

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

Professor Tava Olsen

Director, Centre for Supply Chain Management

Head of Department, Information Systems and Operations Management

Associate Dean Faculty

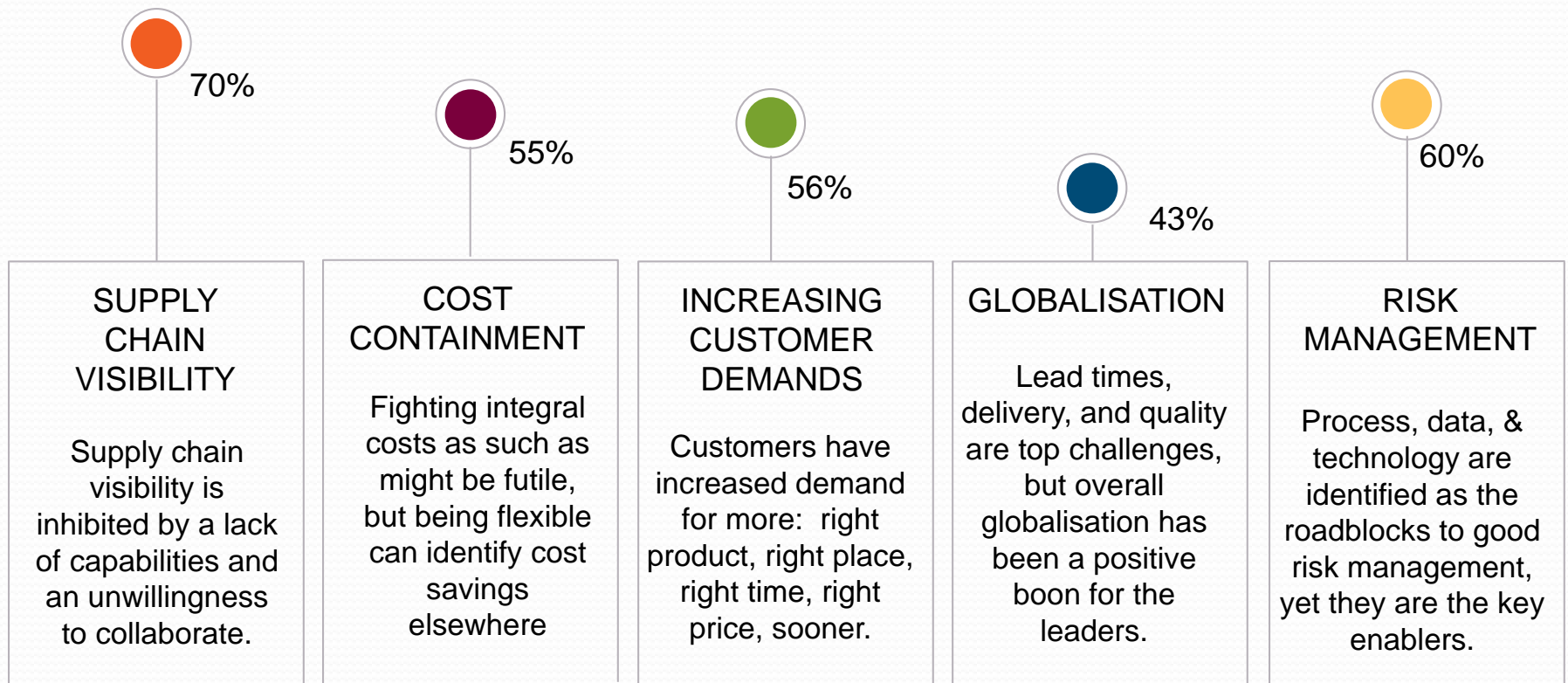
University of Auckland Business School

t.olsen@auckland.ac.nz

Outline

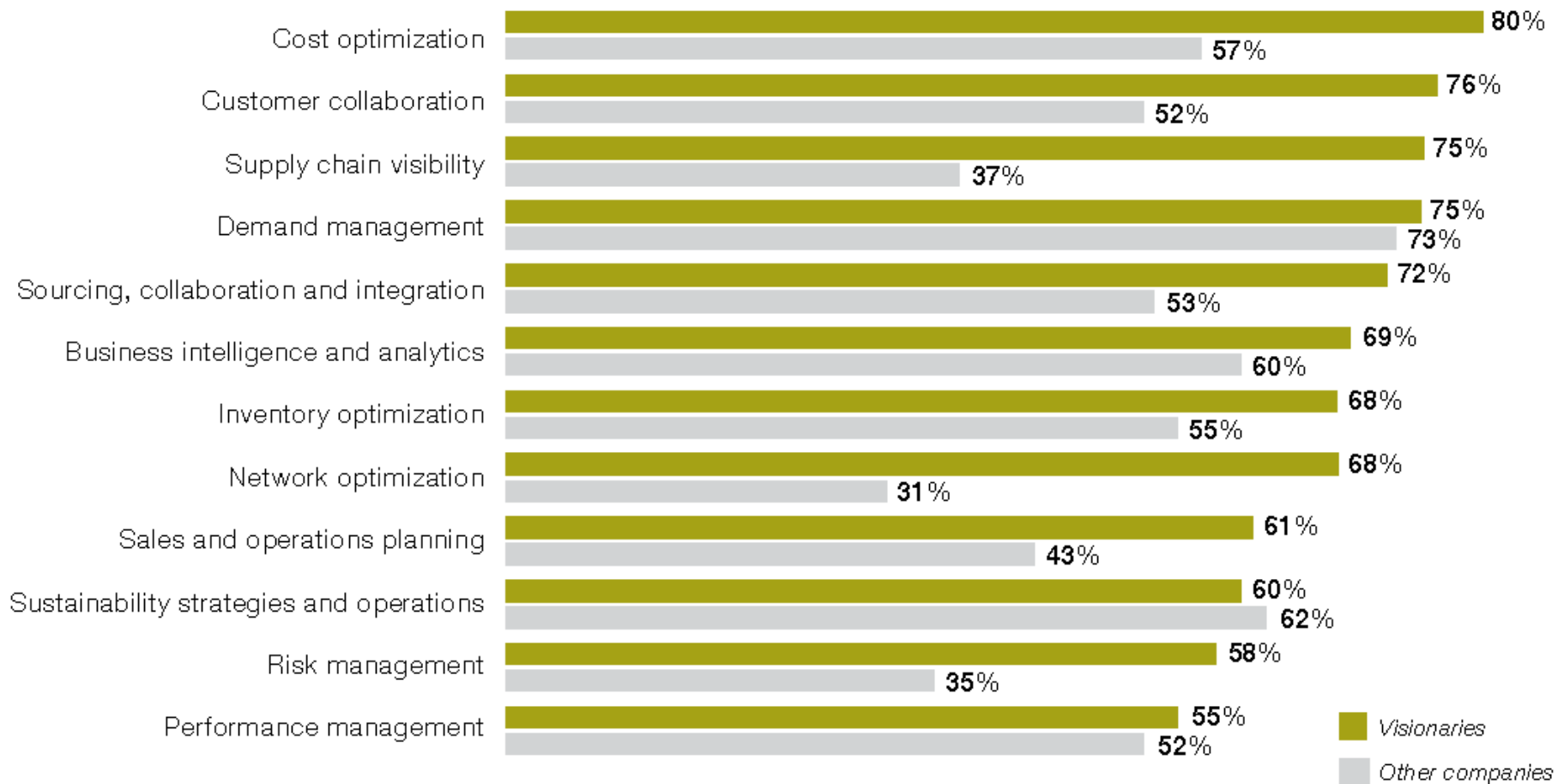
- Background
- Demand changes
- Supply changes
- Supply chain structural changes
- Supply chain strategy theory
- My predictions
- The Centre and exec programme
- My wish list for government

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....

