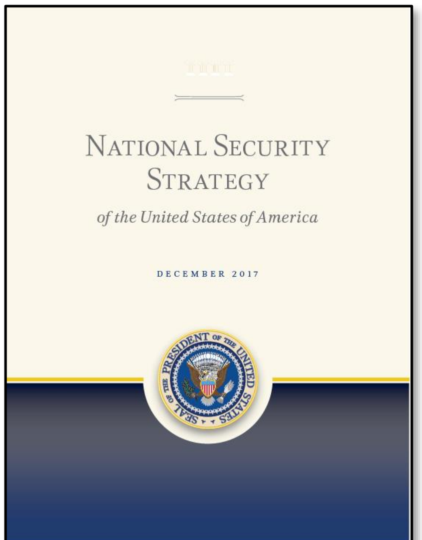
Executive Order 13806

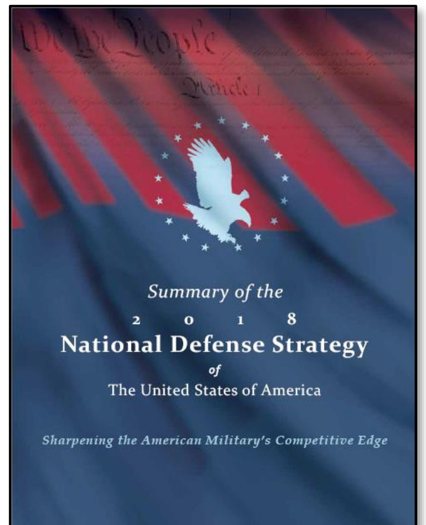
Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States

Strategic Alignment

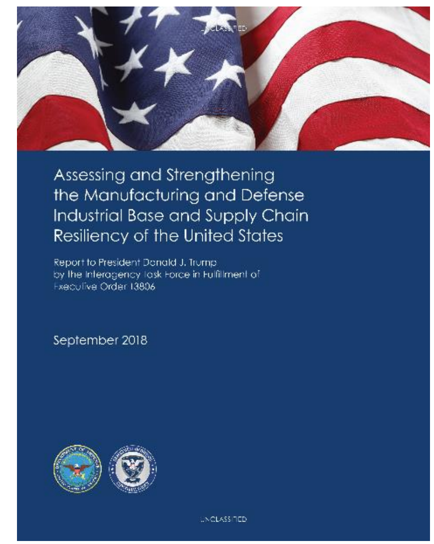
National Security Strategy
December 2017



National Defense Strategy
January 2018



Executive Order 13806 Report
October 2018



"A healthy defense industrial base is a critical element of U.S. power and the National Security Innovation Base. The ability of the military to surge in response to an emergency depends on our Nation's ability to produce needed parts and systems, healthy and secure supply chains, and a skilled U.S. workforce."
~ 2017 National Security Strategy

Executive Order 13806

- Executive Order 13806 Requirement:
  - Conduct assessment of U.S. manufacturing capacity, defense industrial base, and supply chain resiliency
  - Develop policy, regulatory, legislative, and investment recommendations to strengthen U.S. manufacturing capacity and the defense industrial base – **Focus on the “fight tonight”**
- Whole of Government effort:
  - Interagency task force identified traditional and cross-cutting sectors for examination
  - Working groups conducted analysis to identify industrial base risks in each sector
- Phased approach:
  - Current effort
    - Assess current state of manufacturing and defense industrial base
    - Identify industrial base risks and impacts in traditional and cross-cutting sectors
  - Future efforts:
    - Conduct scenario-based modeling to assess resiliency of the manufacturing and defense industrial base
    - Explore next generation technologies necessary for modernization and future threats

