

Advanced supply chain risk management

Capstone: Future-proofing supply chains



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Risk is...

Probability



Impact

To make things a bit more complicated...

| Risk parameter | Brief description | Firm opportunity to manage? |
|-----------------------|---|------------------------------------|
| Impact | The severity or intensity of a risk's impact on company performance | HIGH |
| Probability | The likelihood with which a risk will occur | LOW |
| Detectability | The likelihood with which risks can be uncovered before they manifest | HIGH |
| Exposure | The potential negative impact on a firm's performance measures | HIGH |
| Avoidance | The ease and/or practicability with which risks can be avoided | MEDIUM |
| Duration | The length of time a risks persists | LOW |
| Cost | The cost to predict, prevent and/or recover from risks | MEDIUM |
| Expected Utility | The benefits associated with taking greater levels of risks | HIGH |

Four key concepts in supply chain risk management

Supply Risk

- “...as the probability of an incident associated with inbound supply from individual supplier failures or the supply market occurring, in which its outcomes result in the inability of the purchasing firm to meet customer demand or cause threats to customer life and safety.” (Zsidisin, 2003)

Supply Chain Vulnerability

- “...an exposure to serious disturbance, arising from risks within the supply chain as well as risks external to the supply chain” (Svensson, 2000)

Supply Chain Disruption

- “...unplanned and unanticipated events that disrupt the normal flow of goods and materials within a supply chain” (Craighead et al, 2007)

Supply Chain Resilience

- “...the ability of a system to return to its original state or move to a new desirable state after being moved” (Christopher & Peck, 2004)










| Type of risk | Sources | Illustrative alternative strategies |
|---|---|--|
|  Supply risks | Disruption of supply, inventory, schedules, and technology access; price escalation; quality issues; technology uncertainty; product complexity; frequency of material design changes | Multiple sourcing, operational flexibility, risk sharing |
|  Operational risks | Breakdown of operations; inadequate manufacturing or processing capability; high levels of process variations; changes in technology; changes in operating exposure | Maintain duplicative or excess capacity, high levels of maintenance |
|  Demand risks | New product introductions; variations in demand (fads, seasonality, and new product introductions by competitors); chaos in the system (the bullwhip effect on demand distortion and amplification) | Postponement, risk sharing with customers, high levels of safety stock |
|  Security risks | Information systems security; infrastructure security; freight breaches from terrorism, vandalism, crime, and sabotage | High investment levels in security technology, minimize sourcing and firm-owned infrastructure in less stable geopolitical environments, high levels of physical security investment |
|  Macro risks | Economic shifts in wage rates, interest rates, exchange rates, and prices | Currency hedging initiatives, diversification of product lines |
|  Policy risks | Actions of national governments such as quota restrictions or sanctions, as well as actions of regional and local government entities | Avoid significant investments in perceived unfriendly international markets, invest heavily in lobbying practices |
|  Competitive risks | Lack of history about competitor activities and moves | Defensive product line and entire company mergers and acquisitions, acquisition of key competitive personnel, first to market approaches |
|  Resource risks | Unanticipated resource requirements | Conservative balance sheet approach including high cash balances |
|  Natural risks* | Tornadoes, tsunamis, hurricanes, fires, pandemics | Avoid facility location in geographies subject to frequent earthquakes, tornadoes, and hurricanes |

Figure 6: Risk Management Strategies Pursued in 2023

Risk Management Strategies

Diversifying by sourcing goods and services from additional markets

Diversifying the range of suppliers

Securing external supply chain financing

Adopting a just-in-time supply chain to reduce costs of stockpiling

Stress-testing supply chains to map critical value chains and then run disruption scenarios

Renegotiating supply chain and procurement contracts more frequently

Adopting a hybrid approach, operating a just-in-time supply chain for goods sourced close to the point of production

