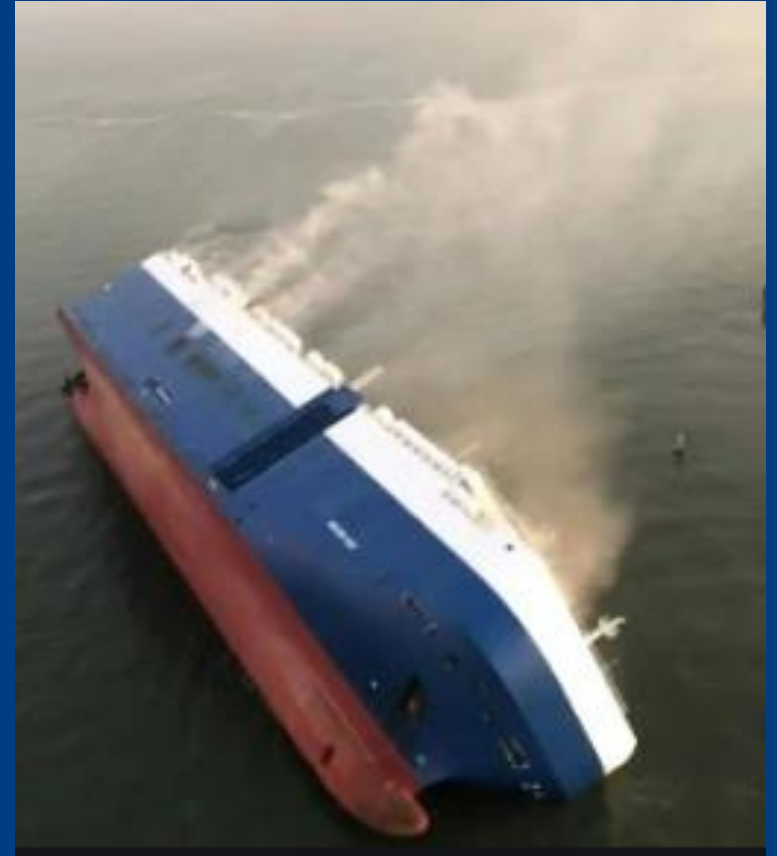


Supply Chain and Trade Disruption

Marine Insurance Day Seminar
October 4, 2019.

Linda Conrad
Stone Harbor Investments Consulting and
Professor, Supply Chain Risk Management,
University of Maryland



Agenda - Supply Chain and Trade Disruption

Supply Chain Risk Management

- Understanding the challenges in the value chain
- Why does climate change matter?
- How can trade disruption risks be addressed?

Hurricane Dorian September 2019



Supply Chain and Trade Disruption

- A decade ago, supply chain risk was primarily focused on supplier inventory, distribution interruptions, commodity price volatility and product shortages.
- Now, changing corporate expectations, emerging e-commerce technology, cyber threats, transportation problems, labor issues, and the rising frequency of natural disasters, create a myriad challenges and trade disruptions.
- As we dive into this maelstrom of threats to supply chains, we will explore some major issues and trends that can impact global trade

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Understanding Supply Chain challenges

Global sourcing

Geopolitical Risk
Increasing

Market Shortages

Single sourcing

Just-in-time
manufacturing

Increased Complexity

**Actions taken to drive costs out
can drive greater risk in**




Understanding the disruption causes



Natural catastrophes




IT failure



Power failure



Labor disputes



Transportation

Delays at supplier's supplier



Supplier insolvency



Piracy



Political risk



Failure at critical suppliers



South Korea's Hanjin Shipping files for bankruptcy

- Hanjin operates approximately 60 regular lines world-wide, with 140 container or bulk vessels. It is ranked as the world's ninth largest container shipping company, transporting over 100 million tons of cargo a year.
- Its failure would be the largest container-shipping failure in history, dwarfing all previous carrier bankruptcies.
- The bankruptcy roiled ports in the U.S. and beyond, as creditors seized ships and terminal operators refused to handle cargo, stranding 45 container ships at sea, loaded with more than half a million containers of appliances, electronics and other consumer goods.

Disarray at the ports

- As the global shipping industry's drive to achieve economies of scale, there are unintended consequences of the rapid escalation of ship sizes
- In 1985, ships carried 20-foot equivalent units. Today, they carry 18,000 TEUs.
- Handlers scramble to sort through cargo boxes dropped at terminals to line them up for distribution, causing chronic delays and, for some shippers, higher costs as they shoulder the cost of longer wait times.

What are the top 3 supply chain challenges?

