NDIA

VITAL SIGNS 2024

The Health and Readiness of the Defense Industrial Base

Similar to applying simultaneous and equal pressure to a vehicle's brakes and accelerator, for the U.S. DIB, the pressure to accelerate is being met with equal pressure to reduce speed.

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Introduction

During the last 35 years, the U.S. lost its understanding of the direct connection between a strong defense industrial base and effective national deterrence. Six U.S. administrations worked tirelessly to deter peer conflict, but in many ways, the U.S. both forgot enduring truths regarding what national deterrence against peer competition requires and failed to successfully address the changing social, demographic, and financial trends impacting the U.S. Defense Industrial Base (U.S. DIB). Forewarned by tragedies of current conflict unfolding in multiple regions around the world, U.S. policymakers are more keenly conscious of the consequences of failed deterrence and the inexorable reality of what it would take for the U.S. military to prevail in and for the U.S. DIB to be responsive to multiple contingencies occurring simultaneously.

While technological advancements provide early tactical advantages, nations usually win or lose conflicts over the long-term based on the strength and endurance of their political and military alliances, national treasuries, and defense industrial bases. The current posture of the U.S. DIB is a result of bipartisan policies and planning assumptions for the 1990s and early 2000s anomaly in the global security environment – an environment that no longer exists. *Vital Signs 2023* was a call to action for the federal government and the U.S. DIB to partner more closely. The National Defense Industrial Association (NDIA) is therefore encouraged by the Department of Defense's (DoD) release of the inaugural 2023 National Defense Industrial Strategy (NDIS).[1] **It is an important first step to acknowledge that it would be strategic negligence to continue to allow the atrophy and to not rebuild the resiliency[2] of the U.S. DIB in an era of great power competition.**

Over the last year, serious and experienced policymakers have asked NDIA how to take response time estimates from years to months. In many cases, that is not an option. Simply put, **time and consistency are immutable factors for both military readiness and defense industrial readiness.** Current policymakers inherited both the benefits of previous resourcing decisions and the consequences of deferred decisions, such as delays in modernization schedules for the nuclear triad. The consequences of all deferred decisions reduce the decision-making space of both current and future leaders. Taken to its logical conclusion, the decisions made or not made this year, such as passing the pending national security supplemental funding request and completing the Fiscal Year (FY) 2025 Defense Appropriations Act on time, will reduce the decision space and options of future government leaders, not just during the next year or two but into the decisive decade of the 2030s.

The defense industrial readiness policy goal is straightforward: to ensure our warfighters have the platforms, services, and technologies they need so they never engage in a fair fight against any competitor. This goal is personal for many working in industry. From the largest defense contractors to small defense companies and technology start-ups, many workers either served in the U.S. military, or have family and friends who serve, and they are therefore committed to U.S. defense industrial readiness as national service from a different angle.

In 1940, General George Marshall wrote: "For almost twenty years we had all the time and almost none of the money; today we have all the money and no time."[3] The *Vital Signs* report series tracks the progress made across the five pillars required for a strong, diverse, resilient, ready U.S. DIB: securing budget stability and sufficiency; advancing DoD digital modernization and transformation; facilitating foreign military sales (FMS) modernization and technology integration with allies and partners; restoring industrial readiness, capacity, and infrastructure; and enabling more resilient supply chains. In a global race for economic and technological supremacy, **the U.S. must simultaneously wisely manage the clock, strategically invest its funding, and appropriately balance risk between government and industry to ensure the U.S. military and the U.S. DIB achieve and maintain the readiness levels required to deter aggression.** The consequences of losing the race will impact the values, standard of living, and security of every American.

We can afford to be ready.

Executive Summary

In *Vital Signs 2023*, NDIA noted the powerhouses of industrial readiness – stable and predictable budgets; an experienced and specialized workforce; diversified and modern infrastructure; manufacturing innovation; and sufficient, including idle, capacity have all atrophied under the combined transition to a services-based economy with a premium on just-in-time commercial supply chains. The report also noted that for the last 35 years, on a bipartisan basis, the U.S. government failed to resource the U.S. industrial footprint required to prevail in near-peer conflict.

The *Vital Signs 2024* report builds on issues identified in both previous annual reports and from NDIA member feedback regarding the 2023 NDIS. It will take time, financial investment, and changes in systemic behavior patterns to reshape the U.S. DIB into a threat-informed defense ecosystem with the capacity to grow its output, fulfill a surge in military demands, and reconstitute during a major conflict. **The report focuses on the key areas where government and industry can partner together to better manage time and money in support of current national deterrence objectives.**

In addition to emphasizing the importance of effectively managing time and money in restoring defense industrial readiness, **the *Vital Signs 2024 Survey* and report also seek to highlight another tension – shared risk – that U.S. policy objectives are struggling to balance.** Examples include:

- Traditional U.S. DIB companies are operating under increasing scrutiny and oversight by both the executive and legislative branches while also competing more directly with both purely commercial and global companies for access to capital.
- Policymakers want to attract and retain small and nontraditional companies into the U.S. defense ecosystem, but they are struggling to reduce significant barriers to entry and retention, including increasing compliance costs and concerns regarding intellectual property (IP) rights.
- Policymakers are working on innovative offensive and defensive strategies as part of global technological competition, but Cold War-era frameworks continue to drive status quo outcomes.
- Policymakers expect the U.S. DIB to rapidly expand production capability before contract vehicles are awarded, but companies must justify pre-contract award capacity expansion to investors and navigate current government policy and regulation that discourage holding onto surge capacity; and
- Policymakers expect companies to change their supply chain strategies, built during the last 35 years for consumer convenience and cost efficiencies, without sufficient government financial incentives or consistency in acquisition strategies, including congressional approvals for advanced procurement and economic order quantities.