Consolidating suppliers

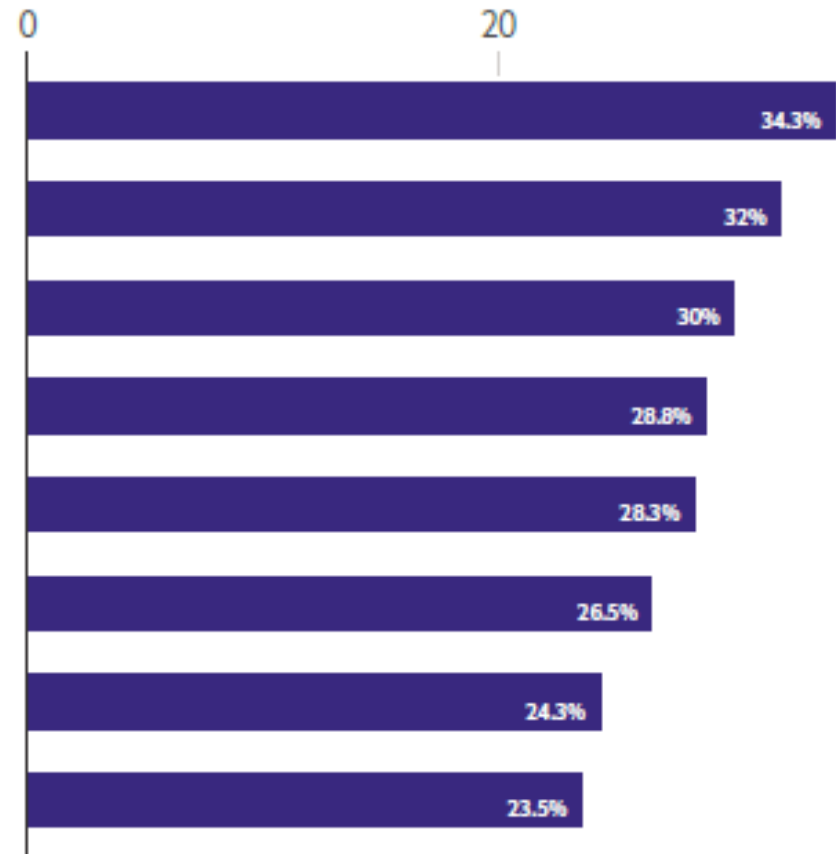
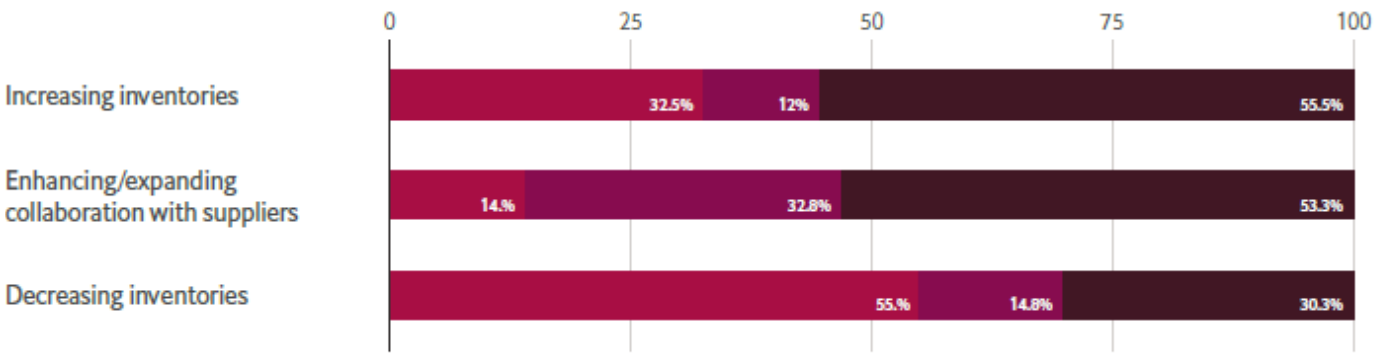


Figure 5.2: Priorities for Mitigating Supply Chain Disruptions, Inventories and Collaboration With Suppliers

Economist impact report 2023 –
Navigating the cost-plus world of supply chains

Priorities/Procurement and Supply Chain Mitigation Strategies

Low priority Moderate priority High priority



Source: Economist Impact

Figure 5.1: Priorities for Mitigating Supply Chain Disruptions, Visibility and Diversification

