

Recent Challenges and Opportunities in GVC

October 2022

KDI Global Forum

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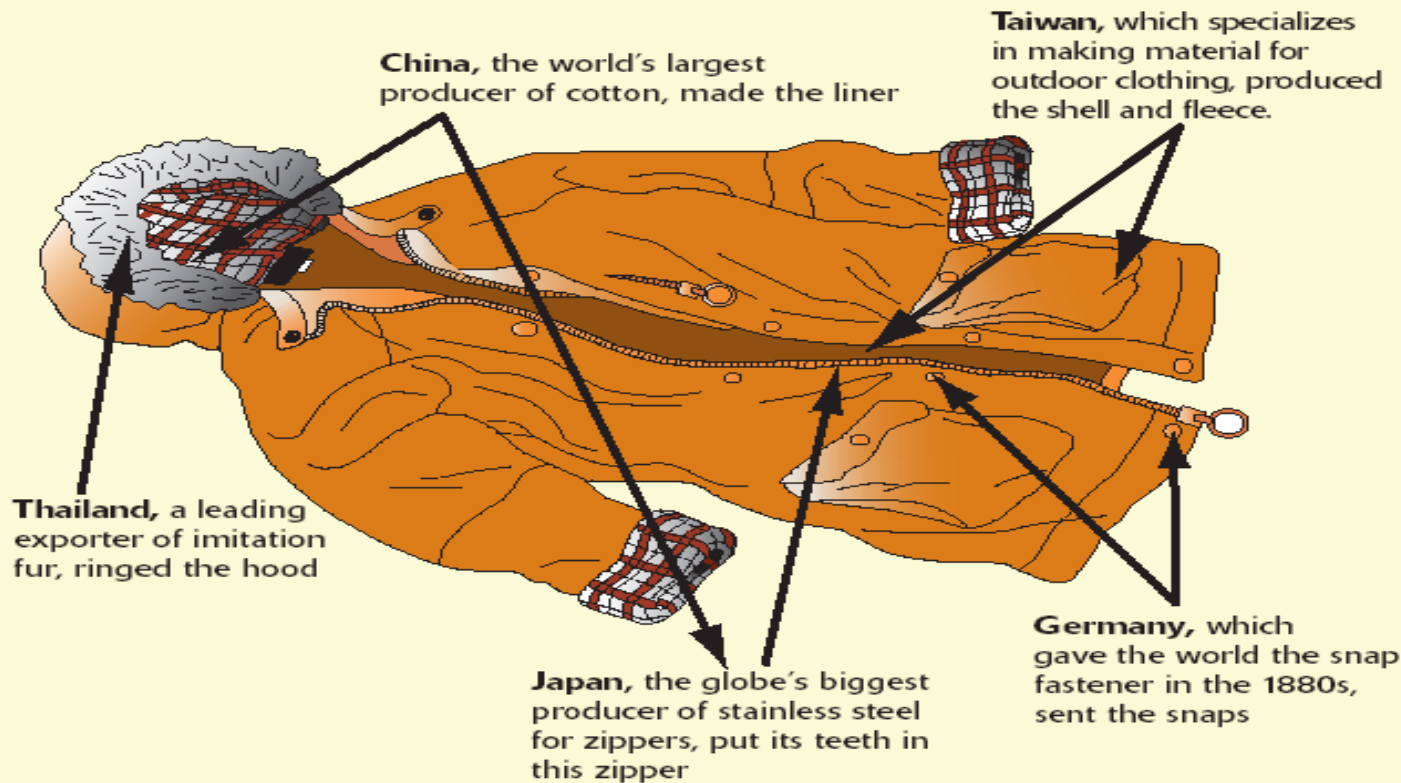
Seoul National University



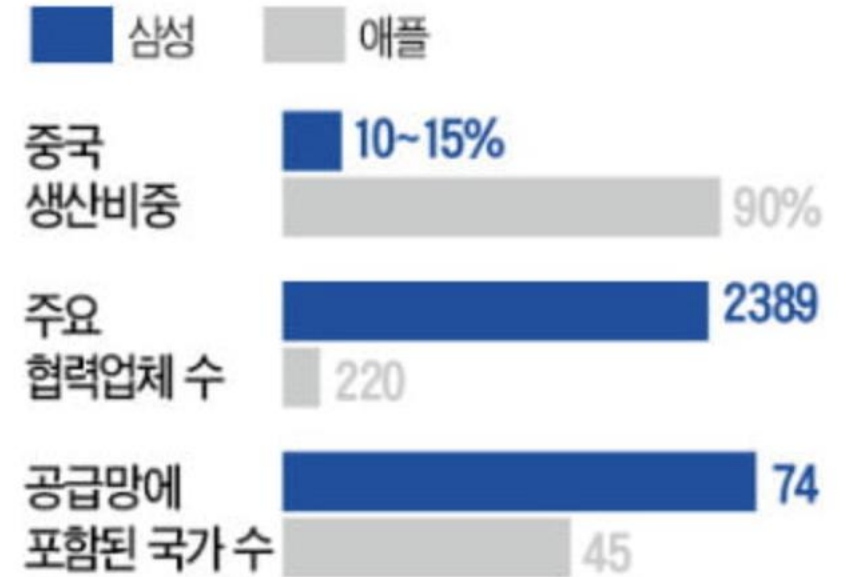
Globalization in Production (GVC) has been successful!

How Many Countries Does It Take to Make a Coat?