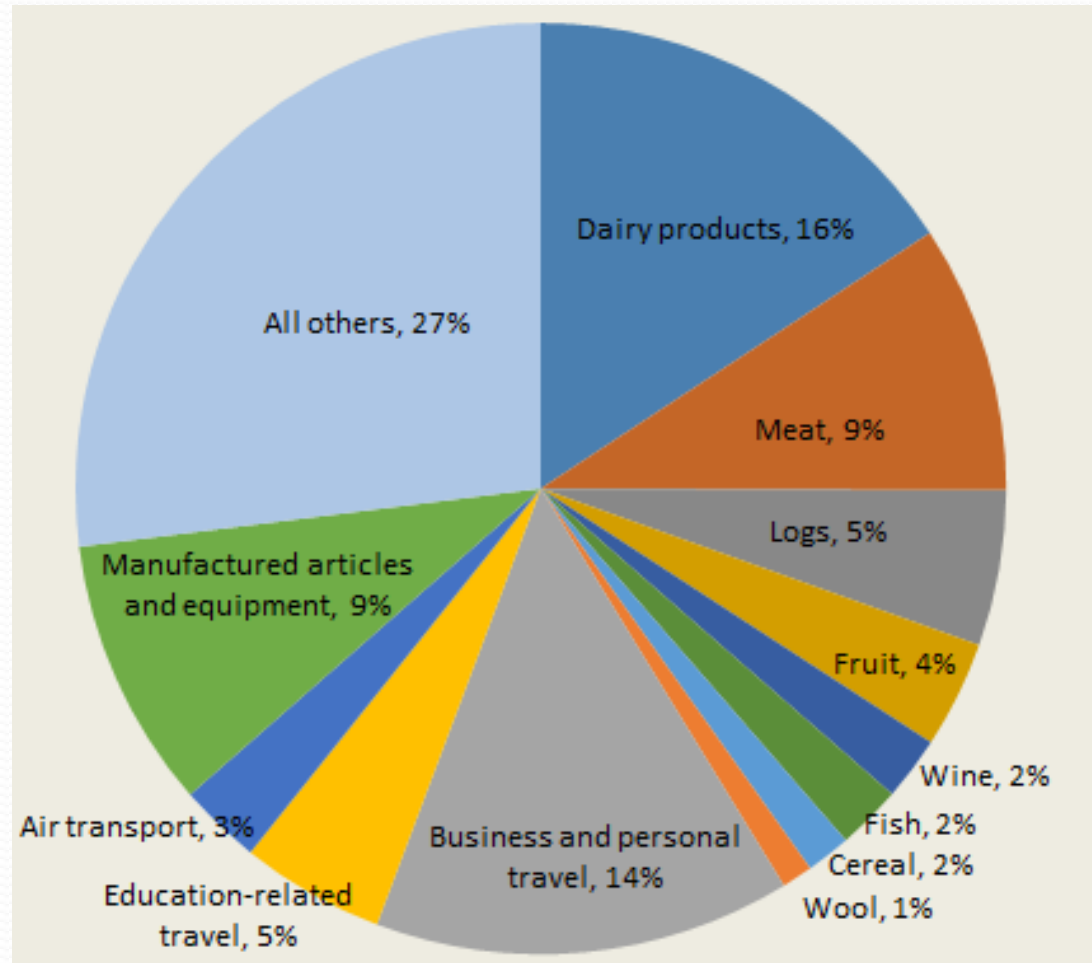


Based on responses of "to a very great extent" and "to a significant extent"

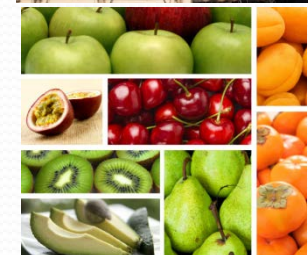
Pre-COVID: Where Top Companies are Investing



NZ Export Profile



Data source: NZTE (2017).