Pick all that apply

- Natural Catastrophe
- Transportation issues
- Production problems
- Strikes and work stoppages
- Cyber disruptions
- Supplier insolvency
- Political risk

Why we should be worried

Top 3 Causes of Supply Chain Disruption

74%
Companies



3rd
Adverse
weather



2nd
Cyber
attacks
and data
breach



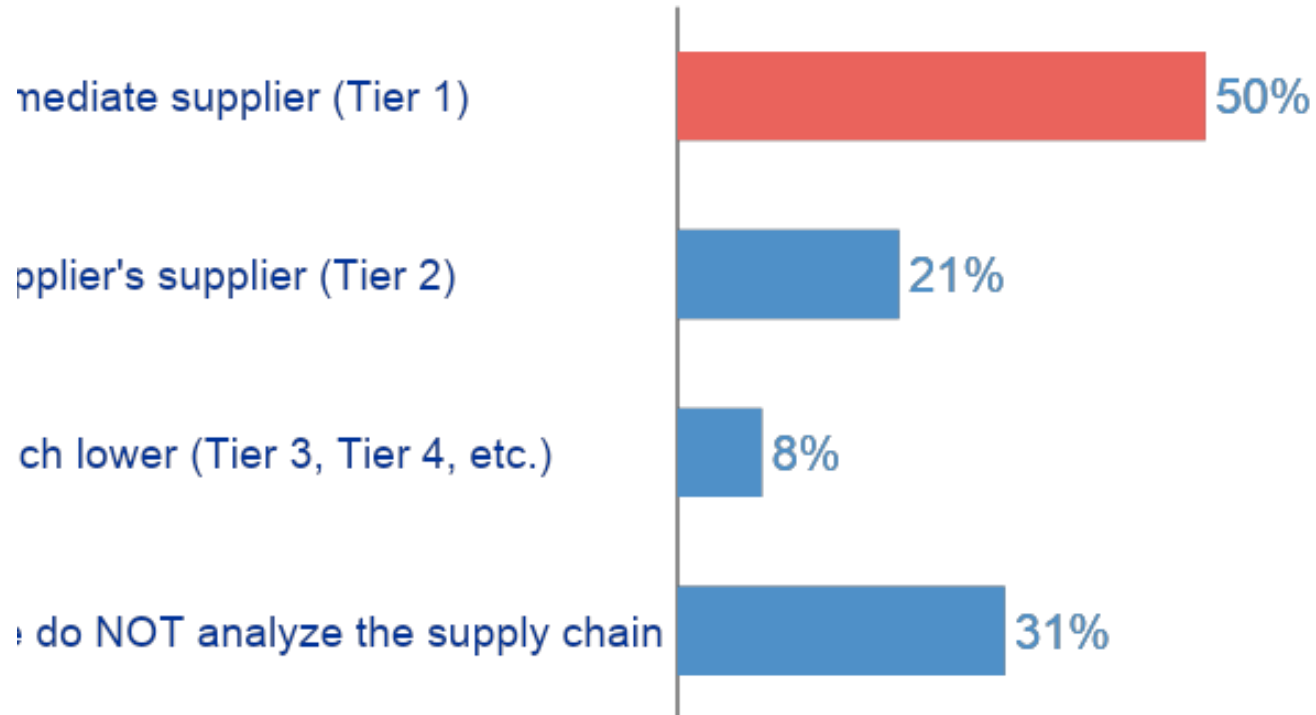
1st
IT &
telecoms
outage

Digital Disruption: the new normal

- The new threat on the block for supply chains: ransomware.
- The NotPetya digital attack on Maersk and subsidiary Damco in summer 2017 paralyzed the firm for days and cost an estimated \$300 million
- For the first time, the supply chain was the specific target of large-scale digital crime.

Need to understand interconnected risk

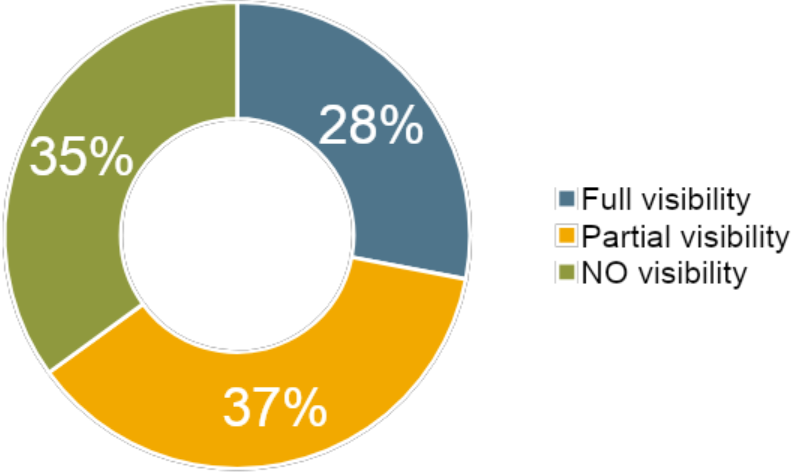
Origin of Disruption



29%
report
disruptions
below Tier 1.