To make this jacket for the U.S. market, Hong Kong garment producer Li & Fung ordered materials from factories in five countries and had them delivered to Thailand, where the jacket was stitched together. Using a network of Web sites, Li & Fung stays in touch with its worldwide suppliers and can compress the time it takes to get items into stores.



삼성과 애플의 SCM 차이



Recent Challenges in GVC: Natural Disasters

FORTUNE

The global supply chain: So very fragile (Dec 21, 2011)

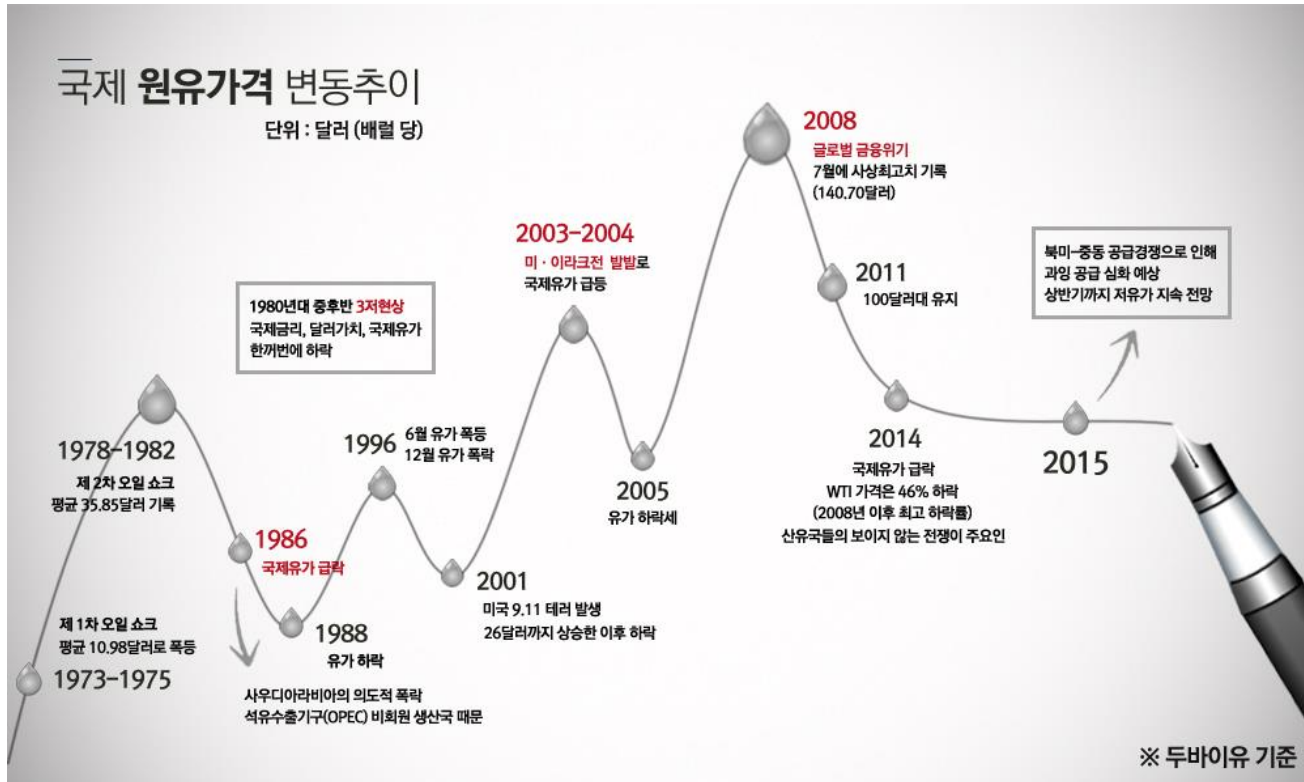
- “Manufacturers have spent years building low-cost global supply chains. Natural disasters are showing them how delicate those networks really are..”
- “Big manufacturers developed a multinational network of specialists to supply them with parts and to make sure those components arrived at assembly plants at the moment they were needed. When things go as planned, the system benefits everyone in the chain” ⇒ If not?