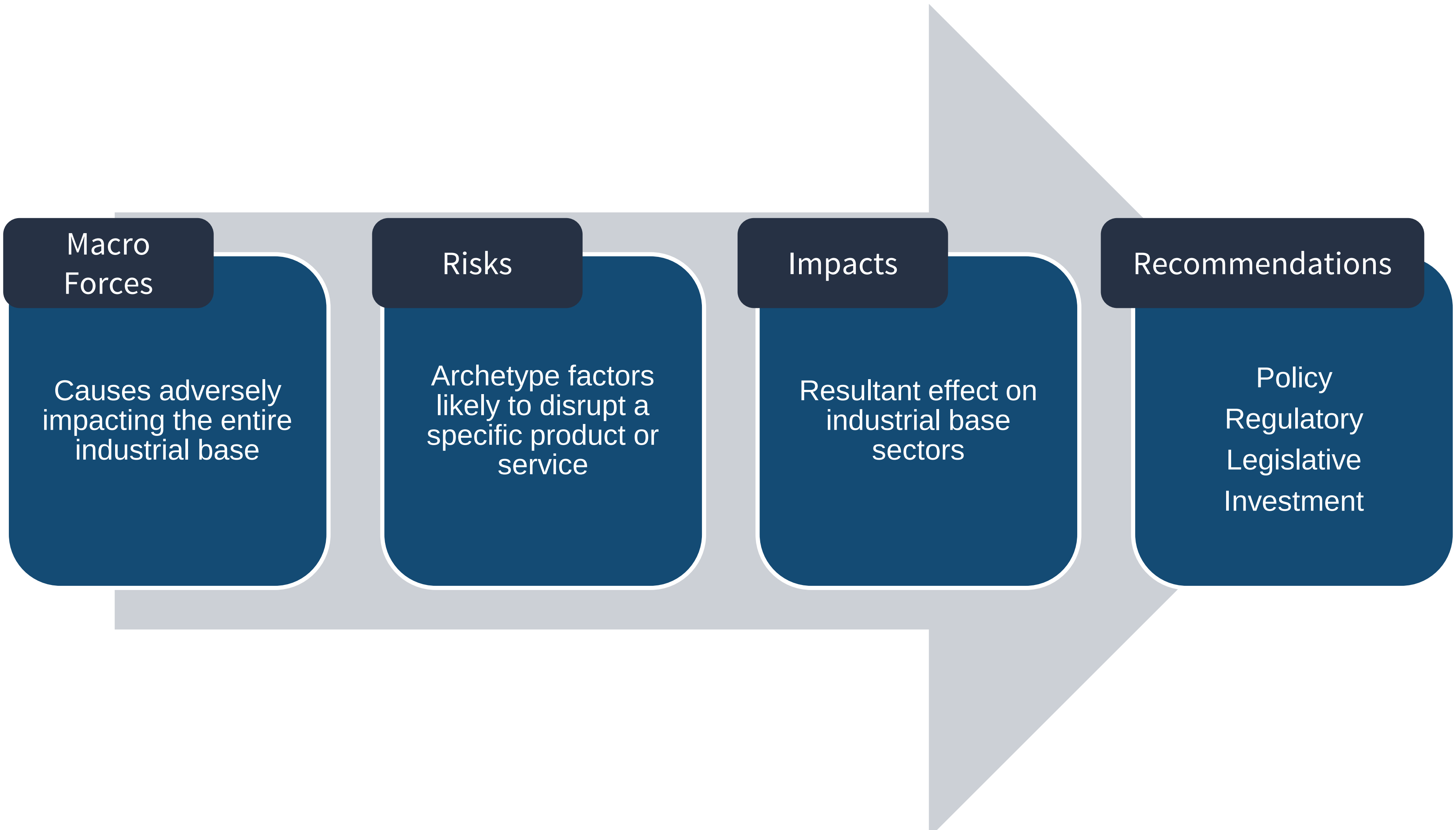
“It would, also, be a material aid to manufactures of this nature, as well as a mean of public security, if provision should be made for an annual purchase of military weapons, of home manufacture, to a certain determinate extent, in order to the formation of arsenals;”

~ Alexander Hamilton, Report on the Subject of Manufactures (1791)

Working Groups

	Working Group
Traditional	Aircraft
	Chemical, Biological, Radiological & Nuclear (CBRN)
	Ground Systems
	Munitions & Missiles
	Nuclear Matter Warheads
	Radar & Electronic Warfare
	Shipbuilding
	Soldier Systems
	Space
Cross-cutting Enablers	Cybersecurity for Manufacturing
	Electronics
	Machine Tools & Industrial Controls
	Materials
	Organic Base
	Software Engineering
	Workforce