Lack of Visibility

Supply Chain Visibility



Almost three-quarters of firms (72%) DO NOT have full visibility of their supply chains

Supply Chain and safety



Supply Chain and safety

- Since the introduction of SOLAS VGM Regulations on the 1st July, 2016, any shipping container leaving from any port in the world must document the verified gross mass of a container in order to be loaded.
- Mideclared weights contributed to maritime casualties such as the breakup and beaching of the MSC Napoli in 2007 and the partial capsizing a feeder ship in the Spanish port of Algeciras in June, 2015.
- Regulations led to protests in India over fees to comply. Kuehne + Nagel say half of China's containerized exports are missing required data

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What is the biggest trend affecting global growth?

- Failure of climate change mitigation and adaptation
- Involuntary migration
- Water crisis
- Fiscal crisis
- Weapons of mass destruction
- Spread of infectious disease

World Economic Forum Global Risk Report

- **Climate is rated the number 1 trend for shaping global development.**
- Climate change is exacerbating more risks than ever before:
 - water crises - both water shortages and damaging floods
 - extreme weather events
 - economic growth
 - societal cohesion
 - peace and security.
- Climate change impacts a business in its value chain, where reliability of resources—whether natural or human—is critical to future growth.

World Economic Forum Global Risk Report

Top 10 risks in terms of Likelihood

- 1 Large-scale involuntary migration
- 2 Extreme weather events
- 3 Failure of climate-change mitigation and adaptation
- 4 Interstate conflict
- 5 Natural catastrophes
- 6 Failure of national governance
- 7 Unemployment or underemployment
- 8 Data fraud or theft
- 9 Water crises
- 10 Illicit trade

