David Steven Jacoby

• CEO of Boston Strategies International
• Author of Guide to Supply Chain Management; Trump, Trade and the End of Globalization; Supplychainification, and other books
• Senior Fellow at Boston University’s Institute for Global Sustainability.
• Professor of Operations Management at NYU (Adjunct)
• MBA (Wharton/Lauder)

boston strategies international

High-Value Supply Chains For Critical Materials and Components
• Total Value Chain: Strategy, Competitive Analysis, Investment Advisory
• Logistics: Digital Supply Chains
• Procurement: International Sourcing, Logistics, Negotiation
• Production: Management & Technology Programs

Value Proposition
• Supply Chain Security
• Supply Chain Resiliency
• Financial: 15% cost reduction, 25% ROI

History and Track Record
• Founded in 1998
• 1,000 impactful client engagements
• 400+ publications
• Offices in USA, India, Italy, UAE, and UK
Advising Corporations, Governments, and NGOs
The team at Boston Strategies did an outstanding job on our supply chain strategy project. Their research and recommendations were thorough and data-driven.

City of New York

I highly recommend BSI for expertise in strategy development involving global markets. It can work across a diverse array of industries and deliver insight based on incredible research capabilities and current knowledge of market conditions.

General Dynamics

The formidable team at Boston Strategies has developed and compiled a valuable toolkit of successful strategies for the implementation of world-class Supply Chain Management.

Saudi Aramco
Agenda

• Historical Evolution of Global Supply Chains
• Pandemic Disruption
• Dependence on China
• Rebalancing Economies and the Manufacturing Sector
• Rebalancing Corporate Supply Chains
• What the US and Japan Can Learn from Each Other’s Approaches to Supply Chain Independence and Resilience
• Essential Areas Of Us-Japan Collaboration For Enhanced Supply Chain Independence And Resilience
Historical Evolution of Global Supply Chains
Global Trade

Regional Tariffs Over Time

<table>
<thead>
<tr>
<th>Year</th>
<th>Place</th>
<th>Subject covered</th>
<th>Countries</th>
<th>Average tariff reduction for industrial goods (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1947</td>
<td>Geneva</td>
<td>Tariffs</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>1949</td>
<td>Annecy</td>
<td>Tariffs</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>1951</td>
<td>Torquay</td>
<td>Tariffs</td>
<td>38</td>
<td>3</td>
</tr>
<tr>
<td>1956</td>
<td>Geneva</td>
<td>Tariffs</td>
<td>26</td>
<td>2</td>
</tr>
<tr>
<td>1960</td>
<td>Geneva</td>
<td>Tariffs</td>
<td>26</td>
<td>7</td>
</tr>
<tr>
<td>1964-</td>
<td>Geneva (Kennedy Round)</td>
<td>Tariffs and anti-dumping measures</td>
<td>62</td>
<td>35</td>
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<tr>
<td>1967</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1973-</td>
<td>Geneva (Tokyo Round)</td>
<td>Tariffs, non-tariff measures, &quot;framework&quot; agreements</td>
<td>162</td>
<td>34</td>
</tr>
<tr>
<td>1979</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1986-</td>
<td>Geneva (Uruguay Round)</td>
<td>Tariffs, non-tariff measures, rules, services, intellectual property, dispute settlement, textiles, agriculture, creation of WTO, etc</td>
<td>123</td>
<td>40</td>
</tr>
<tr>
<td>1994</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001-</td>
<td>Doha</td>
<td>Tariffs, non-tariff measures, rules, services agriculture, DS, trade and environment (certain)</td>
<td>150</td>
<td>7</td>
</tr>
</tbody>
</table>

Sources:
- [https://ipfs.io/ipfs/QmXoypjZw3WknFrJnKLwHcnL22vedqkkqDDP1mXW08uco/wiki/Tariffs_in_United_States_history.html](https://ipfs.io/ipfs/QmXoypjZw3WknFrJnKLwHcnL22vedqkkqDDP1mXW08uco/wiki/Tariffs_in_United_States_history.html)
- Boston Strategies International Analysis
An Explosion of Exports Drove Hyper-Globalization

Value of Global Exports

Source: WTO Secretariat.

Source: Federico and Tena-Junguito (2016), ourworldindata.org/international-trade
US Trade is Weighted Toward ICT and Manufactured Goods

Source: Atlas of Economic Complexity
Japan’s Trade is Weighted Toward Components and Energy

What did Japan import in 2020?