PHOTO: TOHANKOKU/AFL0/2UMAPRESS.COM

Recent Challenges in GVC: Fluctuations in commodity prices

Crude oil prices in Korea



국제유가 추이

단위: 배럴당 달러, WTI 기준

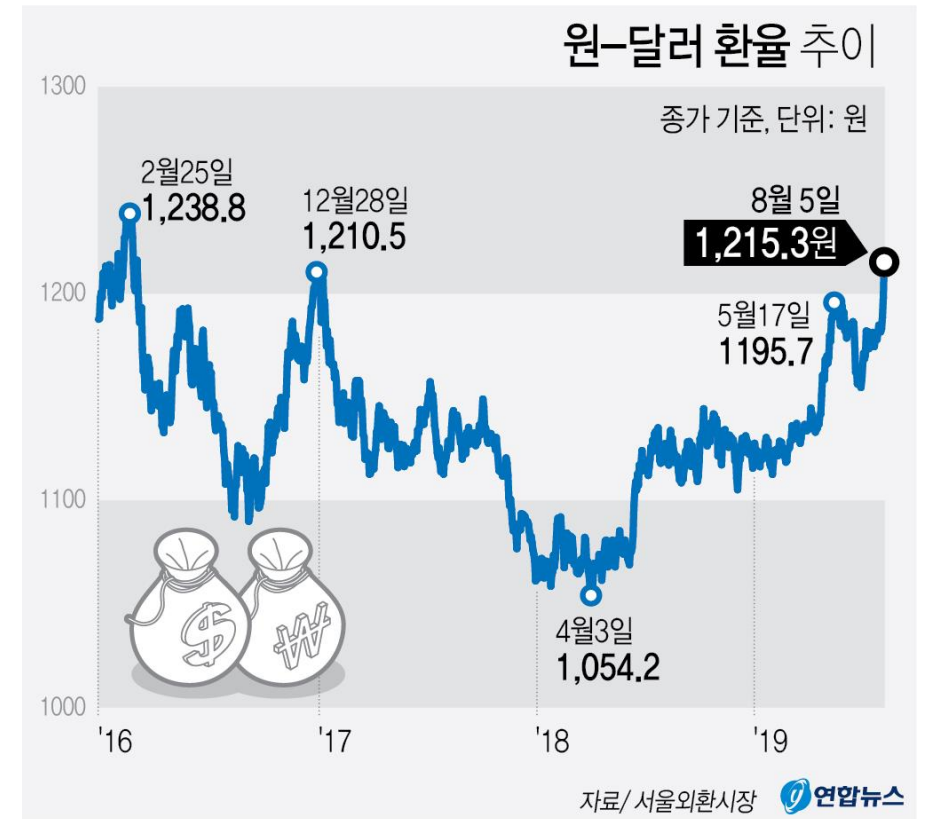


자료: 한국석유공사

The JoongAng

Recent Challenges in GVC: Fluctuations in Exchange Rate

Won/Dollar FX rate (1989-2007, 2016~2020)



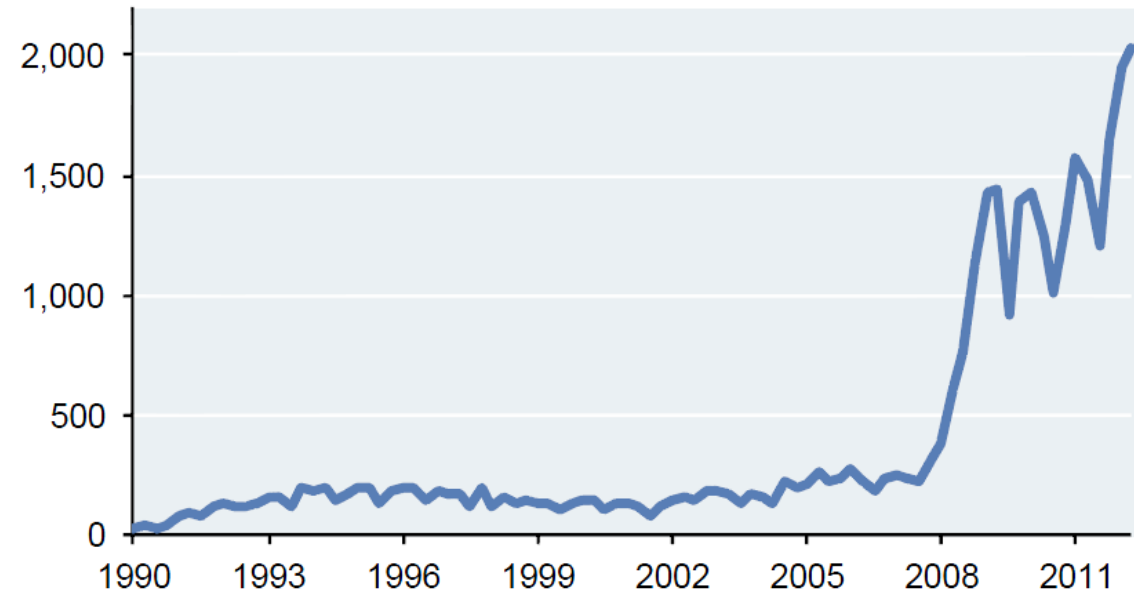
박영석 기자 / 20190805
트위터 @yonhap_graphics, 페이스북 tune.y.kr/LeYN1