Assessment Framework



MACRO FORCES

Macro Forces

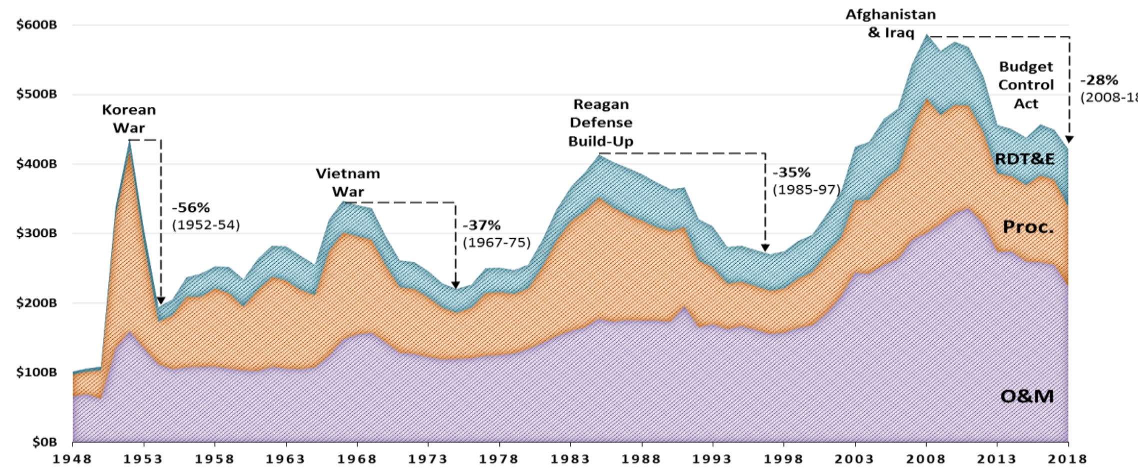
Sequestration and uncertainty of U.S. Government spending	Inconsistent appropriations, uncertainty about future budgets, macro-level ambiguity in USG expenditures, and the effects of the Budget Control Act create market instability
Decline of U.S. manufacturing capabilities & capacity	Reductions across the U.S. manufacturing base affect the viability of suppliers, the overall manufacturing capacity, and capabilities available domestically
Deleterious U.S. Government business & procurement practices	Challenges working with DoD and other USG customers, including contracting regulations, policies, barriers to entry, qualification challenges, programmatic changes, and other problems, can lead to adverse effects on suppliers
Industrial policies of competitor nations	Domestic industrial and international trade policies of competitor nations, notably the economic aggression of China, directly or indirectly degrade the viability, capabilities, and capacities of the U.S. National Security Innovation Base
Diminishing U.S. STEM and trade skills	Gaps in American human capital, including a lack of STEM talent and declining trade skills, diminish domestic capabilities to innovate, manufacture, and sustain

Sequestration and Uncertainty of DoD Spending

Uncertain spending

- Reduces predictability for businesses, rendering forecasting difficult across the supply chain, leading to financial fluctuation and suboptimal investment

