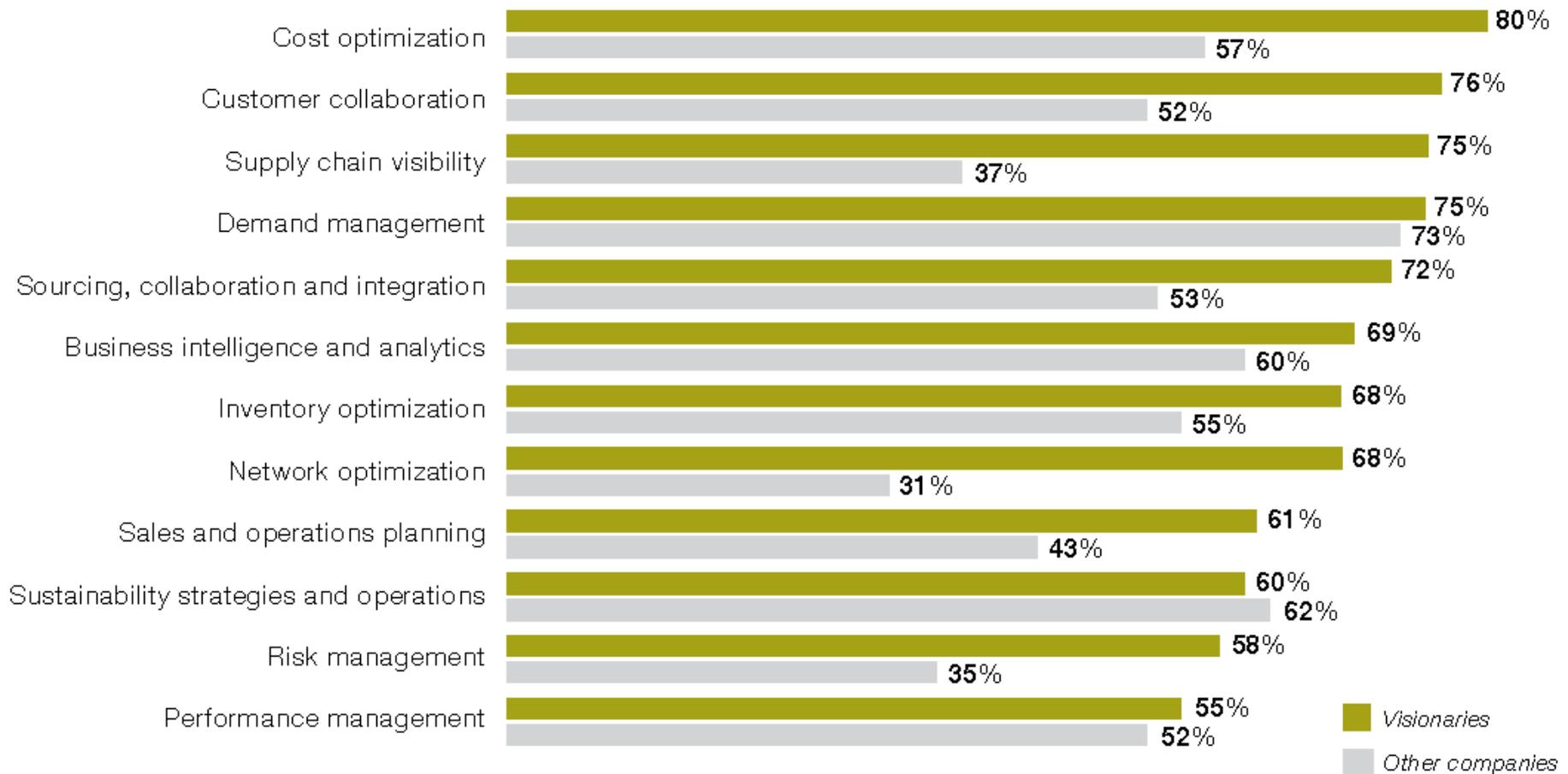
- Background
- Demand changes
- Supply changes
- Supply chain structural changes
- Supply chain strategy theory
- My predictions
- The Centre and exec programme
- My wish list for government

# Pre-COVID-19: The collective insights from 400 Supply Chain Executives surveyed by IBM identified five major challenges that comprise the Chief Supply Chain Officer (CSCO) agenda....