Recent Challenges in GVC: Global Financial Crisis

2008.Sep.15 Lehman Brothers bankruptcy



National bankruptcies in Spain
Number of companies filing each quarter

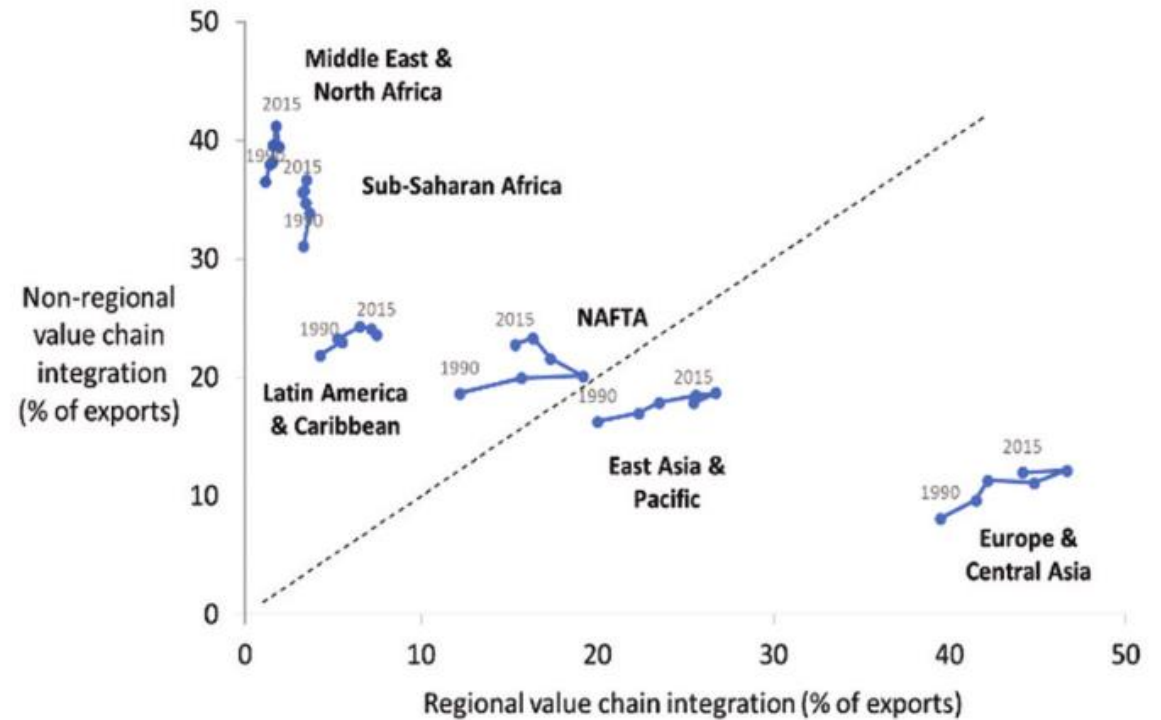


Source: INE.

Recent Challenges in GVC: Social and Political Forces toward RVC

GVCs are rapidly reorganized by regional blocks (RVC).

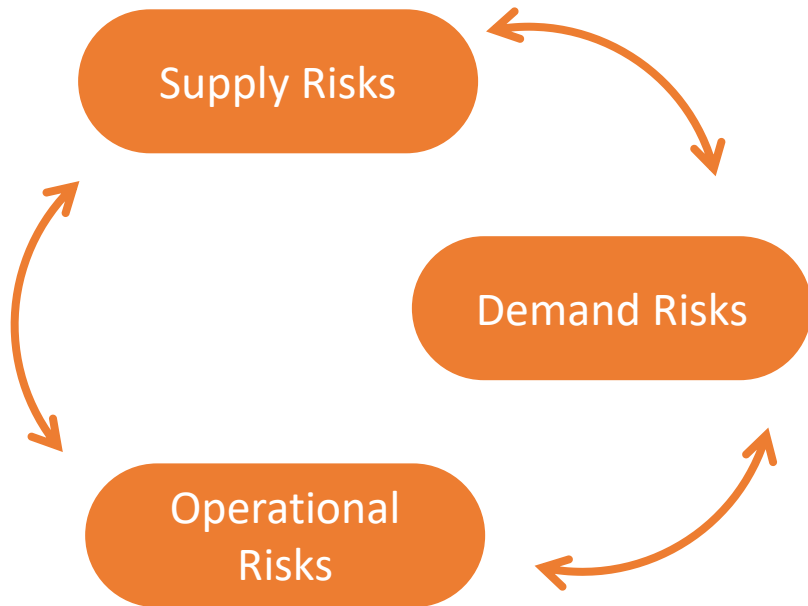
- EU, NAFTA, East Asia, etc.
- But this would come at a high efficiency cost
- Fewer options to substitute between suppliers or buyers in case of a disruption for RVC.



| Decomposition of Global Value Chain (GVC) participation by major geographic regions (a) and by type (b). Source: Authors calculations using GVC database from Borin and Mancini (2015, 2019). Breakdown of regional and non-regional value chain participation provided by Borin and Mancini using a novel extension of dataset available on request. Note: Points above the 45° indicate an increase in GVC participation.

Paradigm Shift in GVC Management

Increased variability in GVC call for systematic risk management



External Risks	Political Risks	Political Instability, Trade restrictions, Terrorism, Piracy, Lawsuits, etc.
	Economic Risks	Interest rate fluctuation, Exchange rate fluctuation, Economic recession, etc.
	Social Risks	Labor shortages, Ethics, Strikes, etc.
	Environmental Risks	Natural Disasters, Pandemics, etc.
Internal Risks	Operational Risks	Forecast errors, Quality problems, Shortages, Capacity constraints, etc.
	Strategic Risks	Business process errors, etc.
	Technological Risks	IT disruptions, Cyber security attack, etc.

Paradigm Shift in GVC Management

Investment in GVC risk management

- Companies are willing to invest more on supply chain resilience after COVID-19 pandemic.

Exhibit 2:

Supply-chain leaders expect to focus on resilience and digitization.

93%

Plan to increase resilience across the supply chain



53% Dual sourcing of raw materials
47% Increasing inventory of critical products
40% Near-shoring and increasing supplier base
38% Regionalizing supply chains

54%

Expect changes to supply-chain planning after COVID-19



58% Centralizing supply-chain planning
50% Retaining faster S&OP¹ cycle
60% Implementing advanced analytics

90%

Plan to increase digital supply-chain talent in-house



70% Reskilling today's labor force
55% Acquiring new talent from the labor market