DOD TOTAL OBLIGATION AUTHORITY
FY2018 CONSTANT DOLLARS

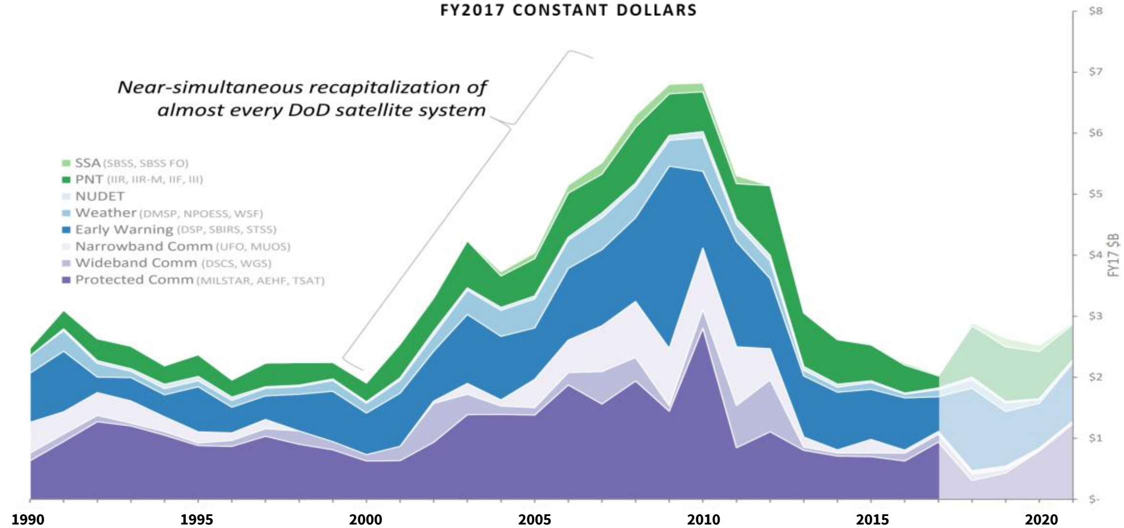


Source: DoD Comptroller National Defense Budget Estimates for FY 2018

"Bullwhip Effect" on sectors

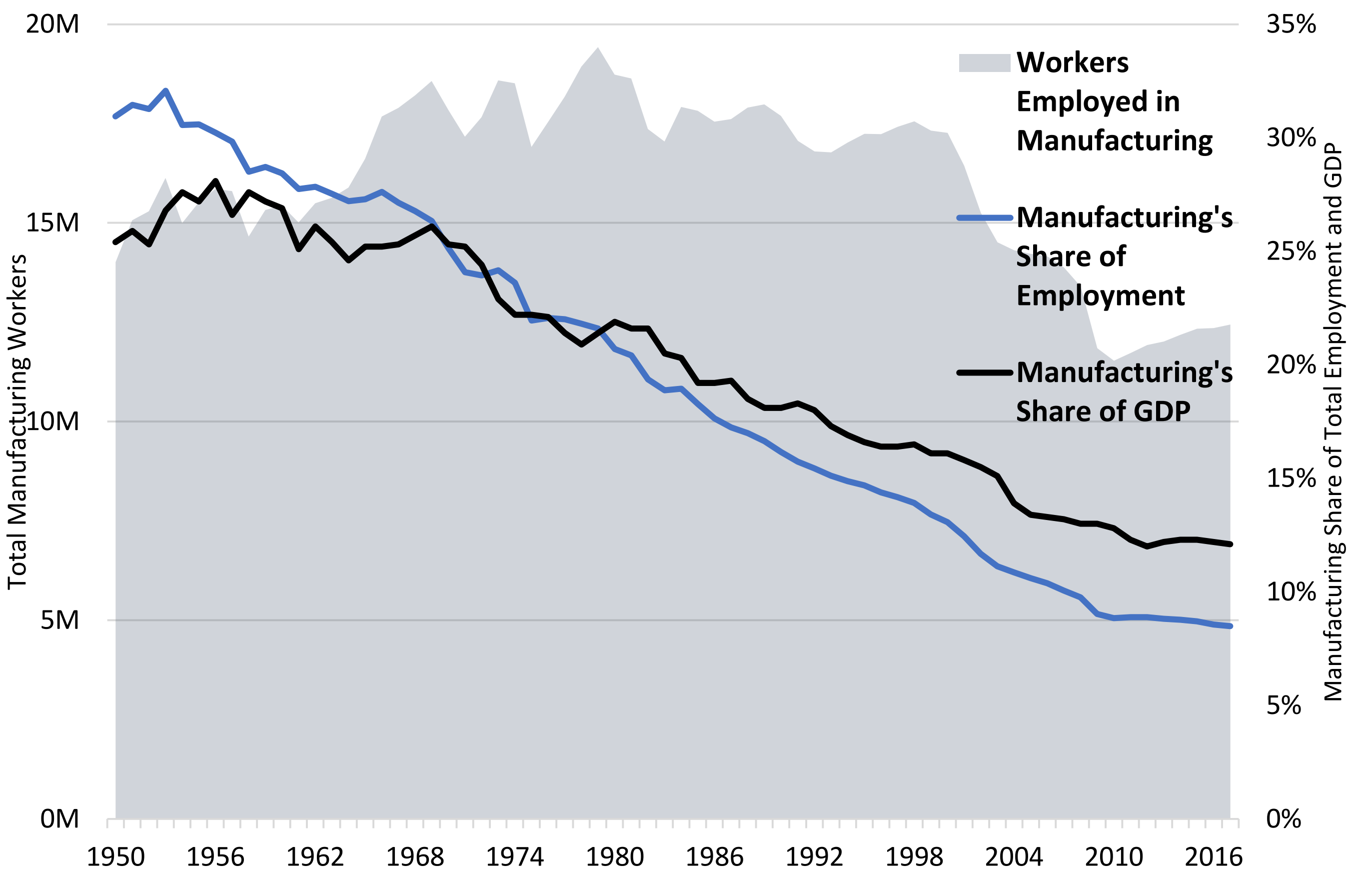
- Recapitalization of satellite systems triggered 3x spending spike over 10 years
- Only to be followed by ~65% funding drop, leaving manufacturers to contend with excess capacity and limited supply chain volume

DOD SATELLITE BUDGET OBLIGATION AUTHORITY
FY2017 CONSTANT DOLLARS



Source: DoD CAPE

Decline of U.S. Manufacturing Capability and Capacity



Source: BLS and BEA. All values seasonally adjusted.