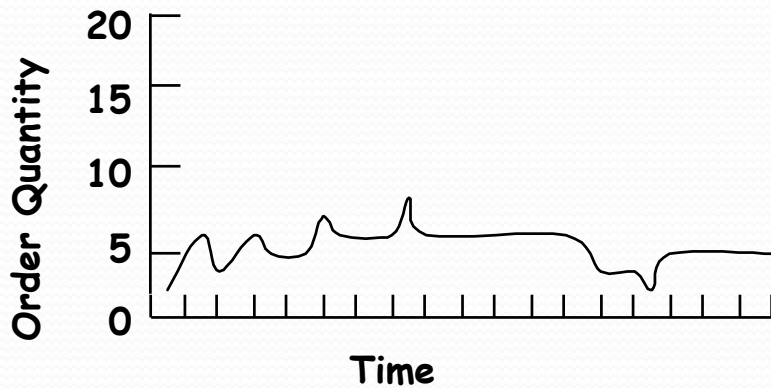


Demand Changes

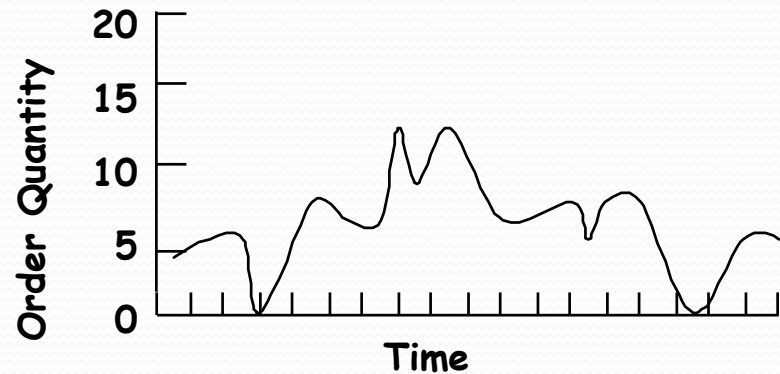
- Decreases
 - Nationally during lockdown
 - Travel dependent services – tourism and education
 - Internationally for nice-to-haves (e.g., lobster)
- Increases
 - Stockpiling
 - Perception of safety?
 - Supply shocks elsewhere
- Other
 - Home versus workplace consumption