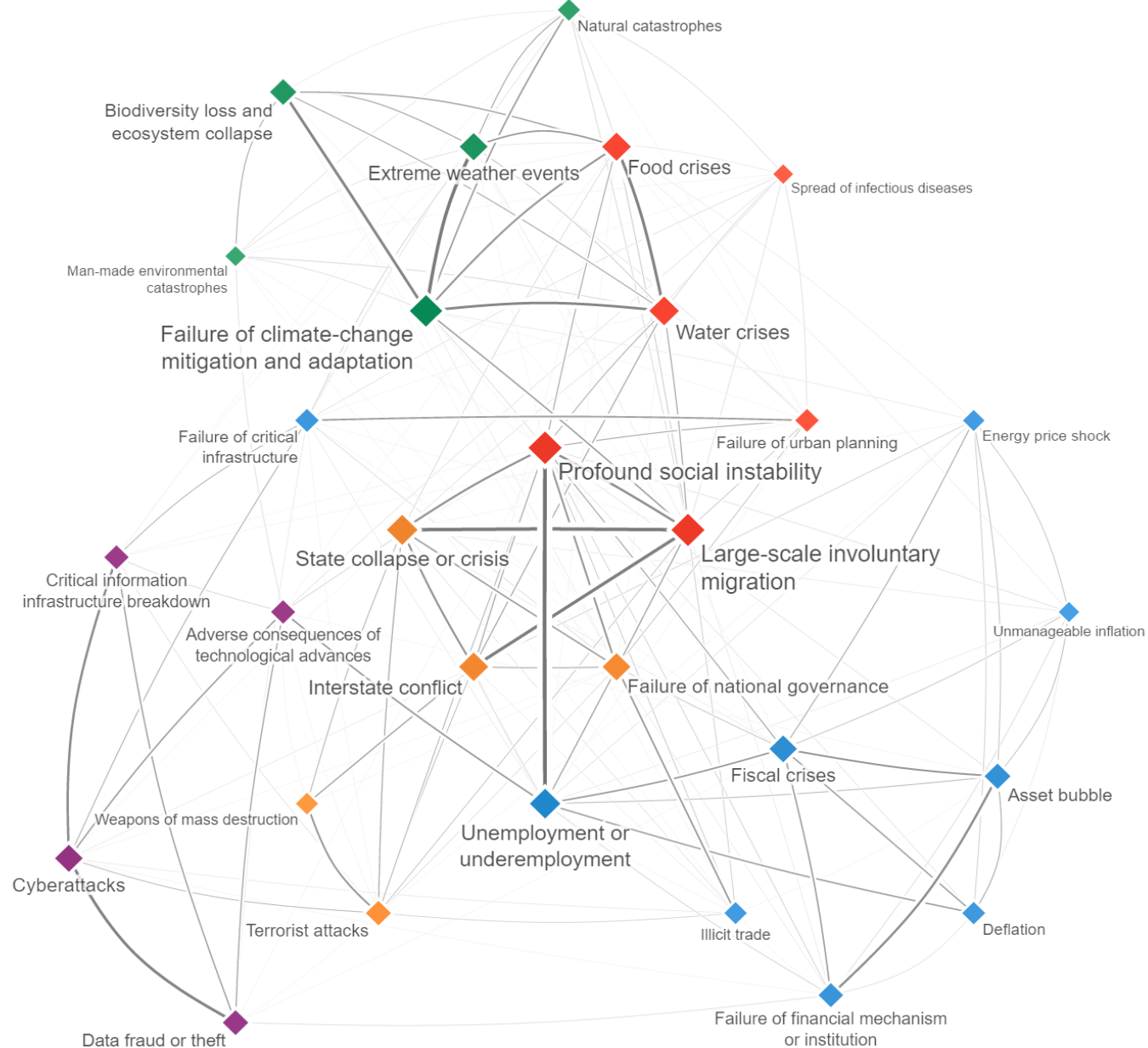
Top 10 risks in terms of Impact

- 1 Failure of climate-change mitigation and adaptation
- 2 Weapons of mass destruction
- 3 Water crises
- 4 Large-scale involuntary migration
- 5 Energy price shock
- 6 Biodiversity loss and ecosystem collapse
- 7 Fiscal crises
- 8 Spread of infectious diseases
- 9 Asset bubble
- 10 Profound social instability

Categories

- Economic
- Environmental
- Geopolitical
- Societal
- Technological

Risk inter-connectivity = unpredictable scenarios



The economic impact of climate change

- Approximately 1/3 of private industry activities have some degree of weather and climate risk
- World Bank says that by 2050, 1.3 billion people, along with \$158 trillion in assets, will be put at risk from flooding and sea level rise alone.
- By 2050, 70% of the world's population will be urban, with a greater concentration of potential disruption from flood