11%

Face budget constraints in transforming supply chains

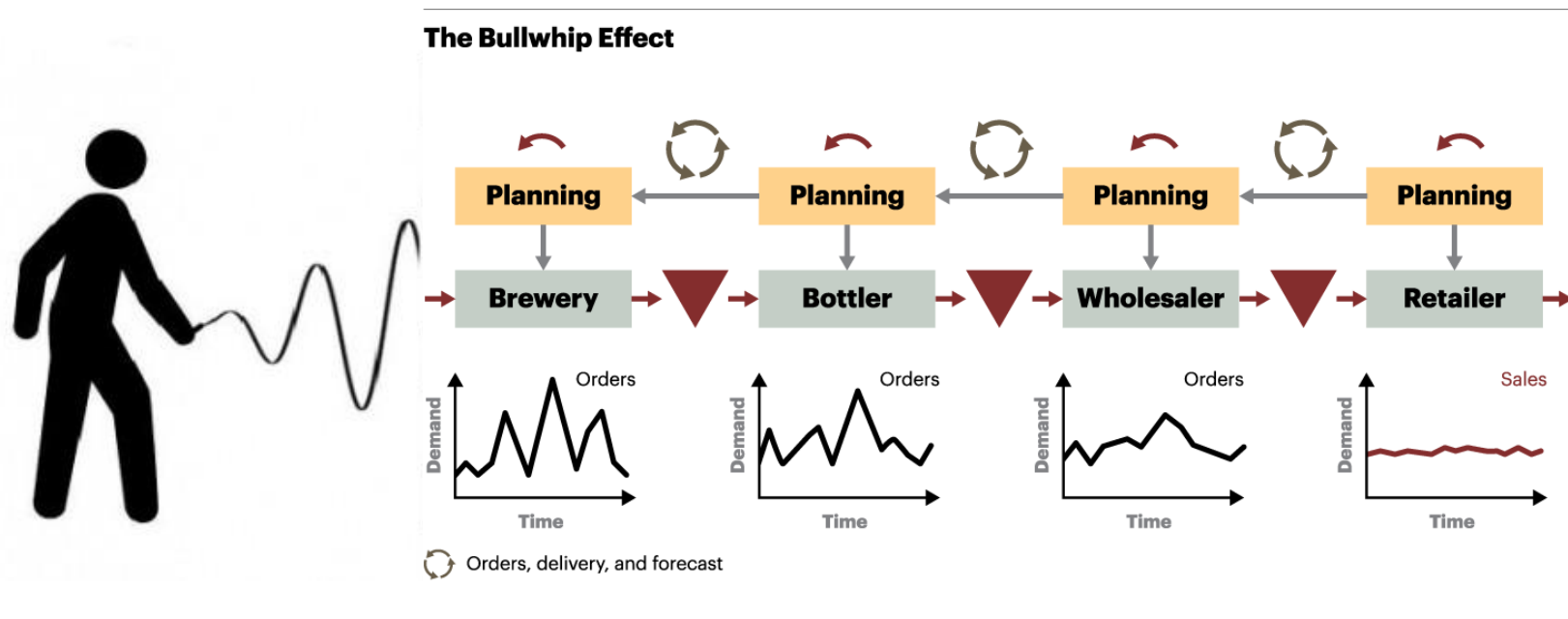
[Source] McKinsey Survey: Resetting Supply Chains For The "Next Normal" (2020.10.20)

https://www.supplychain247.com/paper/mckinsey_survey_resetting_supply_chains_for_the_next_normal/risk_management

Bullwhip vs Ripple Effect

Bullwhip Effect

- The demand order variabilities in GVC are **amplified** as they move up the chain.



Bullwhip vs Ripple Effect

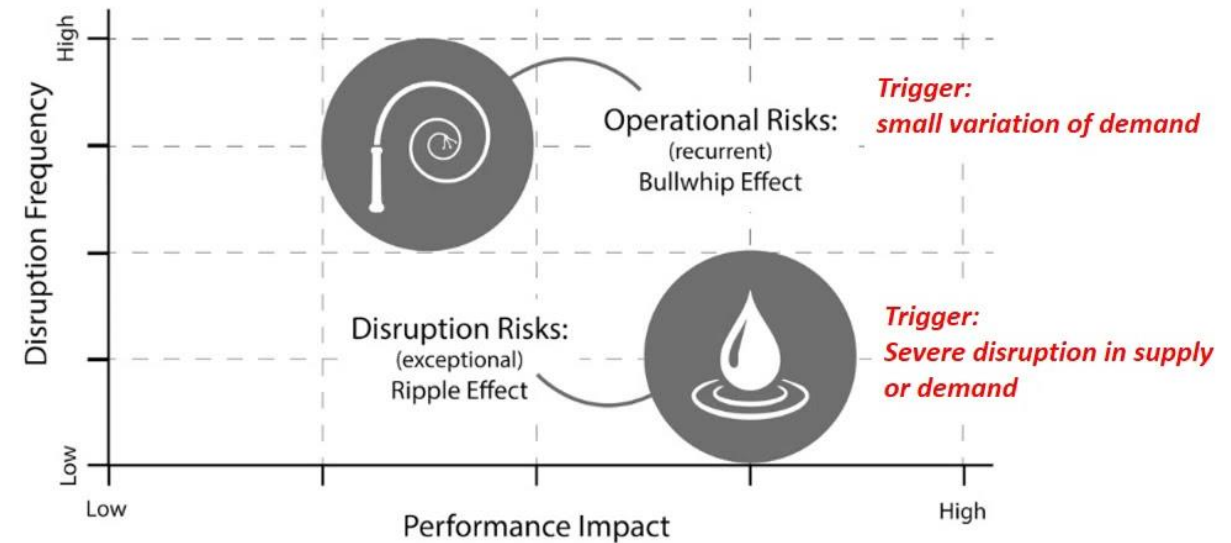
Ripple Effect

- The impact of supplier's disruption **escalates** when they move down the chain.