Financial Metrics	Firm size >$1B	Firm size <$100M
Annual Growth	2.3%	-0.6%
Return on Invested Capital	13.5%	11.5%
Operating Margin	7.1%	5.8%
Avg A/P to A/R (% of sales)	1.0%	5.4%

Source: Mckinsey & Company

U.S. manufacturing has declined in absolute terms and relative to GDP

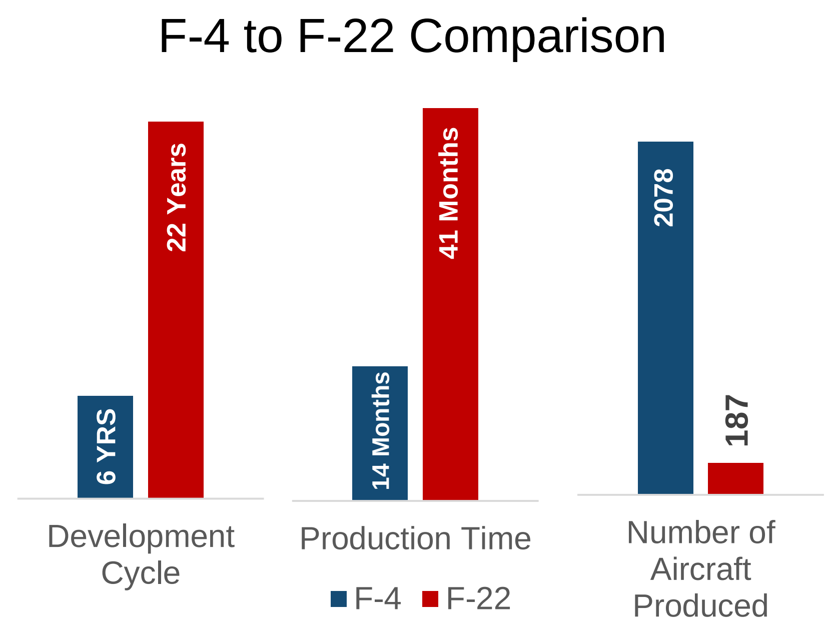
Small businesses suffer disproportionately

Deleterious USG business & procurement practices

Established Timelines for New Army Contracts – Procurement Action Lead Time

Contract Dollar value	Competitive contracts (days)	Non-competitive contracts (days)
Less than $25,000	55	55
$25,000 to $1M	75	100
$1M to $50M	180	250
$50M to $250M	600	520
$250M to $500M	630	550
$500M to $1B	630	610
Greater than $1B	700	610

Source: June 2017 GAO Report on Defense Science & Technology Adopting Best Practices



Source: Dec 2013 CNAS Report : Process Over Platforms

Procurement practices increase time to contract

Outcomes take longer now

Industrial Policies of Competitor Nations

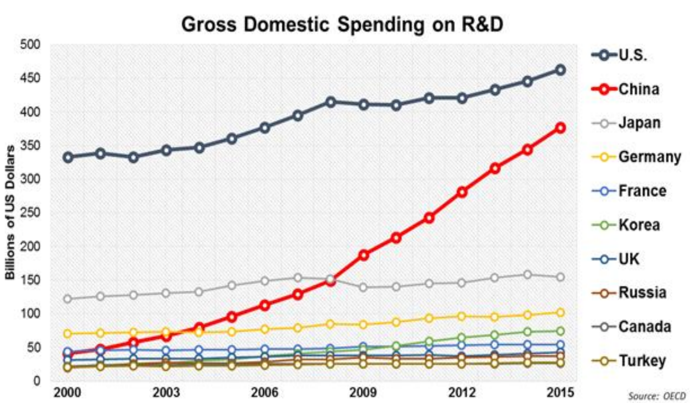
Six Strategies of Chinese Economic Aggression

China provides over $360B in energy subsidies to domestic producers—more than any other country
(IEA)