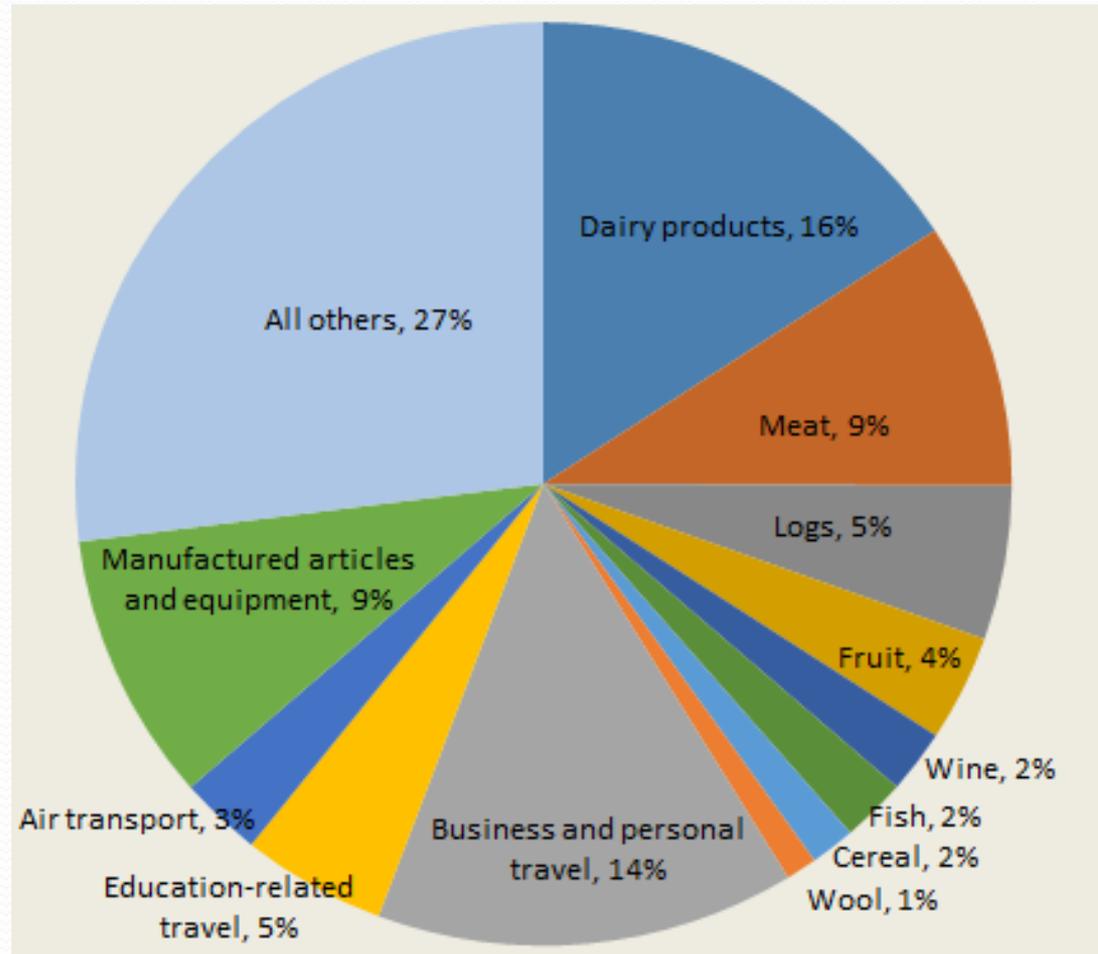


*Based on responses of "to a very great extent" and "to a significant extent"*

# Pre-COVID: Where Top Companies are Investing



# NZ Export Profile



Data source: NZTE (2017).