The "Bullwhip Effect" in Supply Chains - Illustration

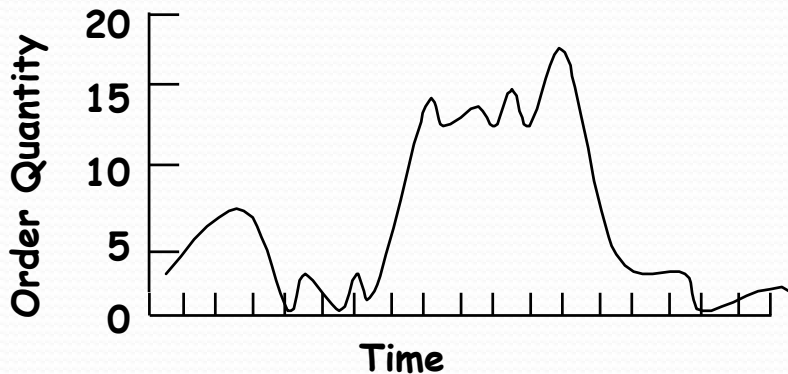
Consumer Sales



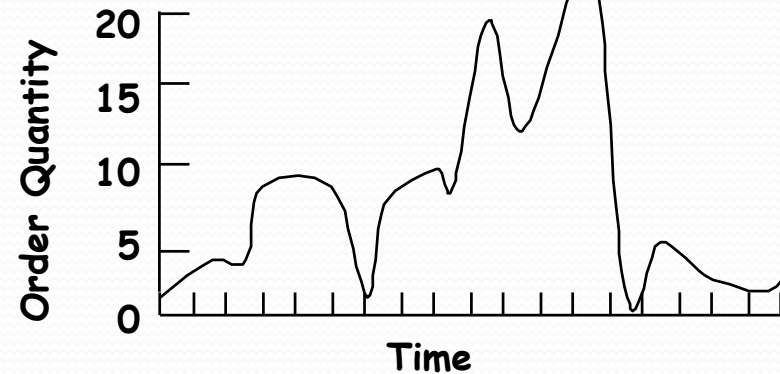
Retailer's Order to Wholesaler



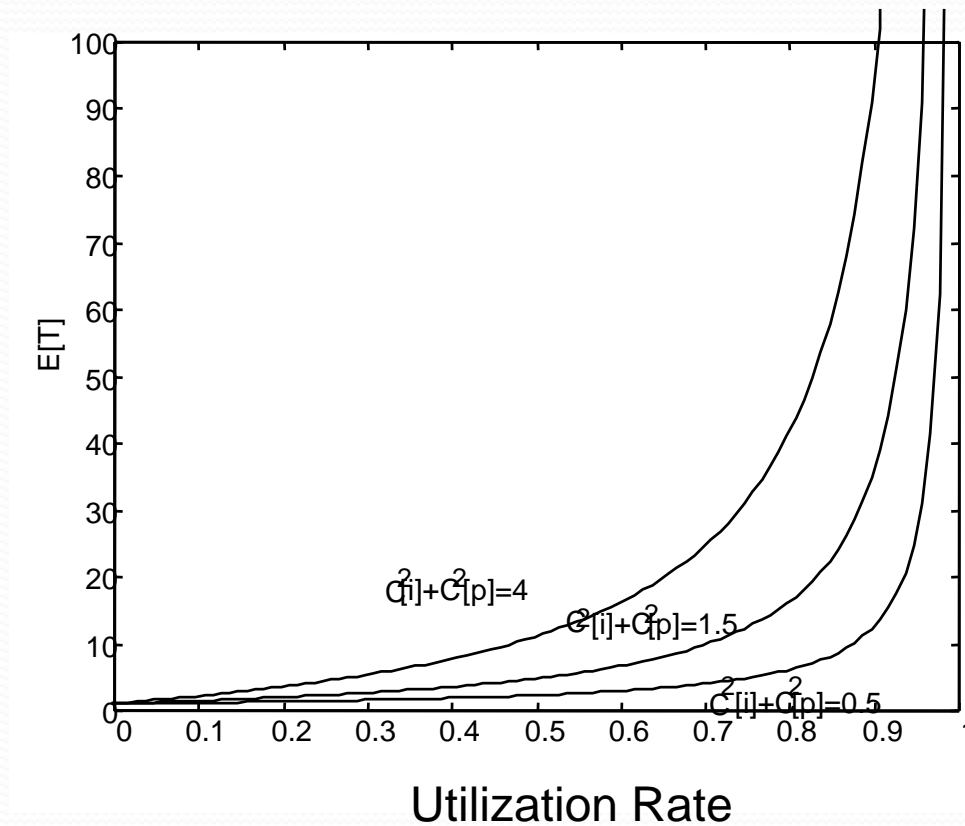