Protect China's Home Market

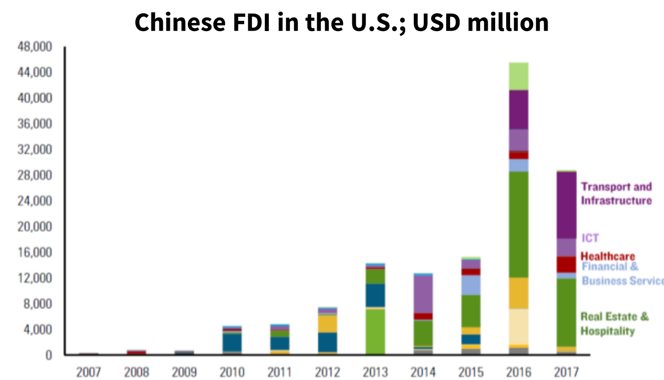
Dominate Traditional Mfg Industries

China imposes export tariffs to hurt foreign manufacturers; 5-20% tariffs on rare earths enabled China to corner global industries
(WTO)



Capture Emerging High Tech Industries

Acquire America's Intellectual Property & Technology



*Source: Rhodium Group. *2017 data preliminary and partial.* **ICT:** Info. & Comms. Technology

THE WALL STREET JOURNAL.

WORLD

China Hacked South Korea Over Missile Defense, U.S. Firm Says

Beijing denies it is retaliating over the Thaad missile system, but a U.S. cybersecurity firm suggests they are

Attack Global Markets

Control the World's Natural Resources

THE WALL STREET JOURNAL.

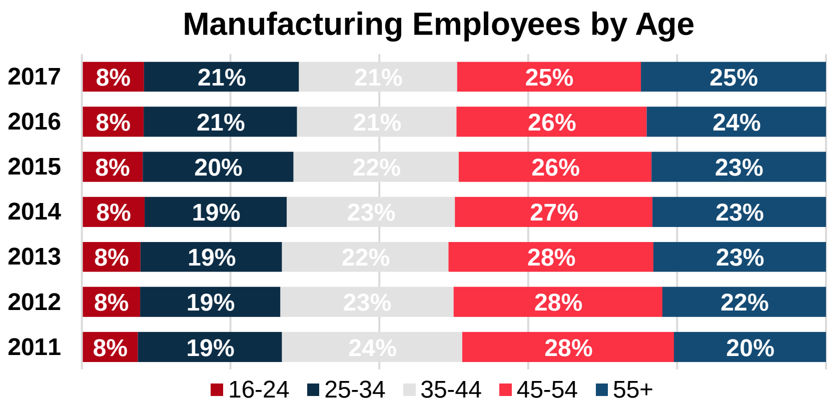
BUSINESS

There's a Global Race to Control Batteries—and China Is Winning

Chinese companies dominate the cobalt supply chain that begins in Congo

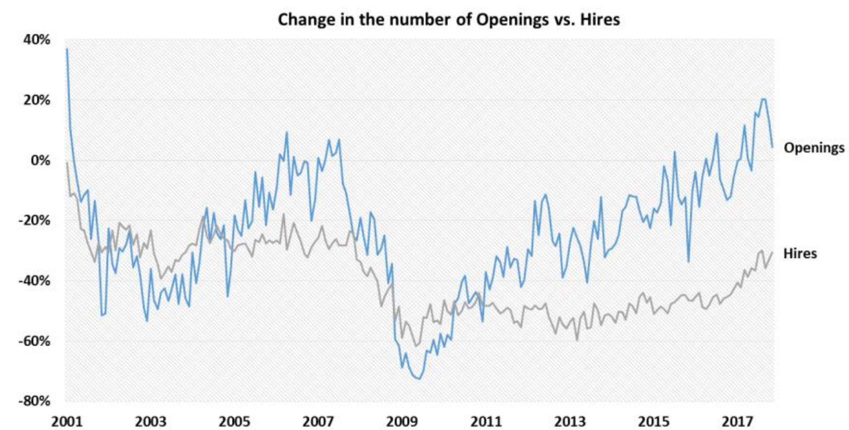
Diminishing U.S. STEM and Trade Skills

Aging workforce with insufficient new entrants



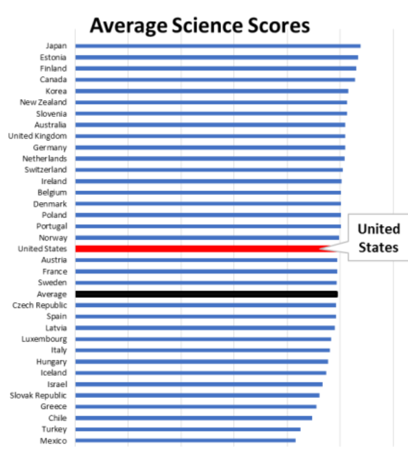
Source: U.S. Bureau of Labor Statistics

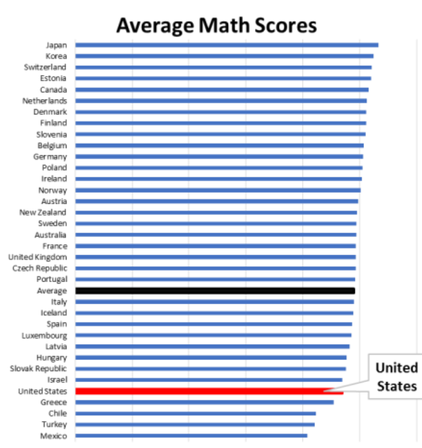
Manufacturing workforce gap due to lack of skilled labor