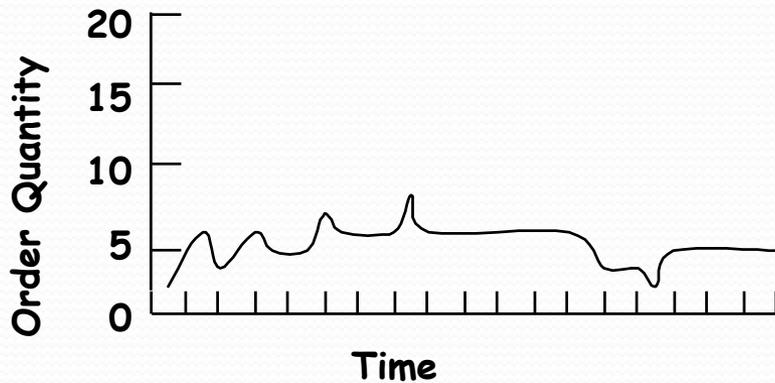


# Demand Changes

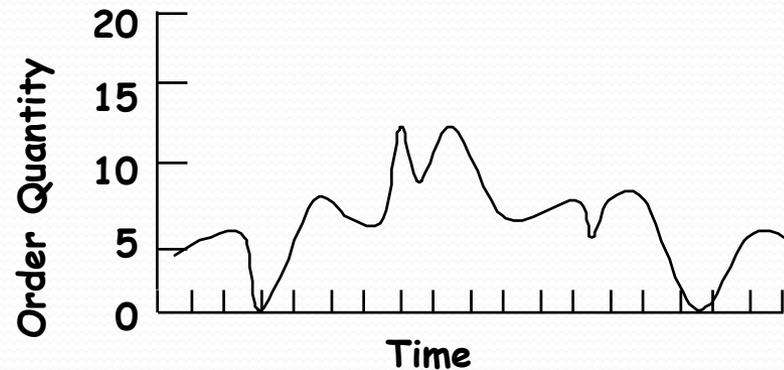
- Decreases
  - Nationally during lockdown
  - Travel dependent services – tourism and education
  - Internationally for nice-to-haves (e.g., lobster)
- Increases
  - Stockpiling
  - Perception of safety?
  - Supply shocks elsewhere
- Other
  - Home versus workplace consumption