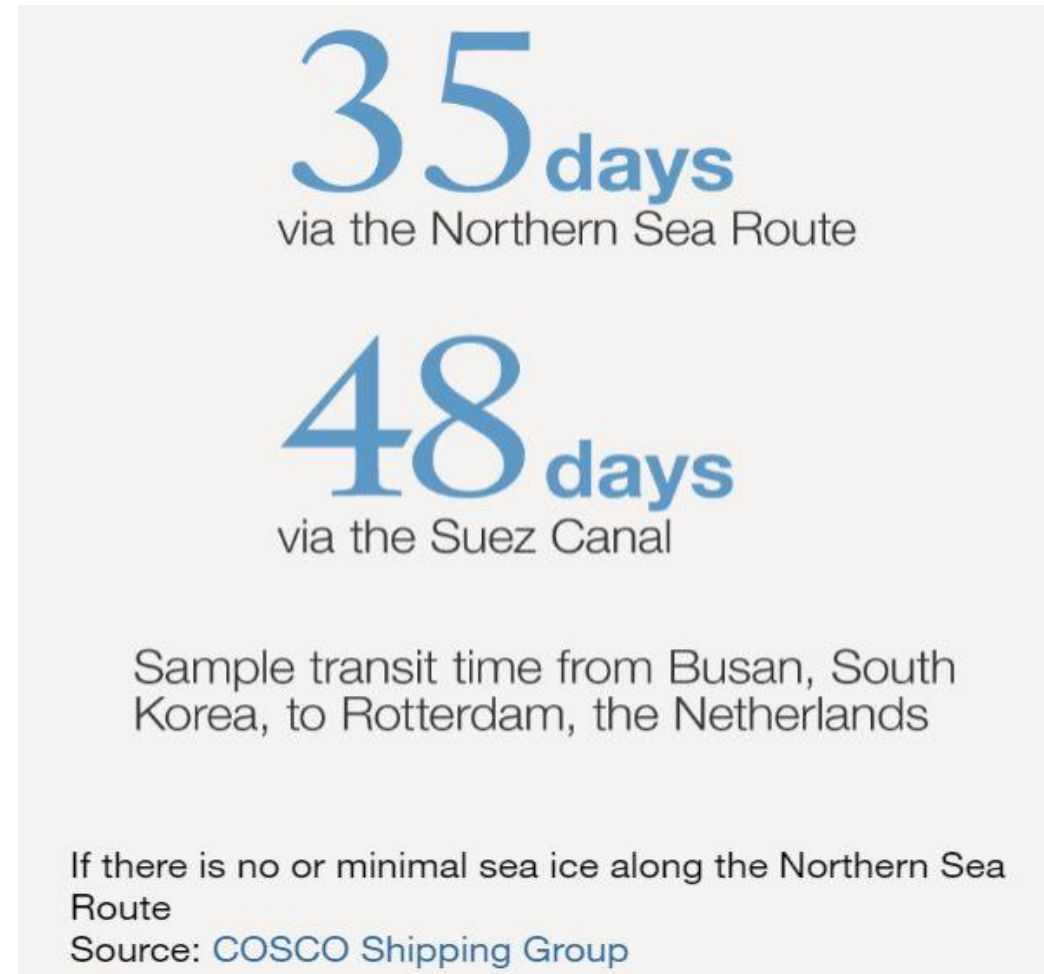
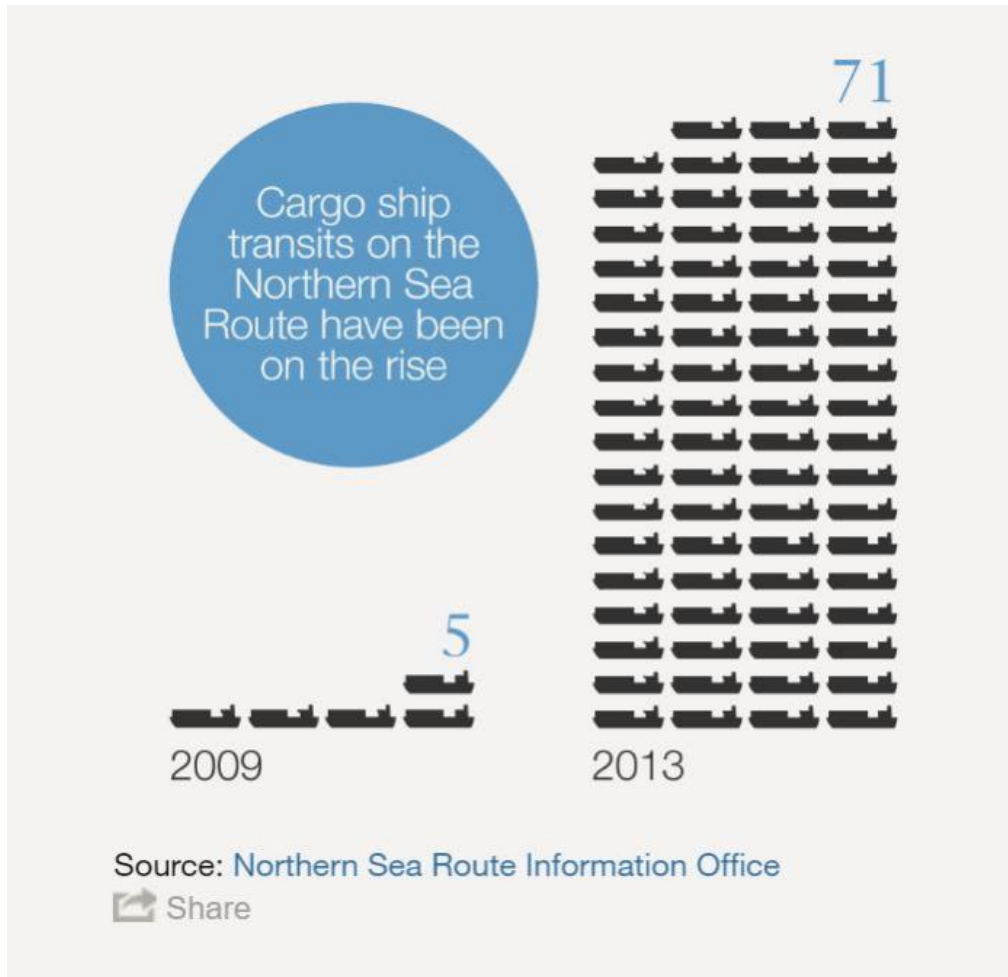
Ports exposed to climate change

- The riskiest ports are in Nagoya, Japan and Guangzhou, China, six of the top ten riskiest ports are in the US, with the last two in Europe.
- “Surprisingly, a port’s size and its catastrophe loss potential are not strongly correlated....Many smaller U.S. ports rank more highly for risk, largely due to hurricanes.”
- “Outdated techniques and incomplete data have obscured many high-risk locations.”

The 'positive' side of climate change: the Arctic

- Shipping lanes are opening that would be many thousands of miles shorter than traditional seaways via the two capes or the two canals.
- Russia's Northern Sea Route shaves roughly 30 percent of the distance off a voyage from Shanghai to Hamburg via the Suez Canal. It avoids heavily pirated Strait of Malacca and Horn of Africa waters. Operators can either arrive at their destinations earlier or use the extra time for super-slow sailing, reducing fuel costs and emissions.
- The Northeast Passage connecting the Atlantic and Pacific first became ice-free for a short period in the summer of 2007. In Sept. 2013, Nordic Orion reportedly saving about \$80,000 in fuel.