© Fotolia/FG

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[15] Ivanov, D. (2018). *Structural Dynamics and Resilience in Supply Chain Risk Management*. Springer, New York

[source] Ivanov (2019) Handbook of ripple effects in the supply chain

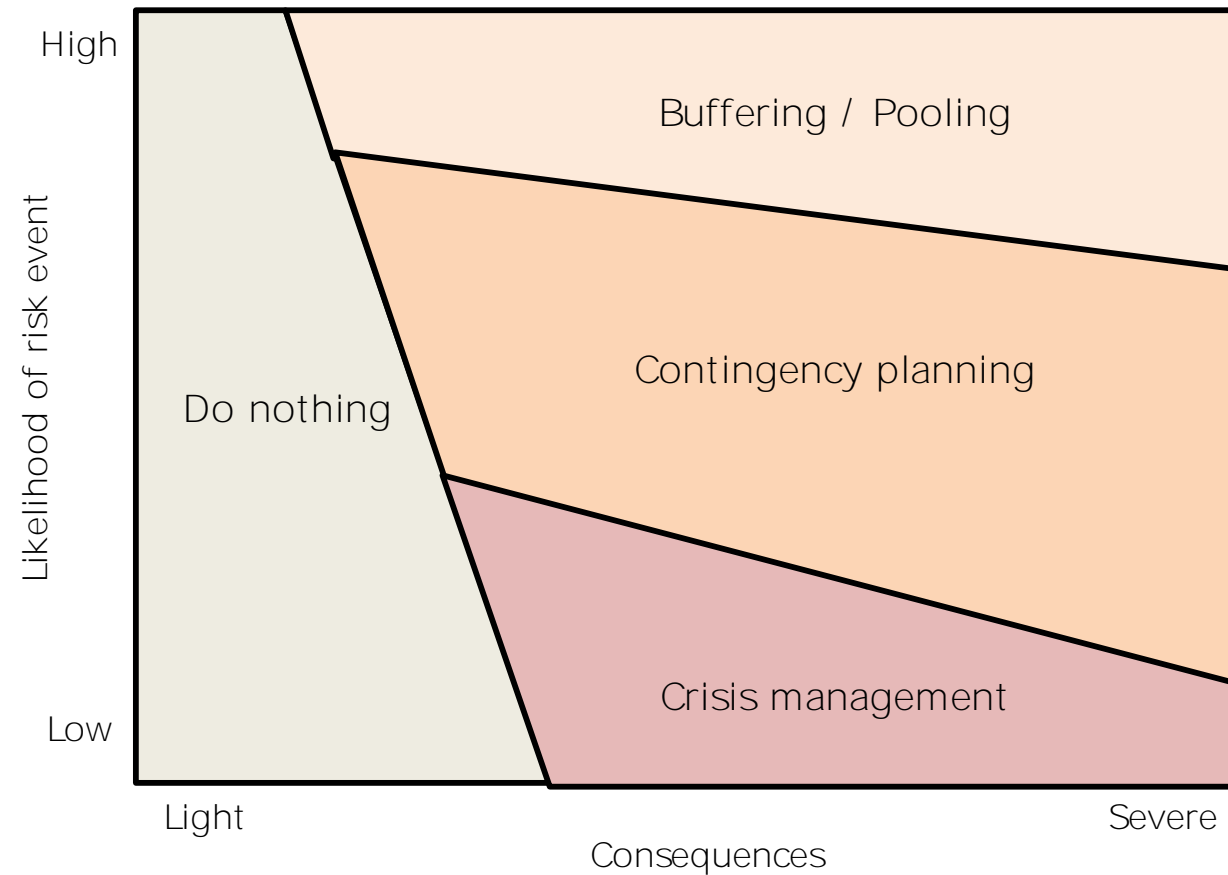
Policy Implications

Governments can work jointly with firms on improving risk preparedness

- (1) Applying proper **risk mitigation strategies** carefully
- (2) **Mapping** the local and international players involved in essential logistic chains
- (3) Developing **stress tests** for essential supply chains

(1) Risk Mitigation Strategies

Risk mitigation strategy according to probability and consequences of risk events



[출처] Van Mieghem (2010) Handbook of integrated risk management in global supply chains

(1) Risk Mitigation Strategies

Risk mitigation strategies for types of supply chain risk

- **Buffering/pooling**: require the firm to keep the physical resources ready for use when a risk event occurs when risk event is highly likely and consequences are not light
- **Contingent planning**: when the likelihood of risk events is moderate, secure the access to resource in times of need
- **Crisis management**: when risk events are rare but the consequence is severe, the above strategies still are insufficient for recovery
- **Do Nothing**