Wholesaler's Orders to Manufacture



Manufacturer's Orders to Supplier



Growth of Expected Time in System

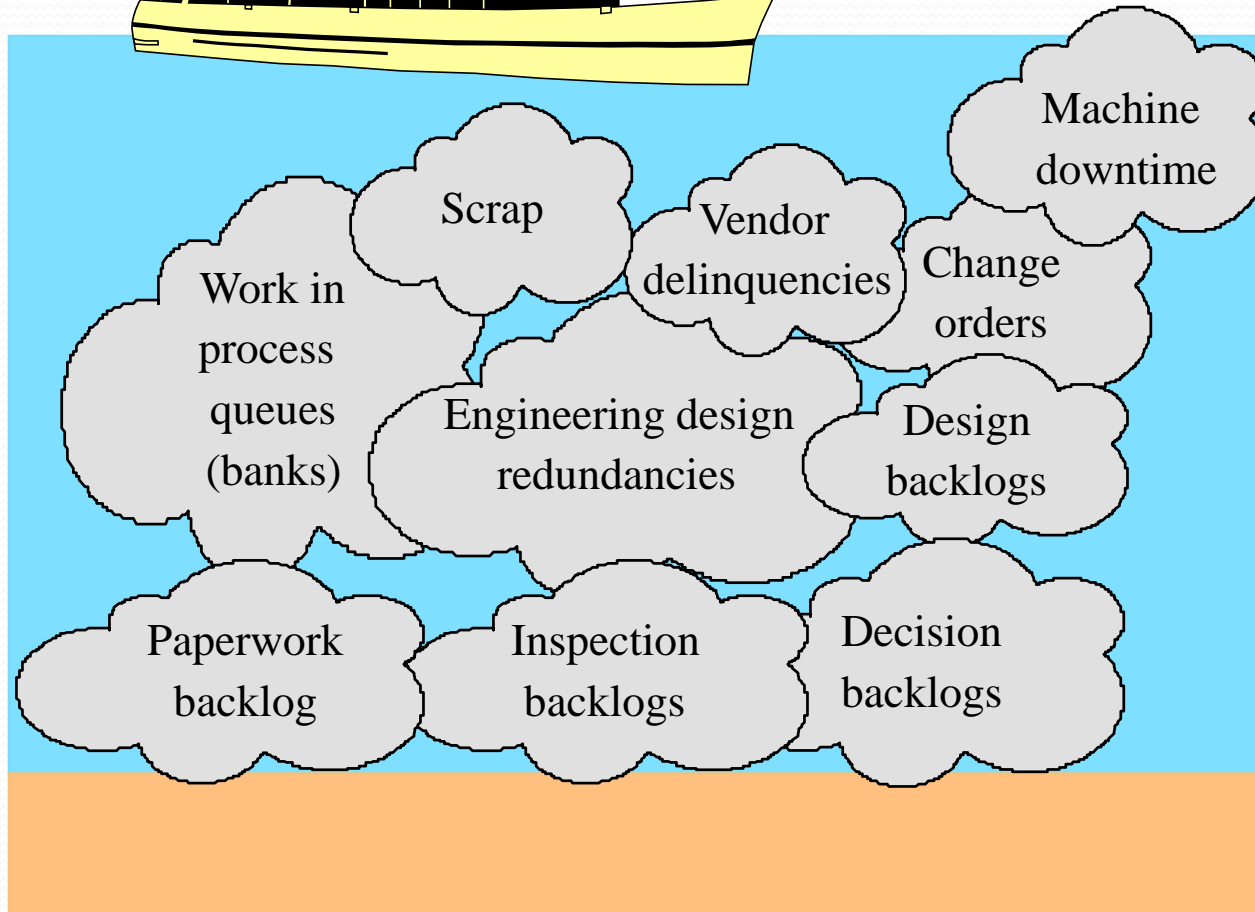
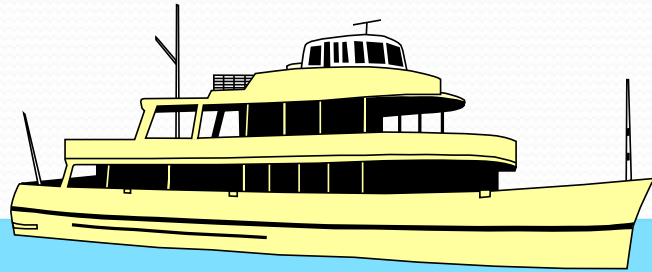