Arctic arithmetic

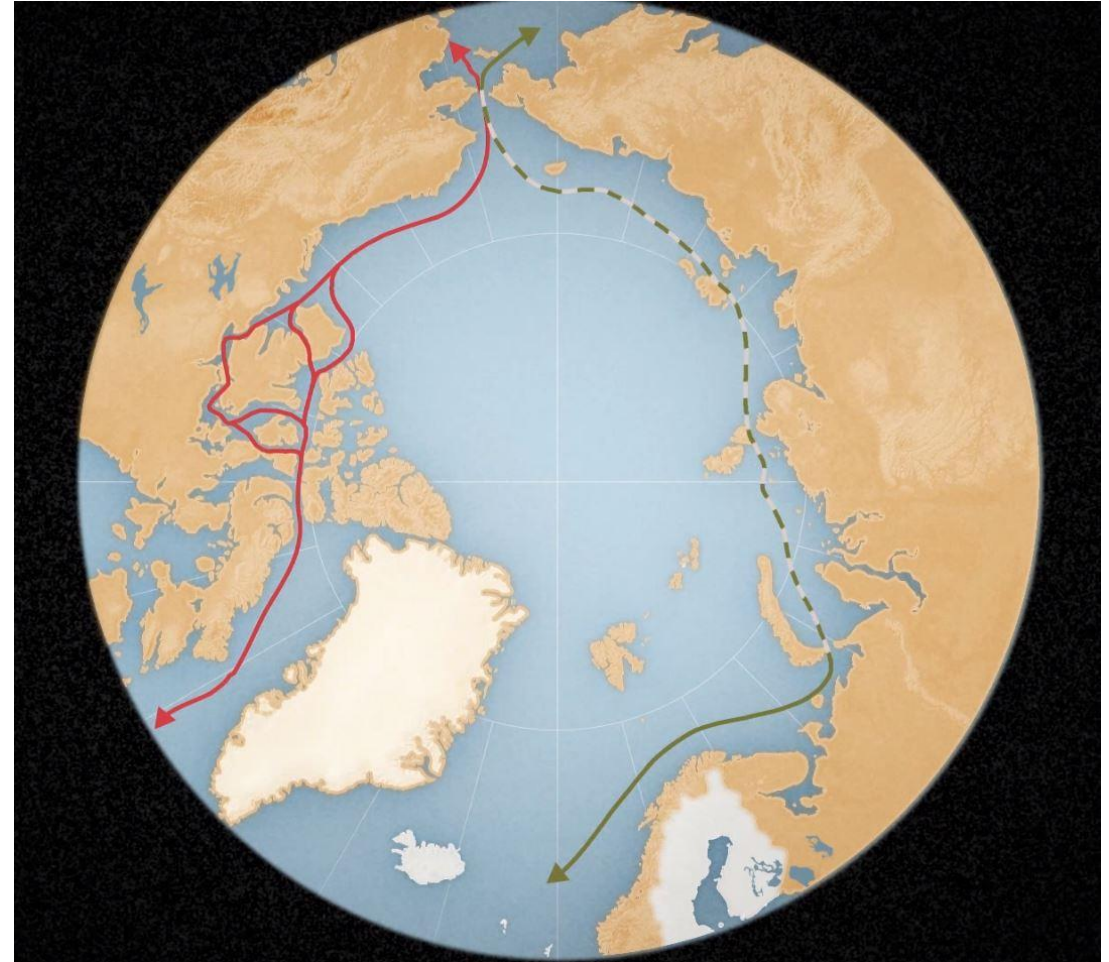


What is the average cost of an ice breaker escort?

- \$100,000
- \$200,000
- \$300,000
- \$400,000

A balancing act

- Russia invests tens of billions of dollars in infrastructure to create the “Suez of the north,” with new ports of call and nuclear-powered icebreakers
- Yet, unpredictable weather and ice floes make navigation difficult.
- Ships often require an icebreaker escort which can cost \$400,000. Additional insurance can offset potential savings.




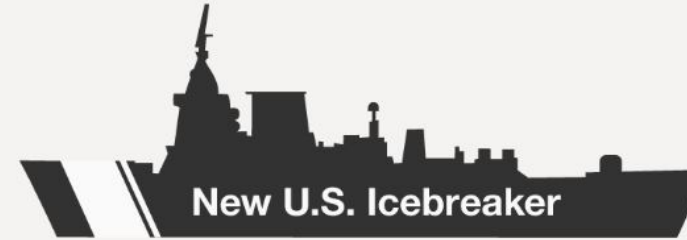
Ice breakers



Russia's large fleet (with the world's only nuclear icebreakers) is needed to support its vast Arctic regions.

Polar icebreakers of at least 20,000 horsepower
Source: [U.S. Coast Guard](#)

 Share



\$1 billion

8-10 years to procure

Estimated for one heavy U.S. Coast Guard polar icebreaker

Source: [Congressional Research Service](#)

 Share

Is Arctic shipping 'safe and sound'?