# The "Bullwhip Effect" in Supply Chains - Illustration

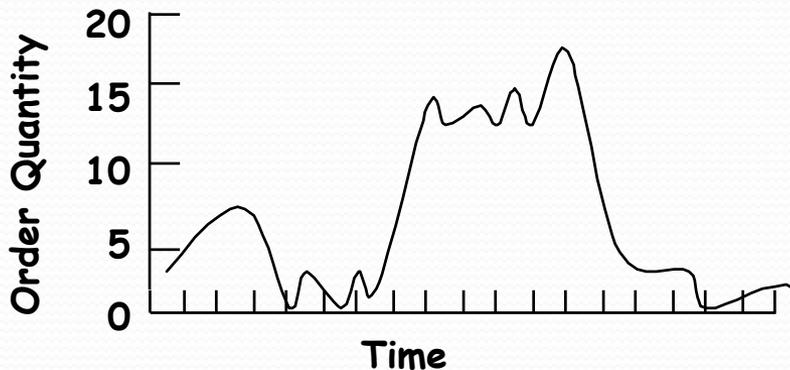
Consumer Sales



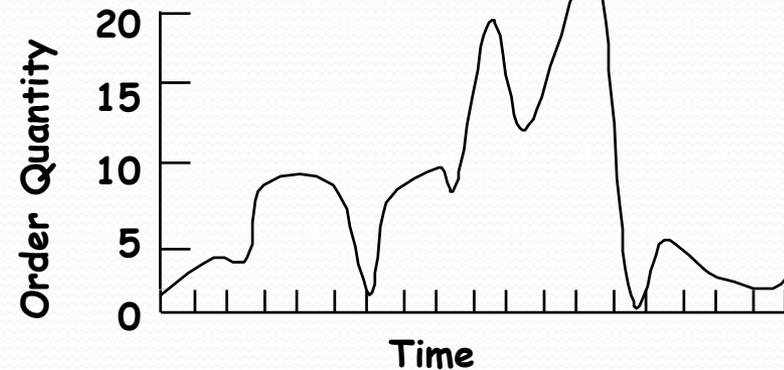
Retailer's Order to Wholesaler



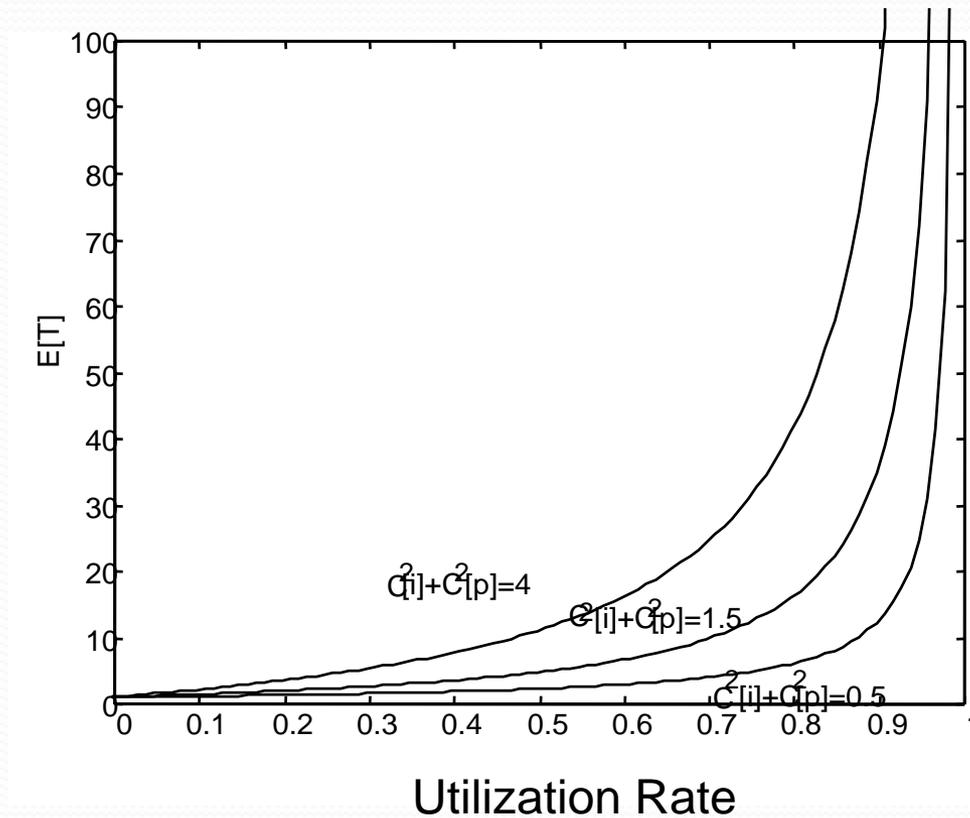
Wholesaler's Orders to Manufacture



Manufacturer's Orders to Supplier