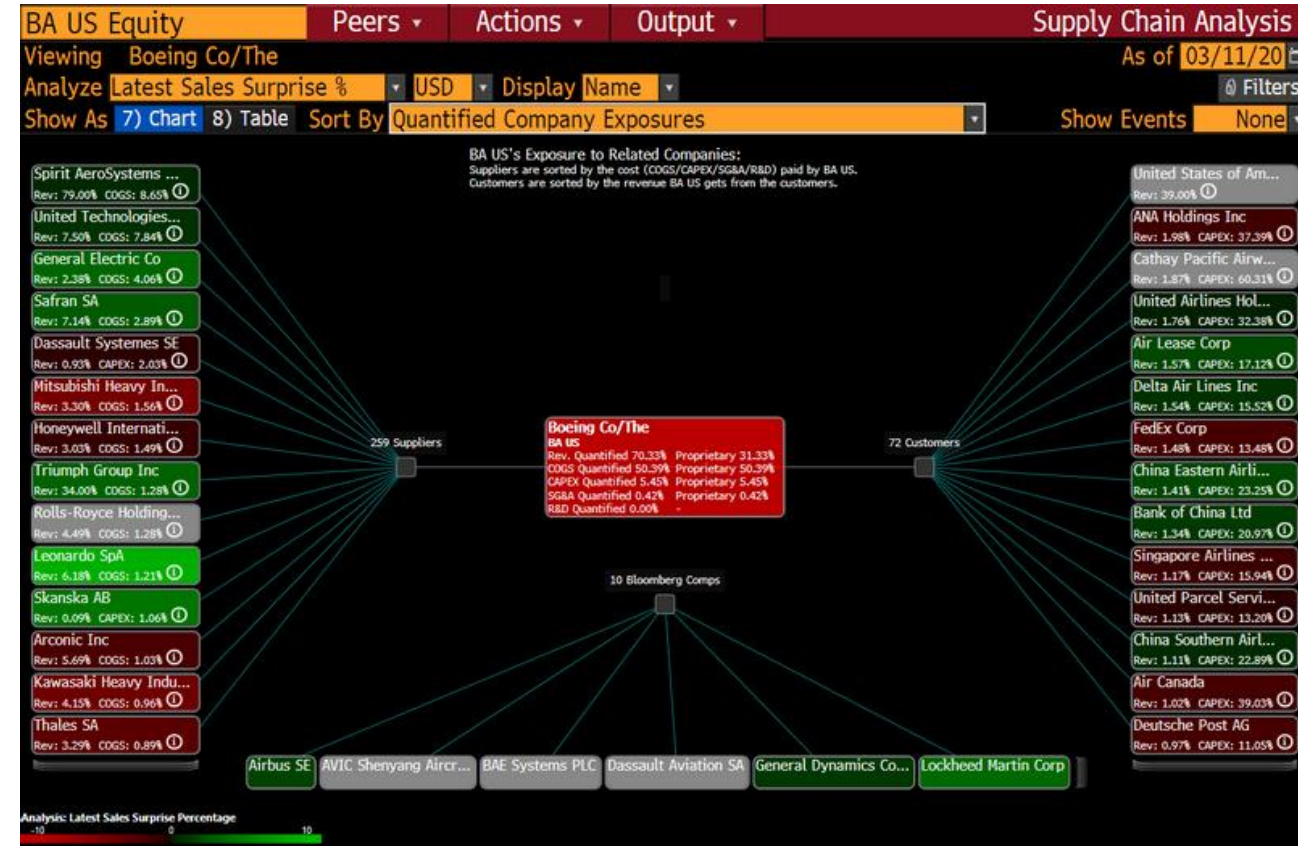
(1) Risk Mitigation Strategies

- Need to calibrate the optimal amount of stockpiles of essential goods
 - Too much stockpile is not only costly but also can magnify cyclicity.
 - Need to strike the optimal balance between benefits and costs