Priorities/Procurement and Supply Chain Mitigation Strategies

Low priority Moderate priority High priority

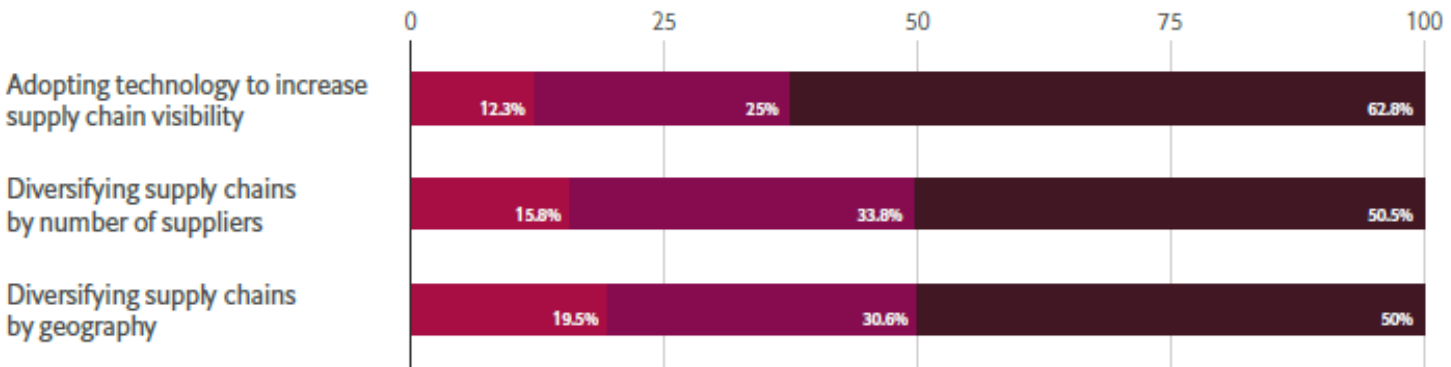
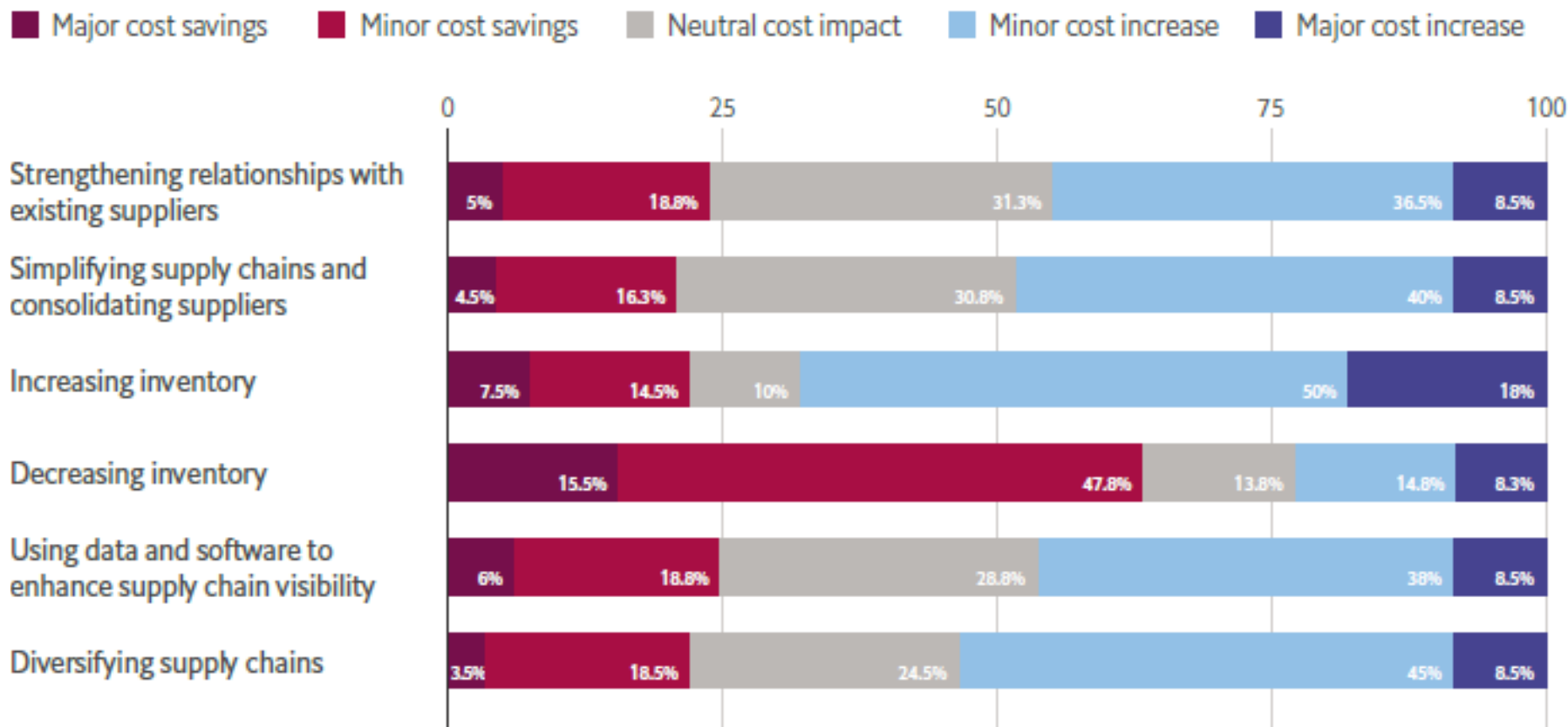




Figure 8: Costs of Strategies to Mitigate Supply Chain Disruptions


How would you rate the cost implications of the following business steps your organisation is taking to mitigate supply chain disruption? Please select one in each row.