Supply Changes

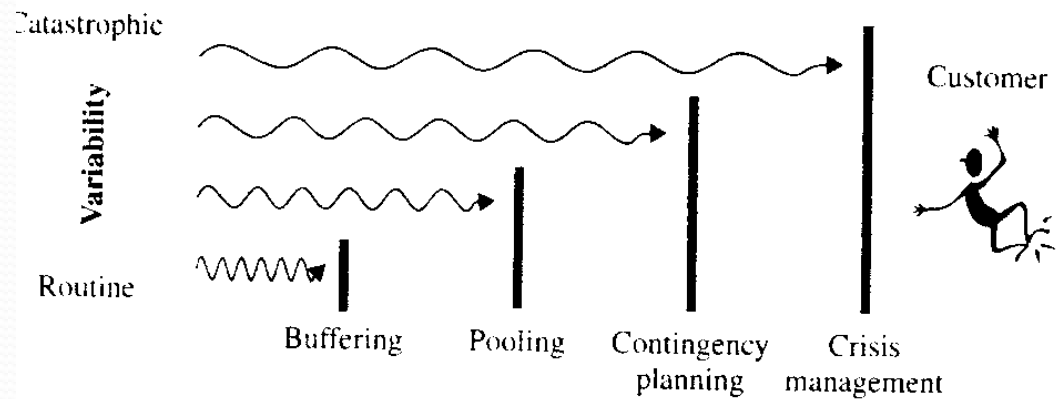
- Suppliers not working
- Transport disruptions
- Social distancing leading to decreased capacity in production
- Closed plants, missing workforce

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

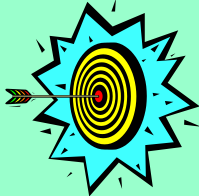
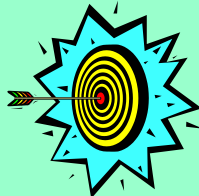
Physically Efficient Supply Chains

- 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

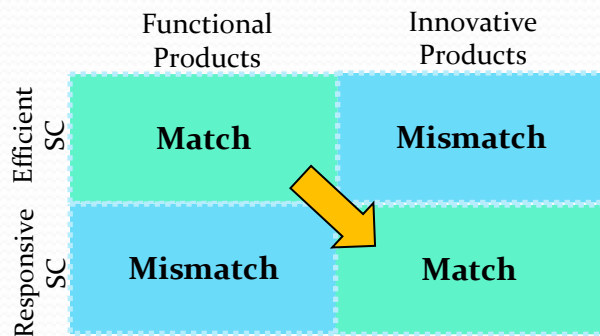
- Cost concerns:
 - Inventory obsolescence, lost sales/poor service
- What to do:
 - Pay a premium for flexibility: faster transportation, lower transportation and factory utilisation, smaller batches
 - Postpone variety as much as possible
 - Reduce low value added variety
- Focus of flexibility:
 - 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