ICT

- Petroleum oils, crude: 4.21%
- Petroleum gases: 3.61%
- Electronic circuits: 2.19%
- Transmission apparatus: 1.97%
- Coals: 19.01%
- Computers: 17.6%
- Machinery: 15.9%
- Vehicles: 15.9%
- Insurance and finance: 2.82%
- Transport: 3.74%

Source: Atlas of Economic Complexity
Pandemic Disruption
The Bullwhip Effect (MIT, ~1965) Is a Phenomenon That Plagues Supply Chains

- **Causes**
  - Perturbances/Over-correction
  - Promotions/Price Discounting
  - Batching/Irregular Production
  - Order Changes/Changes in Order Patterns

- **Characteristics**
  - Oscillation
  - Amplitude Magnification

- **Exacerbators**
  - Long supply chains
  - Long feedback loops

The Bullwhip Effect Has Been Evident in Critical Industries to Both the US and Japan Since the 1950s

The Pandemic Created the Ultimate Conditions for Bullwhip in Global Supply Chains

• Perturbances / Over-corrections: Lockdowns, Factory shutdowns

• Promotions / Price Discounting: Work From Home

• Batching / Irregular Production: Stochastic lockdowns, curfews and travel bans

• Order Changes/ Changes in Order Patterns: Erroneous announcements about when it would end

• Exacerbating Factors
  • Global disruption / affecting all tiers of every supply chain
  • Long feedback loop

Source: USA Today
A Surge in Demand for Goods vs. Services Disrupted Supply Chains

The Perturbation to Global Trade Was Similar in Magnitude to the Global Financial Crisis

Source: Statista

Trends in Global Export Value of Trade in Goods from 1950 to 2021

Export value in billion U.S. dollars

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Global Shipping Rates Went Crazy as Carriers Pulled Capacity Out, Then Couldn’t Supply Enough

Source: Statista
A Recession Will Likely Create an After-Tremor in Global Supply Chains

Monthly Average Likelihood U.S. Will Have a Recession Within Next 12 Months: January 2005 Through July 2022

Source: WSJ Survey of Economists Response Data

Onset of latest recession, Feb. 2020 = 49.0%

Onset of previous recession, Dec. 2007 = 38.0%

Jul. 2022: 48.6%
Dependence on China
The US and EU Have Become Dependent on China’s Exported Goods

Share of World Exports, 2016

<table>
<thead>
<tr>
<th>Region / Country</th>
<th>Billions of US Dollars</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe &amp; Central Asia</td>
<td>8,580</td>
<td>40%</td>
</tr>
<tr>
<td>--Germany</td>
<td>1,573</td>
<td>7%</td>
</tr>
<tr>
<td>East Asia &amp; Pacific</td>
<td>6,649</td>
<td>31%</td>
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<tr>
<td>--China</td>
<td>2,431</td>
<td>11%</td>
</tr>
<tr>
<td>North America</td>
<td>2,757</td>
<td>13%</td>
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<tr>
<td>--USA</td>
<td>2,264</td>
<td>11%</td>
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<tr>
<td>Other</td>
<td>3,331</td>
<td>16%</td>
</tr>
<tr>
<td>World</td>
<td>21,318</td>
<td>100%</td>
</tr>
</tbody>
</table>

Share of World Imports, 2016

<table>
<thead>
<tr>
<th>Region / Country</th>
<th>Billions of US Dollars</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe &amp; Central Asia</td>
<td>7,832</td>
<td>38%</td>
</tr>
<tr>
<td>--Germany</td>
<td>1,319</td>
<td>6%</td>
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<tr>
<td>East Asia &amp; Pacific</td>
<td>5,985</td>
<td>29%</td>
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<tr>
<td>--China</td>
<td>2,046</td>
<td>10%</td>
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<tr>
<td>North America</td>
<td>3,315</td>
<td>16%</td>
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<tr>
<td>--USA</td>
<td>2,786</td>
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<tr>
<td>Other</td>
<td>3,621</td>
<td>17%</td>
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<tr>
<td>World</td>
<td>20,754</td>
<td>100%</td>
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</table>

Top Trading Partners, 2016

<table>
<thead>
<tr>
<th>Region / Country</th>
<th>Partner</th>
<th>% of Imports</th>
<th>% of Exports</th>
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</thead>
<tbody>
<tr>
<td>USA</td>
<td>China</td>
<td>21%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
<td>13%</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Mexico</td>
<td>13%</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>Japan</td>
<td>5%</td>
<td>&lt;5%</td>
</tr>
<tr>
<td></td>
<td>Germany</td>
<td>5%</td>
<td>&lt;5%</td>
</tr>
<tr>
<td></td>
<td>South Korea</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>EU</td>
<td>USA</td>
<td>15%</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Switzerland</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>Russia</td>
<td>7%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>Turkey</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Japan</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>China</td>
<td>South Korea</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>USA</td>
<td>5%</td>
<td>22%</td>
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<tr>
<td></td>
<td>Japan</td>
<td>5%</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>Germany</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>Switzerland</td>
<td>3%</td>
<td>13%</td>
</tr>
</tbody>
</table>

The US’s Imports From China Are Weighted Toward Manufactured Components

What did United States of America import...