What did supply chain risk management research say about preparing for a pandemic?

 Identify – e.g. supply chain mapping

 Assess – Probability and impact

 Mitigate –accept, transfer, share...

 Monitor – data analytics

e.g. Zsidisin *et al.*, 2005; Manuj and Mentzer, 2008a; Tummala and Schoenherr, 2011; Fan & Stevenson 2018

| | | |
|--------------------------------|--|--|
| Risk category: Catastrophic | It arises from high impact—low probability potential events associated with man-made deliberate acts (e.g. terrorism), unintentional man-made acts or natural hazards (e.g. hurricanes, earthquakes, tsunamis) | Terrorism, war, nuclear accidents, earthquakes, hurricanes, tsunamis, floods |
|--------------------------------|--|--|

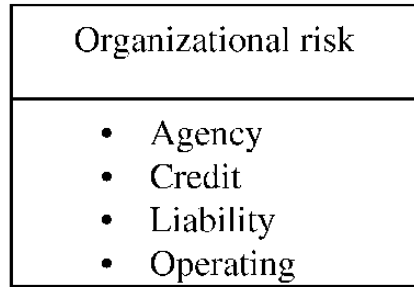
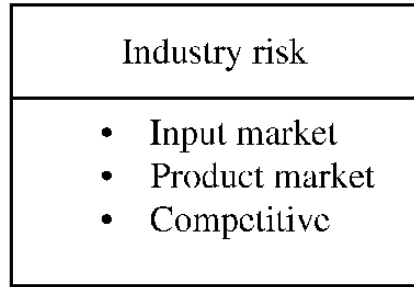
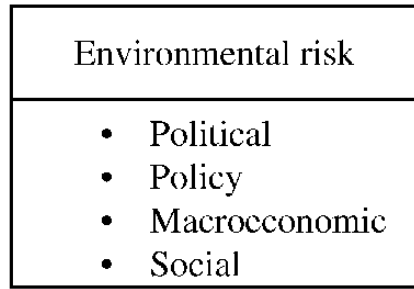
Louis M., Pagell M. (2019) Categorizing Supply Chain Risks: Review, Integrated Typology and Future Research. In: Zsidisin G., Henke M. (eds) Revisiting Supply Chain Risk

NOTHING!