- There are no Arctic-specific safety and environmental standards for shipping, but coastal states may regulate marine pollution from vessels
- The UN's International Maritime Organization made mandatory rules for Arctic ship design /construction, crew training, marine safety equipment
- Critics believe the IMO should reduce global warming by implementing restrictions on the use of heavy fuel oil and emissions of black carbon

Proceed with caution

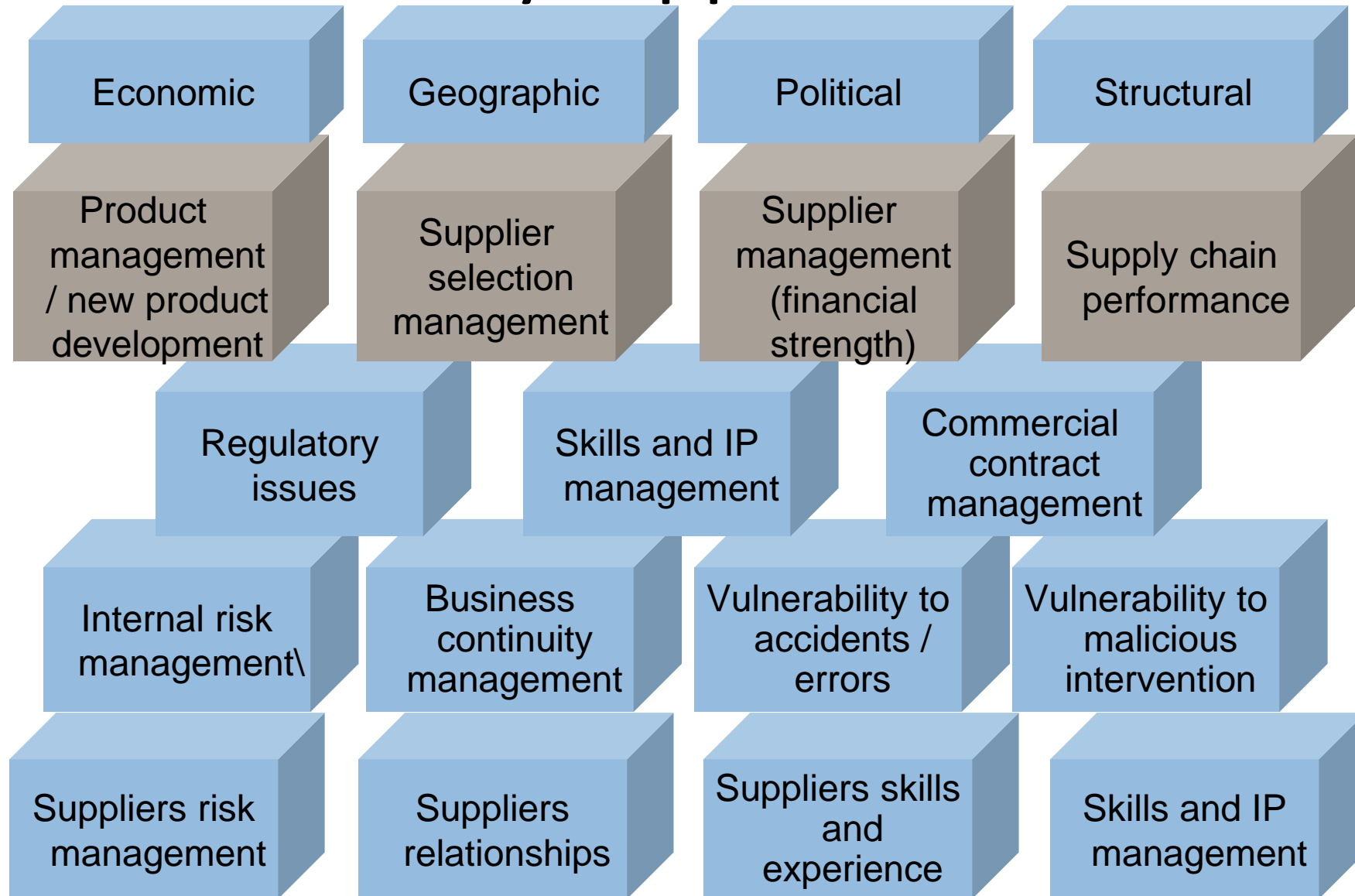
- The Intergovernmental Panel on Climate Change estimate that Arctic summers may become completely ice free beginning 2020 to 2035
- In 2012, parts of the Arctic Ocean covered by ice reduced to its smallest size since record keeping began in 1979, shrinking by 350,000 square miles (an area equal to the size of Venezuela) since the previous summer.
- In the past three decades, Arctic sea ice lost half its area and three quarters of its volume. Good for shipping but bad for the environment?