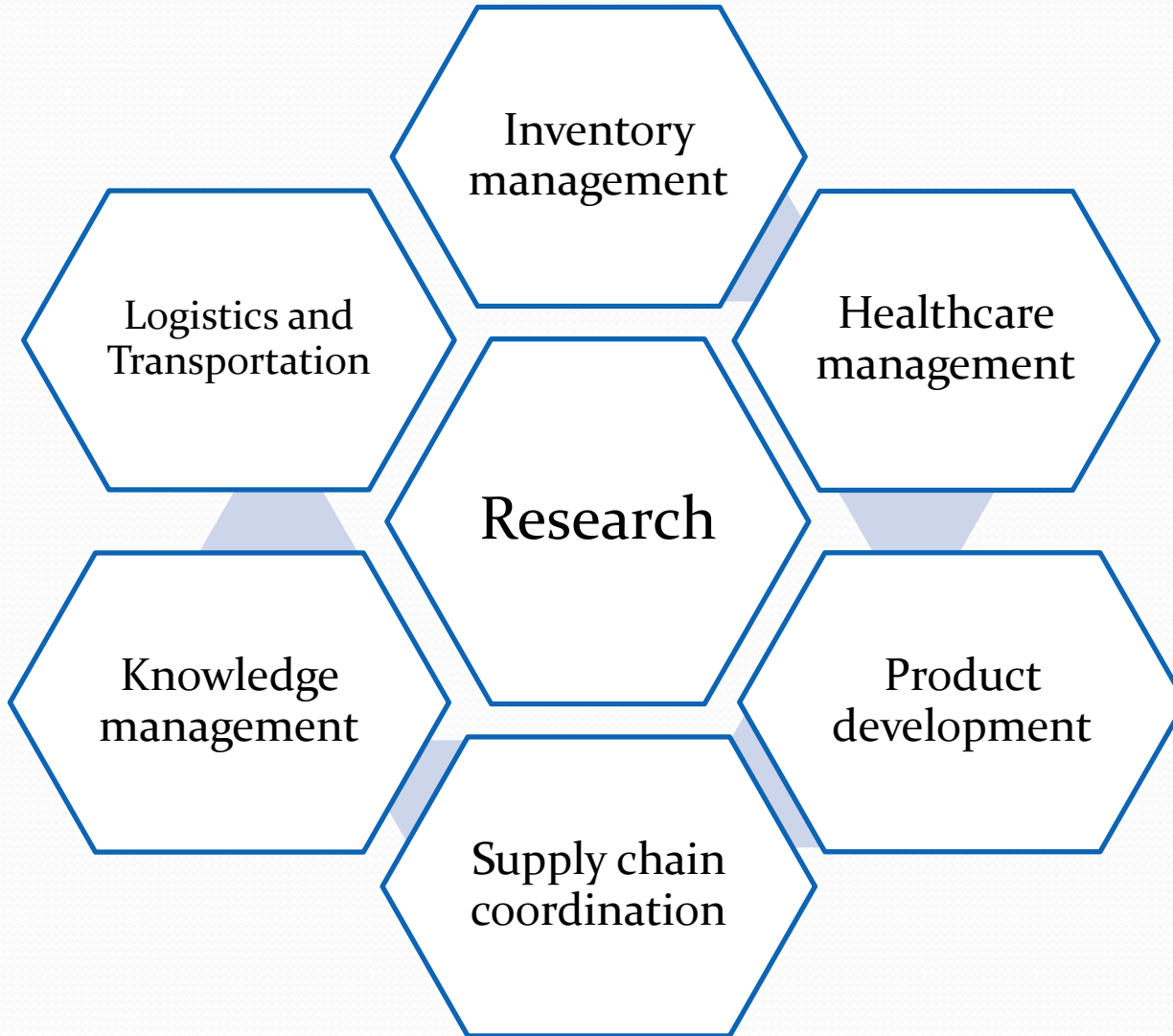
The Centre for Supply Chain Management

- **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
- 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