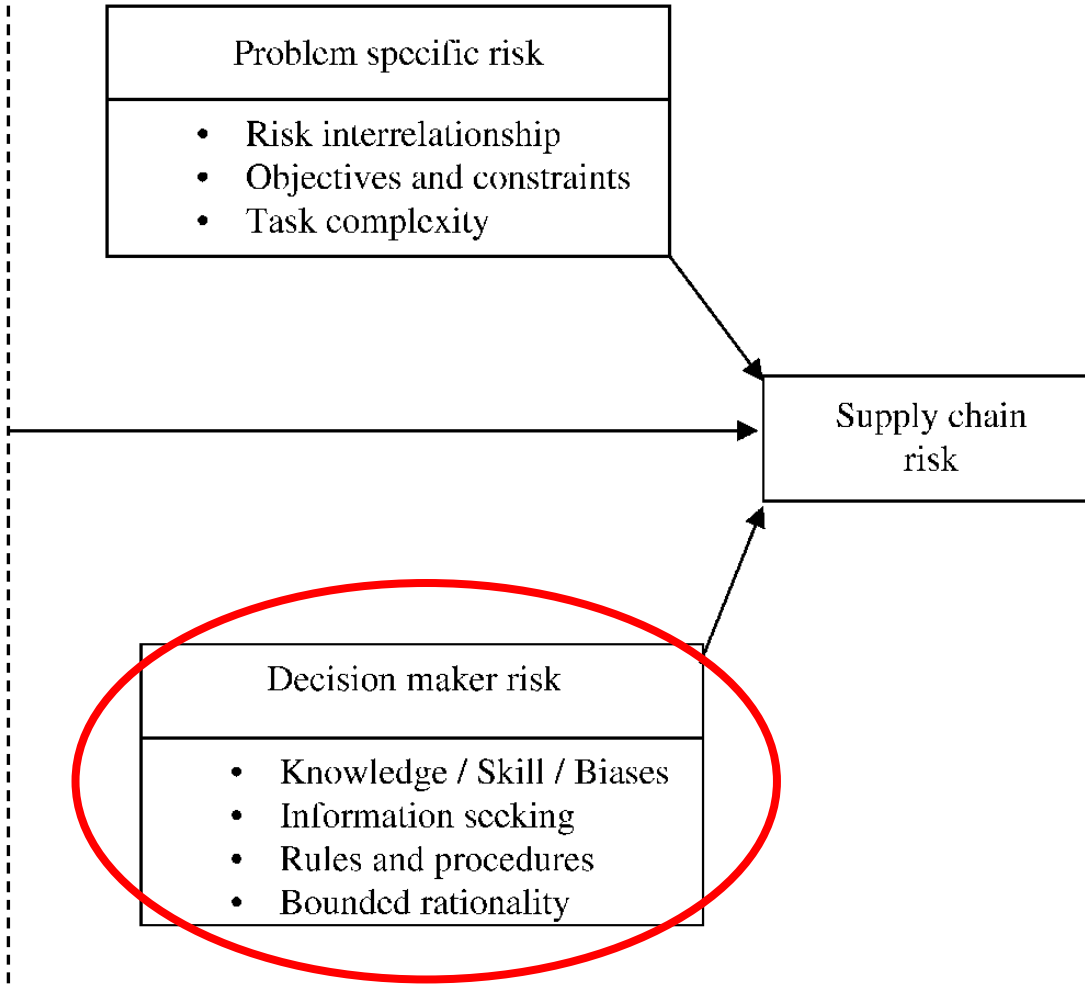
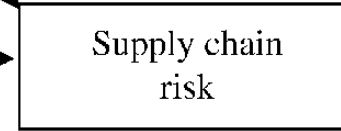
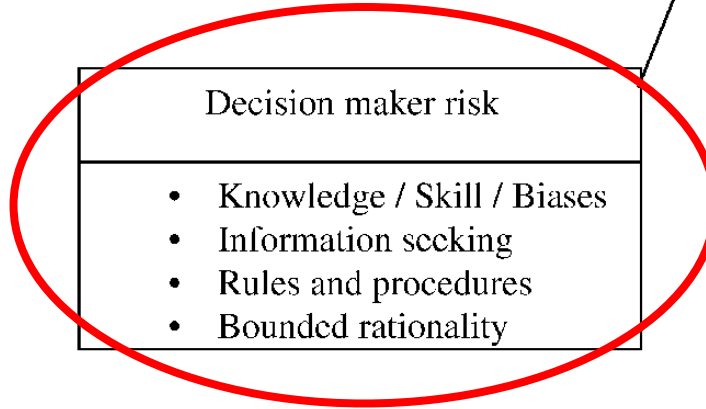
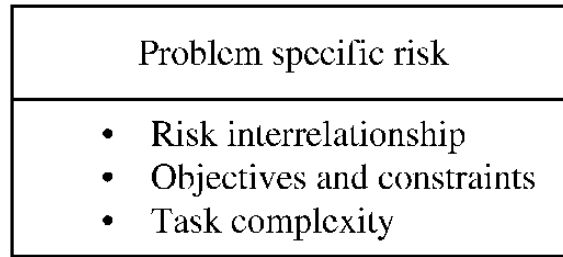
“Normal” disruptions vs. covid in supply chains

| | “Normal” supply chain disruption | Covid crisis |
|-----------|----------------------------------|---------------------------------|
| Geography | Local / regional | Global |
| Industry | Single industry | (nearly) all industries |
| Scope | Supply OR demand OR logistics | Supply AND demand AND logistics |
| Impact | Short-medium | Medium-long |

Lähde: Craighead et al. 2020; Moritz, 2020/ Supply chain management review, Ivanov 2020



“Framework factors”



Knowns and unknowns

Known unknowns: quantifiable uncertainties that we are aware of and for which a specified probability of occurrence exists

- In SCM e.g., yield, supplier delivery lead times, border crossing times, bad weather, and labor strikes