# Growth of Expected Time in System

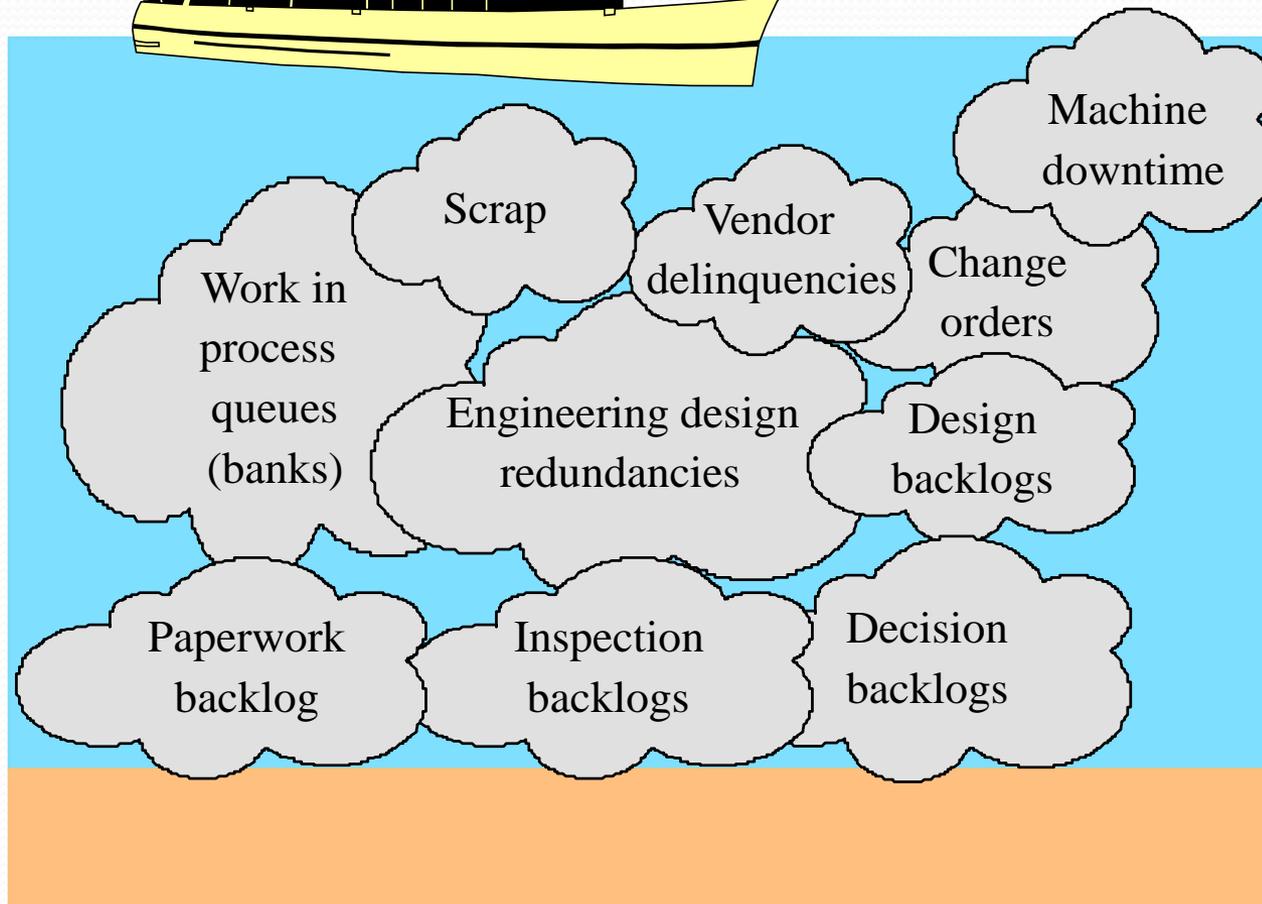
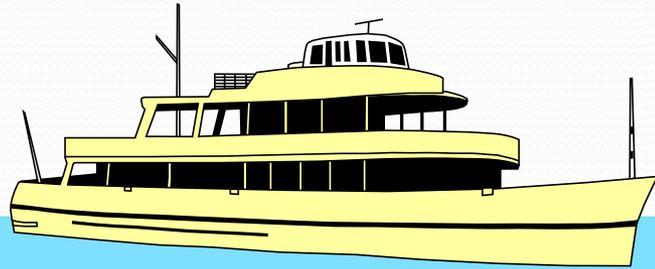


# Supply Changes

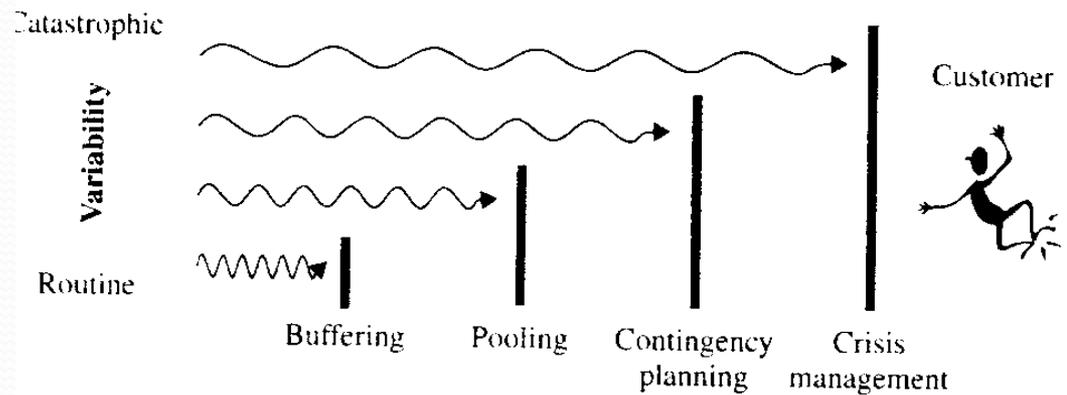
- Suppliers not working
- Transport disruptions
- Social distancing leading to decreased capacity in production
- Closed plants, missing workforce