Source: Atlas of Economic Complexity
Japan’s Imports From China Are Broadly Similar to the US’s

Source: Atlas of Economic Complexity
Import Dependency, Especially on China, Has Become a Political Hot Button

Source: China, the United States, and competition for resources that enable emerging technologies. Andrew L. Gulleya,1, Nedal T. Nassara, and Sean Xuna
Rebalancing Economies and the Manufacturing Sector
The Feds (Globally) Are Raising Interest Rates to Cool Demand, Especially in Housing, Which Could Dampen the Bullwhip Effect

U.S. 10 Year Treasury Note Rate Trend

Near-shoring (or At Least Relocating Production Away From China And Into Home Country) Has Become A Major Focus Of US Trade Policy
The US Has More Recently Layered On Stimulus Packages for Re-Shoring

- “Inflation Reduction Act” includes $369 billion for Energy Security and Climate Change (2022)

- CHIPS: Creating Helpful Incentives to Produce Semiconductors for America Act:
  - $54 billion in grants for semiconductor manufacturing and research
  - Tens of billions to support regional technology hubs
  - Tax credit covering 25% of investments in semiconductor manufacturing through 2026


- Infrastructure Investment and Jobs Act (2021), a $547–715 billion infrastructure package

- Domestic Manufacturing Protection Act of 2021 (inactive)
In Japan, Ministry of Economy, Trade and Industry (METI) Has Been Similarly Stimulating Re-Shoring

- Subsidies to strengthen supply chain resilience by incentivizing Japanese companies to building new plants and introducing new facilities for critical products and materials in Japan.
- Strategically essential products, parts, and materials produced overseas
  - Aircraft parts
  - Automotive molds
  - Chemical fertilizer
  - Displays
  - Electric vehicle battery parts or materials
  - Medical equipment
  - Pharmaceutical ingredients
  - Rare metals
  - Semiconductor parts, materials, and products.
- Health products
  - Antiseptic alcohol
  - Covid-19 test reagent kits
  - Medical gowns and gloves
  - Nonwoven masks, surgical masks
  - Vaccines
- Small and medium-sized business stimulus package
Debottlenecking Corporate Supply Chains
Actors Across the Supply Chain Have Been Liberating Capacity Where Possible

- Ports and airports
  - Union rules and non-union ports
  - Use of smaller ports – terminals
- Transport carriers
  - Vertical integration
  - Upgrade/downgrade modes
  - Enhanced slot-sharing
  - More intermodal routes (trunk and feeder)
- 3PLs and 4PLs
  - Supply chain solutions
  - Postponement
- Shippers
  - Lean
  - Zero Waste
Shippers Have Been Reducing Behaviors That Trigger Bullwhip Dynamics

- More discipline around over-correction and tweaking
  - CPFR
  - S&OP
  - Supply chain control towers
- Fewer promotions
  - Constant price (long-term agreements)
- Less batching
  - One-piece flow
Investors Have Been Plugging Money into Technology Solutions for Increased Supply Chain Visibility

- Of cargo (venture funded startups including Minerva, Altana)

- Of potential future disruptions (venture funded startups including Tive, Project44, SC control towers)

"Magic Quadrant" for Real-Time Transportation Visibility Platforms

Source: Magic Quadrant for Real-Time Transportation Visibility Platforms. 24 May 2022
What the US and Japan Can Learn from Each Other’s Approaches to Supply Chain Independence and Resilience
The US and Japan Are Pursuing Many Common Approaches to Rebalancing Supply Chains and Achieving Supply Chain Independence

Approaches Toward Supply Chain Rebalancing Post-Pandemic

<table>
<thead>
<tr>
<th>Lever</th>
<th>US</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level demand</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Near-shoring production (tariffs, PPP, diversification)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Vertical integration</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Lean</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Postponement</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>JIT</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC Visibility</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SC risk prediction (AI)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CPFR, S&amp;OP, Digital Twins</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>LTAs</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
Essential Areas Of Us-Japan Collaboration For Enhanced Supply Chain Independence And Resilience
The US and Japan Could Benefit By Coordinating Economic & Industrial Policies, Technology & Innovation in Supply Chain Visibility, and Investing in Predictive Artificial Intelligence Solutions

**Essential Axes of US-Japan Coordination for Supply Chain Independence**

**Industrial policies**
1. Reducing import dependence for critical materials
2. Developing trade bi/multi/neo-multilateralism frameworks aside from WTO
3. Reinforcing cybersecurity

**Supply chain visibility technologies**
4. Building manufacturing digital twins
5. Designing supply chain control towers
6. Monitoring supply chain visibility for strategic materials and products

**Artificial Intelligence for supply chain risk mitigation**
7. Developing machine learning algorithms for supply chain management
8. Applying predictive analytics to minimize supply chain risks

Note: Ongoing efforts should include traditional macroeconomic and foreign policies to minimize likelihood of global recession and economic bullwhip, e.g., interest rates, housing, etc.
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