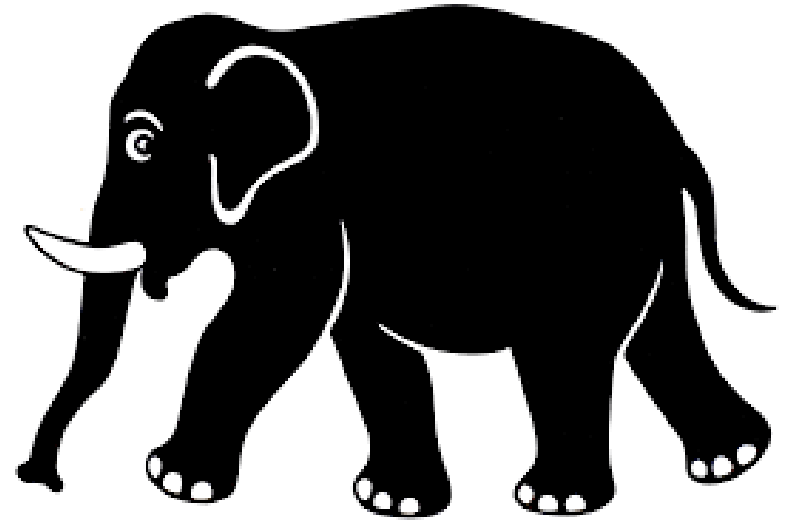
Unknown unknowns: a state or event a decision-maker could not have imagined

- The “black swans”
- Some can be knowable unknowns – e.g. covid did not come as a surprise to epidemiologists

**How can a supply
chain manager
prepare for
unknown
unknowns?**



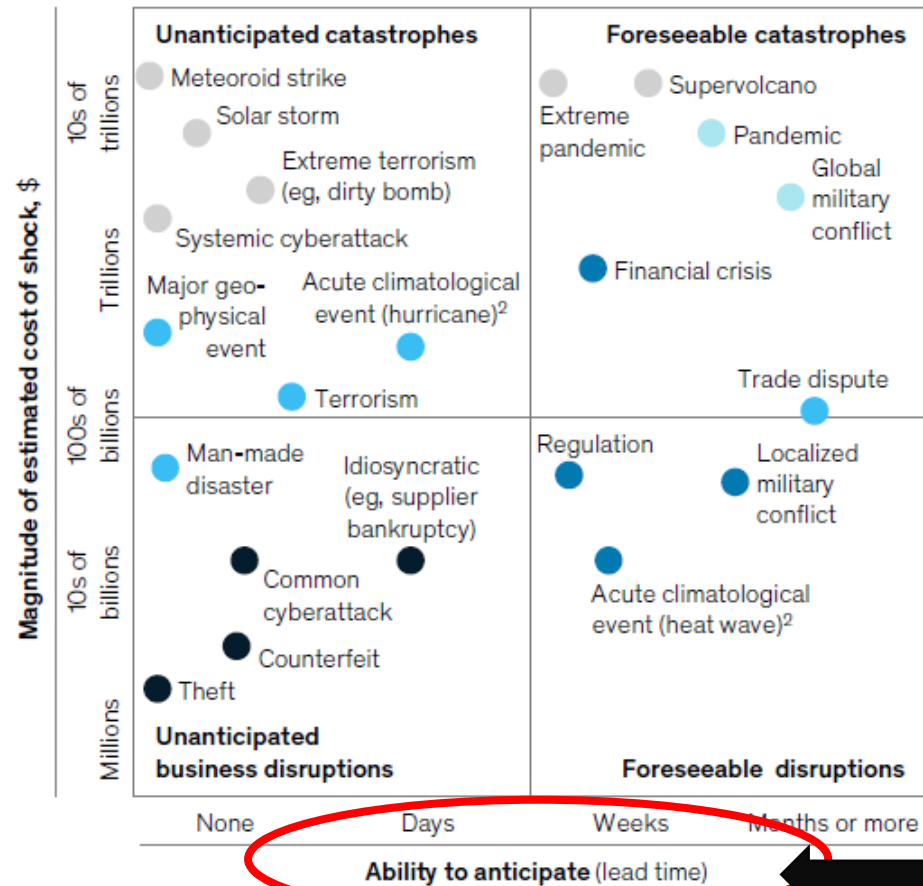
Which should you actually worry about?