# Lean Production:

## *Reduce Inventory*



# Layers of Protection Against Supply Chain Risk



- **Buffering:** Maintaining excess resources (inventory, capacity, time) to cover for fluctuations in supply or demand
- **Pooling:** Sharing buffers to cover multiple sources of variability (e.g., demand from different markets)
- **Contingency planning:** Establishing a preset course of action and “virtual buffers” for an anticipated scenario
- **Crisis management:** Generating responses to events for which buffers (individual or pooled) and contingency plans are inadequate

# Structural Changes

- Digitisation
- Technology
- Air versus sea

# Tech Trends

- Advanced manufacturing technologies
  - RFID
  - The Internet of Things
  - Last mile delivery
  - Drones
  - Robots
  - Autonomous vehicles
  - AI & Data analytics
  - Blockchain
- 
- How do they affect the competitive priorities of cost, flexibility, speed, quality, and service?

# On NZ Ag

- Supply chains are changing in many ways
- Some is non-disruptive but productive
  - Precision ag, tech assistance, etc.
- Some may change SC structure
  - Blockchain, co-ops, vertical farming, COVID-19
- High tech food may change how we eat
  - Too early to tell

# Physically Efficient Supply Chains

- Cost concerns:
  - inventory holding, transportation, handling and manufacturing costs
- What do we usually see?
  - Large manufacturing batches to achieve scale
  - Minimum order quantities to reduce handling/order processing costs
  - Full truck load shipments
- Focus on traditional cost measures:
  - Inventory turns, factory and transportation utilisation

# Market Responsive Supply Chains

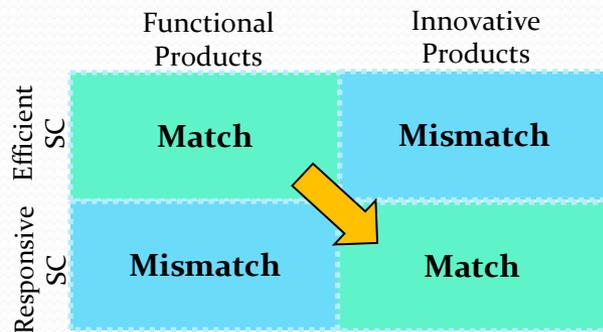
- Cost concerns:
  - Inventory obsolescence, lost sales/poor service
- What to do:
  - Pay a premium for flexibility: faster transportation, lower transportation and factory utilisation, smaller batches
  - Postpone variety as much as possible
  - Reduce low value added variety
- Focus of flexibility:
  - Avoid emphasis on traditional explicit costs (inventory holding, transportation efficiency, manufacturing utilisation)
  - Recognise that opportunity cost of lost sales and poor service are high

# Matching Supply Chains With Product Demand Characteristics

	Product Demand	
Supply Chain Types	Functional	Innovative
Efficient		Mismatch
Responsive	Mismatch	

# The Reality

- Far away from markets
- Low physical connectivity
- Many small businesses with lean processes



**Difficult to have a responsive supply chain!**

# What Next?

- Recession most places – depression will depend on government actions
- Supply chains will refill and readjust
- Travel restrictions won't be lifted for a long time
  - Maybe see world divide into with and without COVID endemic regions?
- Some of the move to online will become permanent