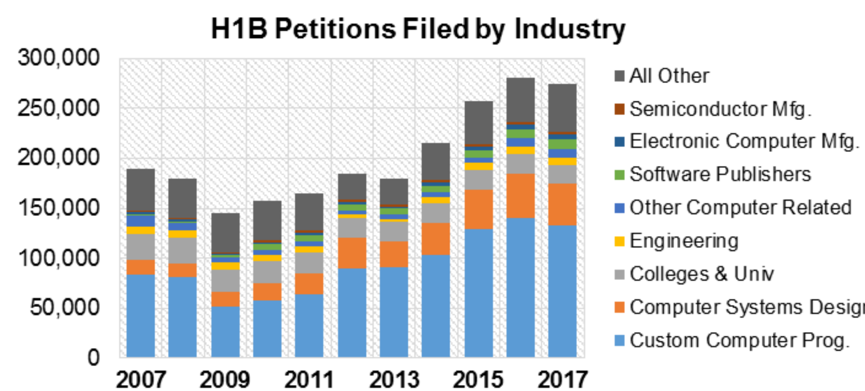
Source: U.S. Bureau of Labor Statistics

U.S. lags OECD nations in math and science





Increase in H1B filings indicates growing need for skilled labor



Source: USCIS

SOURCE: OECD, Program for International Student Assessment (PISA), 2015 Reading, Mathematics and Science Assessment.

MACRO FORCES DRIVE RISKS

Macro Forces Drive Risks

- Sequestration and uncertainty of U.S. Government spending
- Decline of U.S. manufacturing capabilities & capacity
- Deleterious U.S. Government business & procurement practices
- Industrial policies of competitor nations
- Diminishing U.S. STEM and trade skills

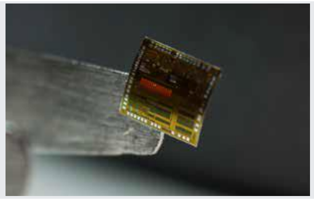
- Sole source
- Single source
- Fragile supplier
- Fragile market
- Capacity constrained supply market
- Foreign dependency
- Diminishing manufacturing sources and material shortages
- Gap in U.S.-based human capital
- Erosion of U.S.-based infrastructure
- Product security

Risk Archetypes

Ten factors likely to disrupt or inhibit the delivery a national security product or service	
Sole source	Only one supplier is ***able*** to provide the required capability
Single source	Only one supplier is ***qualified*** to provide the required capability
Fragile supplier	A specific supplier is financially challenged / distressed
Fragile market	Structurally poor industry economics; maybe near globalized tipping point
Capacity constrained supply market	Capacity is unavailable in required quantities or time due to competing market demands
Foreign dependency	Domestic industry does not produce the product, or does not produce it in sufficient quantities
Diminishing mfg sources & material shortages	Obsolescence resulting from decline in relevant suppliers
Gap in U.S.-based human capital	Industry is unable to hire or retain U.S. workers with the necessary skills sets
Erosion of U.S.-based infrastructure	Loss of specialized capital equipment needed to integrate, manufacture, or maintain capability
Product security	Lack of cyber and physical protection results in eroding integrity, confidence, and competitive advantage

Examples

Sole Source



Strategic Radiation Hardened (SRH) Microelectronics
- No commercial applications
- Low volume, subject to defense cyclicality

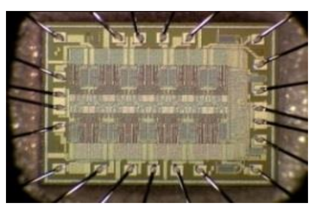
Single Source

Ammonium Perchlorate
- Chemical widely used in DoD solid rocket motor propulsion systems
- Only one domestic qualified source

Fragile Supplier

Alloy Castings Supplier
- Only qualified supplier on several aircraft programs filed for bankruptcy in 2016

Fragile Market



Printed Circuit Boards (PCBs)
- 70% decline in U.S. share of global production since 2000
- Asia produces 90% of worldwide PCBs, China produces half
- DoD risks losing visibility into manufacturing provenance

Capacity Constrained Supply Market

ASZM-TEDA1 Impregnated Carbon
- Defense-unique material, provided by a single qualified source
- Current sourcing arrangements cannot keep pace with demand
- DoD is using DPA Title III to stand up additional sources

Examples (cont.)