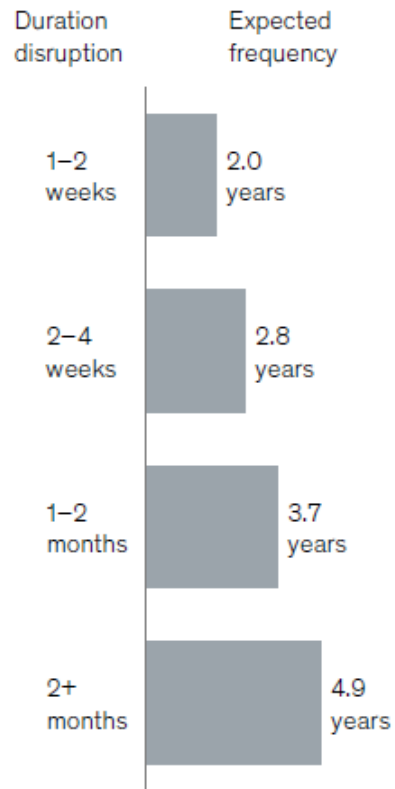
Disruptions vary based on their severity, frequency, and lead time—and they occur with regularity.

Magnitude and ability to anticipate

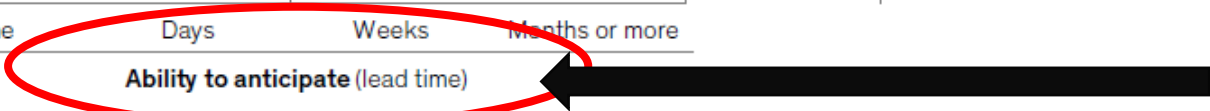
Historical frequency More frequent ●●●● Less frequent ● Has not (yet) occurred at scale¹



Expected frequency of a disruption, by duration, years
Based on expert interviews, n = 35



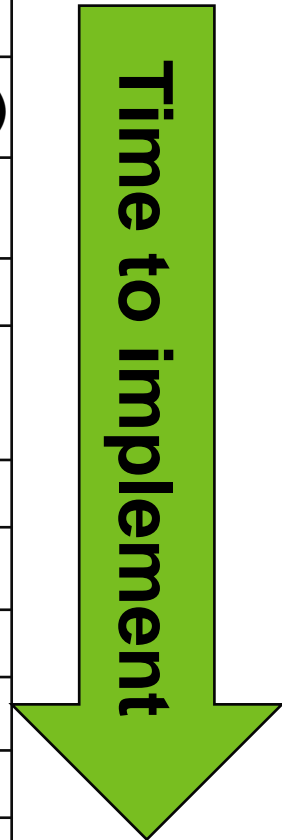
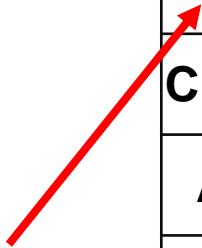
Here is where the difference is made!



PROACTIVE MITIGATION OPTIONS

| |
|--|
| Inventory/safety stock management |
| Forward buying or hedging to mitigate cost risks |
| Closer collaboration and planning with suppliers (Tiers 1&2) |
| Active supplier monitoring combined with early detection |
| Alternate or dual sourcing |
| Contract management, including risk sharing and performance-based contracts |
| Designing products for resiliency |
| Designing supply networks for greater resiliency |
| Rationalizing product portfolios |
| Regionalizing production and distribution |
| Near-shoring |
| Vertical integration |

Cross-functional work needed



Managing financial risk in supply chains

Strategic requirements for supplier insurance and limitations of liability

- Every contract should address: limitation of liability, indemnification, and supplier insurance

Provider optimization and redundancy

- Avoid excessive consolidation of the supplier base
- A balanced supplier portfolio:
 - Multiple plants by the provider
 - Multiple suppliers in a primary and secondary role

Visibility to supplier financial stability

AGILE DESIGN INNOVATION



- Component substitution
- Material substitution
- Multiple variations that are non-visual
- Shift in usage process

ADAPTABLE GLOBAL SOURCING



- Real-time global sourcing map
- Substitution sourcing plan
- Inventory planning and positioning
- Shift baseline from total cost management to total out of stock management

Supply chain resilience playbook

MODAL MANUFACTURING



- Finish-to-order thinking
- Global contingency planning
- Disaster recovery sites/arrangements
- Inventory management for reserve stock