# The Centre for Supply Chain Management

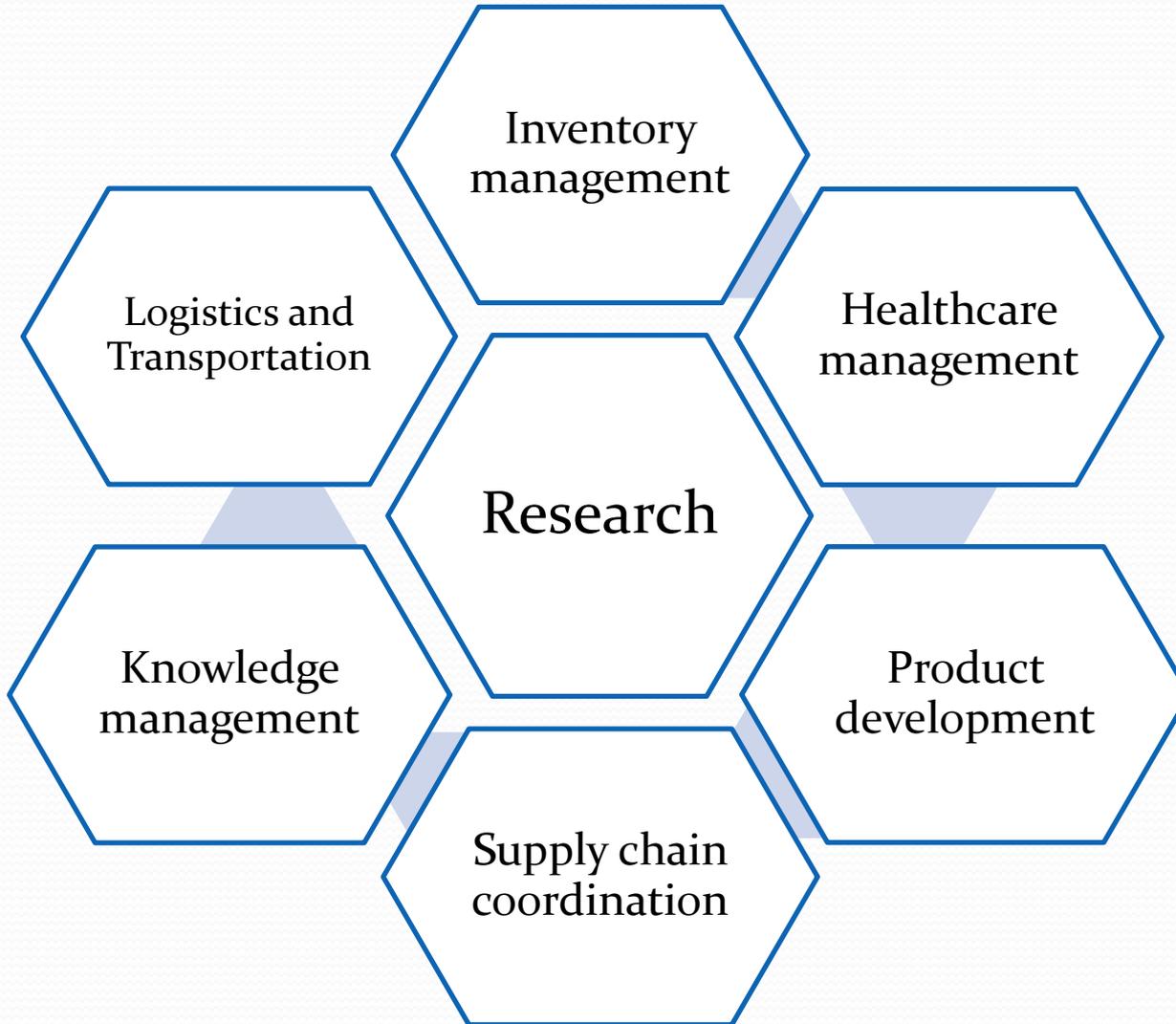
- **Produce world-class *supply-chain research*** that is relevant to the New Zealand environment and the economic challenges confronting the nation
- ***Disseminate both the Centre's research*** and supply chain best practices through print, electronic media, seminars, and education
- **Bring together a *critical mass*** of New Zealand companies involved in various roles in supply chains to facilitate engagement and debate on matters of common interest

# The Centre for Supply Chain Management

## Research Themes

- Supply chain collaboration
- Supply chain risk management
- Sustainable supply chain management
- Supply chain networks and infrastructure

# Our Research Team



PhDs from



# The Strategic Supply Chain Executive Programme

- The Centre is taking an active role in developing mid-career supply chain professionals to become the next generation of strategic supply chain leaders
- Ten-day programme set across five modules, held over five months
- Who Should Attend:
  - Currently be in a mid-to-senior supply chain or related role for at least five years (e.g. procurement, inventory, planning, logistics or related disciplines)
  - Have been identified as having potential to progress to a senior leadership role within the next five years
- For further information contact Felicity Lawrence  
[f.lawrence@auckland.ac.nz](mailto:f.lawrence@auckland.ac.nz)
- Or go to: <https://www.exec.auckland.ac.nz/c-suite/strategic-supply-chain-management/>

# My Wishlist for Government

- A stocktake of our preparedness for self-sufficiency
- Put lots of money into research
  - *The Entrepreneurial State* by Mariana Mazzucato
- Allow immigration for work visas (but make sponsoring company pay for quarantine)
- Allow immigration for PostGrad student visas (student pays for quarantine)
  - Many of our PostGrad programmes don't have sufficient numbers to run for kiwis only