(2) Mapping GVC Network and Players Therein

Ex. Bloomberg SPLC

- 23,000 firms worldwide
- More than 220,000 transactions

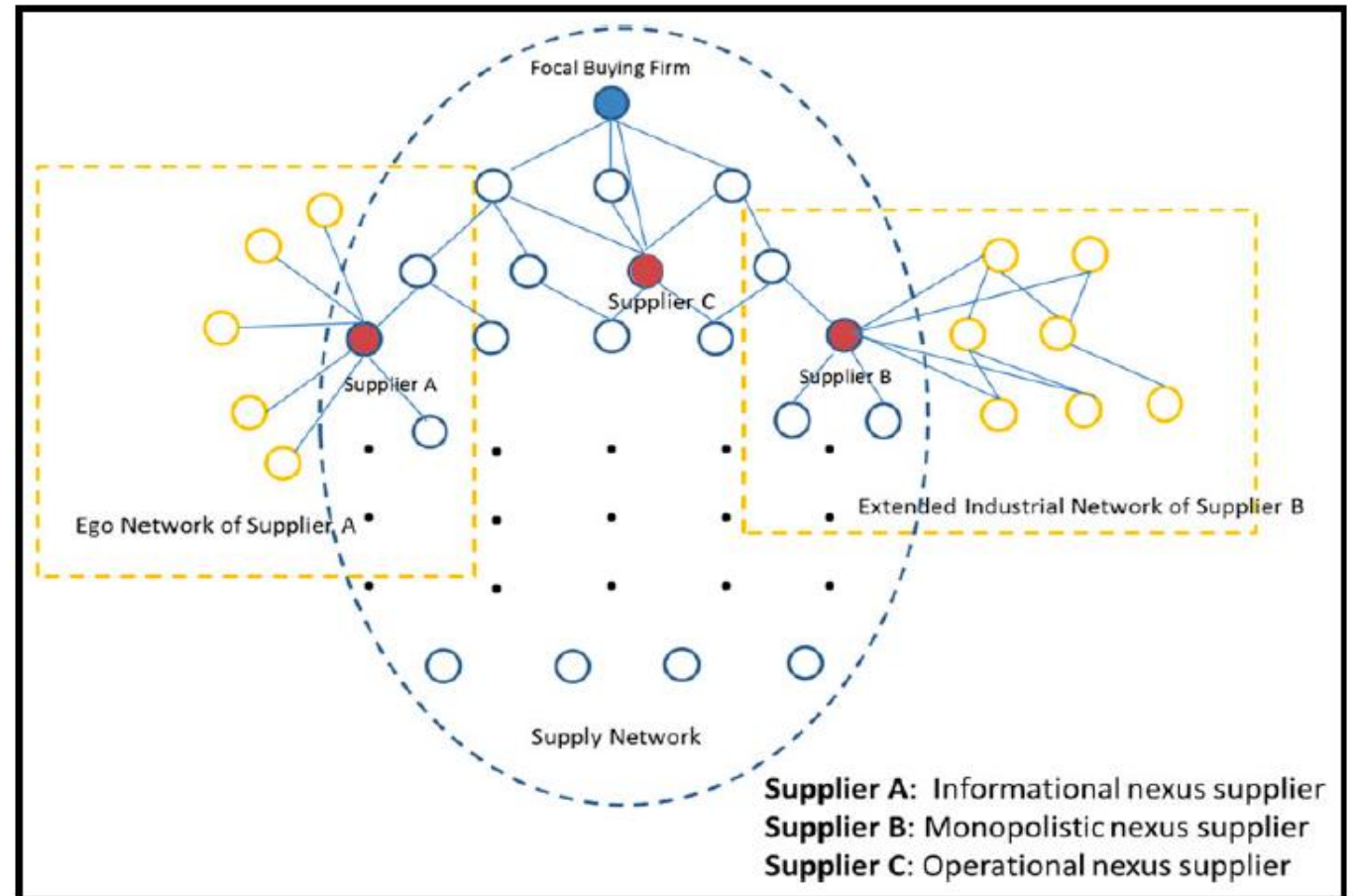


<https://www.bloomberg.com/professional/blog/researching-supply-chain-exposures-how-to-analyse-coronavirus-related-risks/>

(2) Mapping GVC Network and Players Therein

Nexus Supplier (Shao et al, 2018)

- Big impact on supplier's disruption
- Can identify this systematically via network analysis



(3) GVC Stress Test

Stress Test (Simchi-Levi and Simchi-Levi, 2020)

- Test the weak point in GVC
- Time-To-Recover(TTR) vs Time-To-Survive(TTS)
 - **TTR:** Time to recover GVC for full-functionality from disruption
 - **TTS:** Time to survive GVC for full-functionality after disruption



3) GVC Stress Test

- Spending vs profit loss
 - Need to identify firms where Ford spends low but potential loss is high

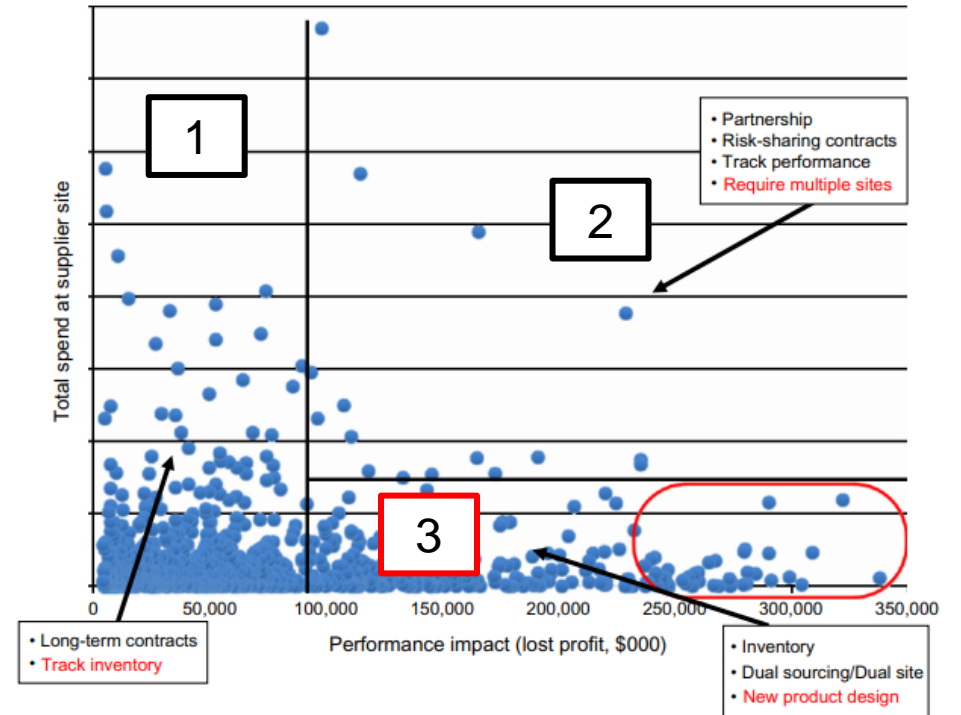
AUTOS

Ford's supply chain problems include blue oval badges for F-Series pickups

PUBLISHED FRI, SEP 23 2022-12:00 PM EDT | UPDATED FRI, SEP 23 2022-3:12 PM EDT

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Take Aways: Political Challenges & Opportunities

Challenges

- Policies in general concerns only in national contexts while GVCs cross borders

Opportunities

- Facilitate substitution between alternative suppliers within GVC by **reducing unnecessary heterogeneity** of technical standards
- Foster advanced technologies (e.g., AI/ML & Big data) to **improve visibility** of GVC
- Develop **GVC risk management system** including early warning system

Thank you for your attention!

Q&A