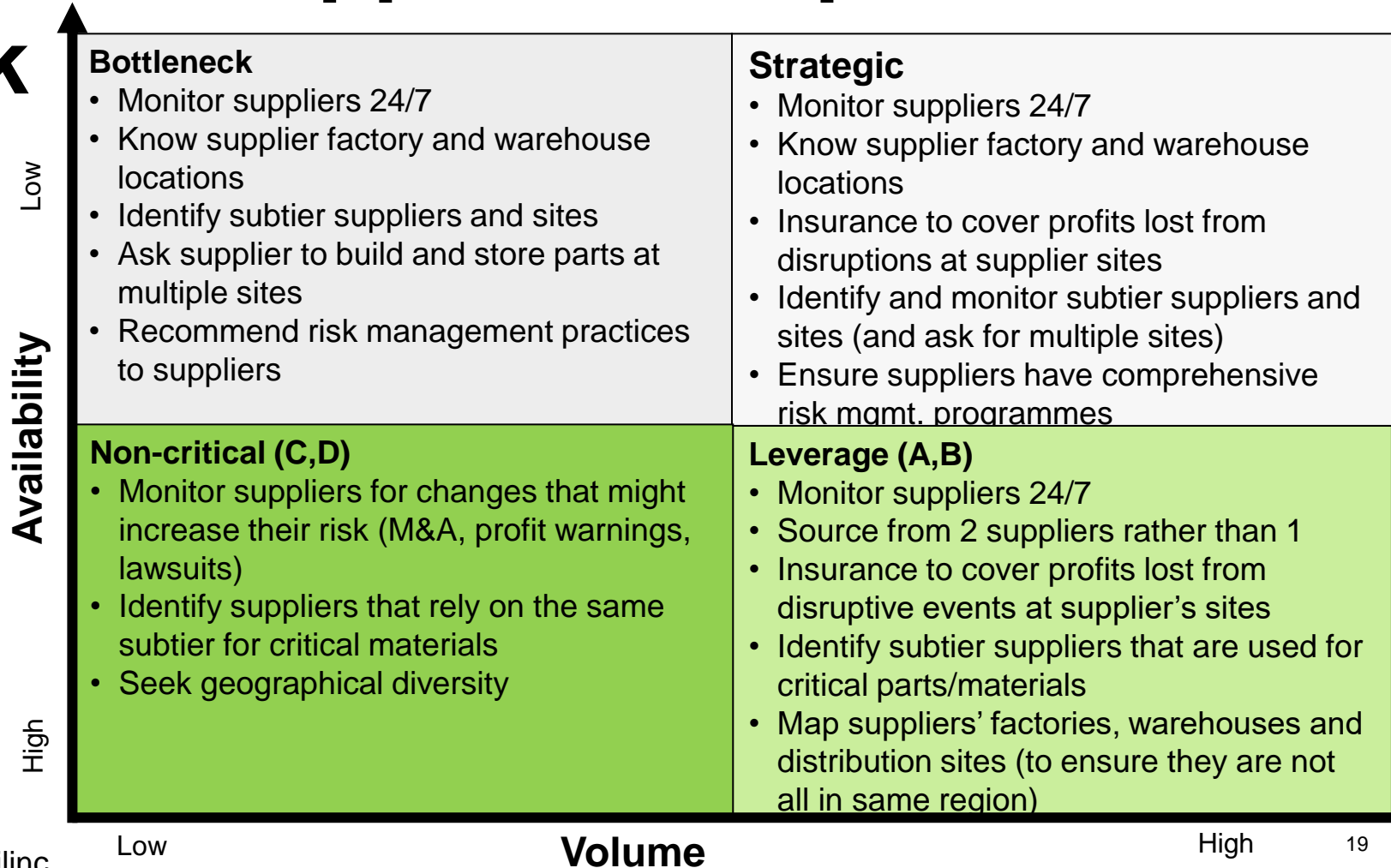
FLEXIBLE ORDER TO DELIVERY



- Real-time key route alternatives
- Within country multi-modal planning
- Disaster recovery site
- Tiered inventory management that shows balance sheet measurements that are unique

Network design
Sourcing strategy
Planning and inventory management
Product and engineering flexibility

Portfolio approach to procurement risk



Learn to manage complexity & uncertainty

Analytics: internal and external

- Increased spend visibility through systems and analytics
- Market intelligence, supplier health checks, weather & political monitoring
- Understand, forecast, make decisions

Impact assessment & Risk management

- Increase detection lead time
- Add buffers & flexibility

Be prepared to reroute, have supplier capacity in different regions

Develop strong relationships with key suppliers

Reminder: Project proposal due Friday

This is to communicate your analysis plan for the case company: what do you plan to do and how

700-1000 words (not including references and figures and/or tables)

Outline the following

- Your analysis plan, including but not limited to
 - Assumptions you plan to make in your analyses
 - Potential methods of analysis
 - Key reference sources or software used can be noted as applicable
- Your timeline (e.g. gant chart)
- Expected deliverables based on your analysis
- **Any key questions you want to get feedback on from the case company**
- **Any other information you see relevant**

You have a chance to work & get feedback on it during Thursday lecture too