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Analyze the risk in key suppliers



Cyber risks



Global Trade

- The World Trade Organization warned that trade volumes may fall from 4.7% last year, to 4% next year amid signs that “escalating trade tensions may already be affecting business confidence and investment decisions.”
- The International Monetary Fund, meanwhile, has reduced its estimate for world GDP growth to 3.7% from 3.9%, which is in part due to trade tensions.
- Focus is now firmly on company trade directors, supply chain managers, regulatory and compliance officers, and tax accountants

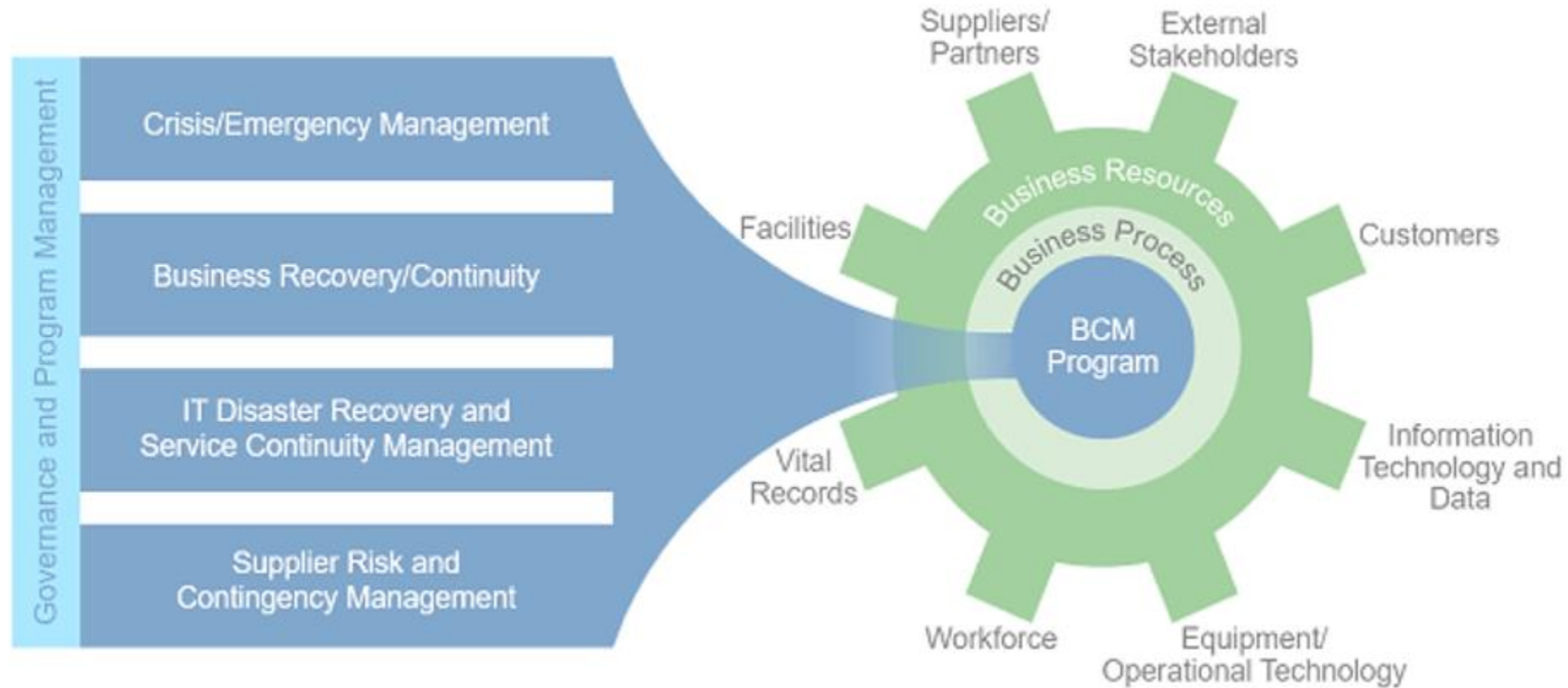
Public-private partnerships



Insurance coverage for supply chain?

	Supply Chain	Contingent BI	Marine & Marine BI	Trade Credit	Political Risk	Stand alone Flood
Supplier insolvency	*			*		
Failure of fuel supply or utilities	*					
Communication system failure	*					
Transport failures or port blockage	*		*			
Raw materials or component delays	*					
Supplier staff illness or strikes	*					
Cyber risks, virus	*					
Denied access to supplier's premises	*					
Physical damage	*	*	*			
Flood and Time Element BI	*					*
Political risk	*				*	
Expropriation	*				*	

Plan for Disruption - Business Continuity Mgmt.



Integrated Risk Management



Protect Profitability: the ERM wheel



Get involved

- Evaluate data used in international logistics and global shipping
- Engage with current environmental and ethical debates, technological developments, government legislation, managerial decision-making
- Balance future shipping needs and environmental impacts
- Encourage youth to take a Maritime & Supply Chain Management major, which consists of courses in international shipping, supply chain and logistics management, port management, and shipping management

Thank you

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Questions