Foreign Dependency

Reliance on China for Energetics
- China is the sole source or single supplier for multiple critical materials used in munitions and missiles
- In many cases, there is no drop in replacement

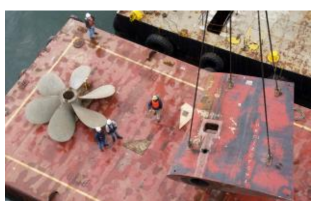
Diminishing Mfg Sources & Material Shortages

Space Sector Material Shortages
- A single foreign source manufactures high quality substrates for space infrared detectors; low volume and long periods between orders results in quality and workforce issues

Gaps in U.S.-based Human Capital

Critical skills shortage
- 72.9% of respondents to a 2017 survey of manufacturers cited an inability to attract and retain quality workforce as a top business challenge

Erosion of U.S.-based Infrastructure



Shipyards
- Average age of naval shipyard capital equipment is 22 years old, seven years beyond industry standards

Product Security

Cybersecurity
- Manufacturers received greatest volume of targeted cyber-attacks (globally) in 2014
- 99% of mfg firms are small to medium-sized & lack basic cyber controls

Nearly 300 risks found across the 16 working groups

Efforts Underway

Sequestration and uncertainty of U.S. Government spending	• Bipartisan Budget Act of 2018 provides near-term budget stability through FY2019 • Secretary Mattis on record for "3-5% growth for 2019 to 2023"
Decline of U.S. manufacturing capabilities & capacity	• Tax Cuts and Jobs Act of 2017 • Creation of National Advanced Manufacturing Strategy • Assuring Microelectronics Innovation for National Security & Economic Competitiveness (MINSEC) • Updates to Conventional Arms Transfer policy & Unmanned Aircraft System export policy
Deleterious U.S. Government business & procurement practices	• Reorganization of AT&L to Research & Engineering / Acquisition & Sustainment • Adaptive Acquisition Framework • Restructuring Defense Acquisition University to increase agility in acquisition personnel • Section 813 panel on intellectual property (IP) rights and restrictions
Industrial policies of competitor nations	• Committee on Foreign Investment in the United States modernization • Section 301 investigation into Chinese IP theft
Diminishing U.S. STEM and trade skills	• Task force on Apprenticeship Expansion

Successful Reform Efforts

Sequestration and uncertainty of U.S. Government spending	• Bipartisan Budget Act of 2018 provides near-term budget stability through FY2019 • More consistent planning and funding for munitions requirements
Decline of U.S. manufacturing capabilities & capacity	• Re-authorization of the Defense Production Act through FY2025 ensures the protection and expansion of critical industrial base capabilities • $225M investment in the submarine industrial base will shore up fragile suppliers • NDAA provides new authorities to revitalize arsenals, public shipyards and depots
Deleterious U.S. Government business & procurement practices	• Implemented re-organization of AT&L to Research & Engineering / Acquisition & Sustainment
Industrial policies of competitor nations	• Establishment of activities to promote National Security Innovation will protect the country's knowledge and resource base from foreign competitors • The enactment of FIRRMA provides CFIUS with new tools to combat predatory foreign investment
Diminishing U.S. STEM and trade skills	• Expanded access to technical talent and expertise at academic institutions

Further EO Directed Actions

Decline of U.S. manufacturing capabilities & capacity	• Support the lower tier of the industrial base through funding increases to the Defense Production Act Title III, Manufacturing Technology, and Industrial Base Analysis and Sustainment Programs
Deleterious U.S. Government business & procurement practices	• Create an industrial policy in support of national security efforts, as outlined in the National Defense Strategy, to inform current and future acquisition efforts
Industrial policies of competitor nations	• DoD creating roadmaps for the critical technologies outlined in the National Defense Strategy
Diminishing U.S. STEM and trade skills	• Implement the National Background Investigation Service to drive efficiency in the personnel security process • Accelerate workforce development efforts to grow STEM and critical trade skills