The results are similar to applying simultaneous and equal pressure to a vehicle's brakes and accelerator. For the U.S. DIB, the pressure to accelerate is being met with equal and abrupt pressures to reduce speed. Valiant efforts have been made to improve the government-industry partnership in many areas over the course of 2023, but uneven political consensus limited those efforts to incremental improvements. In several cases, if the U.S. truly intends to reverse current key industrial readiness indicators for great power competition, boldness will be required.

Methodology

In this report, NDIA uses two primary data sources: public financial data and proprietary NDIA polling data. This polling data is based on a survey of both NDIA members and government employees conducted between October 18, 2023 and November 7, 2023. The poll closed with 1,397 responses.

Of the 1,397 respondents, 568 were government employees and 829 worked at an industry, university, research center, or other non-government organization.[4] For the purposes of clarity in this report, industry, university, research center, and non-government organization respondents will be denoted as private sector respondents. Of these 829 private sector respondents, 418 were from small businesses, which NDIA defined in the *Vital Signs 2024 Survey* as companies receiving between $0-$25 million in revenue in the prior fiscal year and/or registered as a small business with the government. The *Vital Signs 2024 Survey* defined medium-sized businesses as companies reporting an annual revenue of more than $25 million but less than $1 billion, and 211 respondents fell into this category. Finally, the survey had 193 respondents representing large-sized businesses, which reported an annual revenue greater than $1 billion.[5]

The financial data is all publicly available and included in the annual Form 10-K reports publicly traded companies file with the U.S. Securities and Exchange Commission (SEC). NDIA uses these reports to identify each company's total revenue, operating income, research and development (R&D) expenditures, capital expenditures (CapEx), and free cash flow. The latter four categories – operating income, R&D expenditures, CapEx, and free cash flow – are taken as a percentage of revenue to normalize values across companies and the U.S. economy.

NDIA gathered this data across four groups of public companies:

1. The top companies in the U.S. DIB.
2. Companies in the Standard and Poor's (S&P) 100.[6]
3. Companies in the Industrials Sector of the S&P 500; and
4. Technology companies in the S&P 500.[7]

Identifying the top U.S. DIB companies required additional research and analysis. NDIA started by pulling the 100 largest public contractors based on DoD FY2022 transactions. This list was pulled from Bloomberg Government's Historical Spending Database.[8] However, many of the 100 largest DoD public contractors rely on DoD revenue for a small percentage of their total revenue, which make these companies much more comparable to purely commercial companies than members of the traditional U.S. DIB. Therefore, because U.S. DIB companies are subject to DoD rules and regulations that do not apply to purely commercial companies, an additional analysis filter was applied.

Specifically, NDIA calculated the ratio of DoD transactions to total company revenue and set a threshold of 20% for DoD transactions. Our further financial analysis of the U.S. DIB included any U.S. domestic company with a higher percentage of revenue from DoD transactions than the 20% threshold. NDIA chose the 20% threshold because any company sourcing one-fifth or more of its annual revenue from DoD contracts would be significantly impacted by DoD policies and regulations. Finally, to make a better comparision to the S&P 500, NDIA limited the list of top DoD contractors to U.S. based companies.[9]

The Evolving Strategic Environment

The United States is managing a period of profound transition, both domestically and internationally. Domestically, during the past several decades, the U.S. economy has transitioned from primarily a manufacturing and goods economy to a digital- and services-based economy. Since 2008, the country has grappled with the social and economic consequences of parts of the country not fully recovering from the Great Recession. In addition, the global pandemic of 2020 caused significant shifts in population demographics and the commodities Americans buy and consume. These trends have changed how Americans work, connect, and communicate with each other, and have shifted demand and supply for education and training pipelines designed to prepare new entrants for the workforce. Government officials at both the federal and state levels are in the process of responding to this significant reorientation of American society.

The magnitude of the transition and its associated disruptions have caused the U.S. to look inward. Polling from the 2020 presidential election and the 2022 congressional midterms both showed national security challenges ranked well below economic and cultural concerns.[10] One of the organizing themes of the three most recent presidential election cycles is the focus on rebuilding American domestic resiliency with specific emphasis on American workers and economic sectors that have not benefited from the transition to a digital- and services-based economy. As will be discussed further, **critical components of the U.S. DIB, including the manufacturing sector and skilled trade employment, have atrophied during this economic transition.**

Internationally, while national strategy documents[11] and bipartisan policymakers in both the executive branch and legislative branch pivoted from a post-Cold War and post-9/11 security framework mindset to focus on the return of great power economic and technological competition against near-peer competitors, national policymakers are not necessarily acting in those terms. In most cases during the last several years and across two different administrations, specific policy, regulatory, and funding discussions quickly clarify what the United States is really focused on is a U.S. bilateral economic, technological, and military competition with the People's Republic of China (PRC).

Among the many risks of treating a global competition as a bilateral one is the U.S. is in danger of missing critical geostrategic players on the chess board. These risks are discussed further in the report under the FMS and Technology Integration section and the Resilient Supply Chain section. Without bold change and significant financial investment, U.S. allies and partners may continue economic activity antithetical to U.S. policy preferences and at the expense of U.S. companies. This is not the policy result the U.S. seeks, and the **U.S. cannot afford to cede its economic and technological competitive advantages on the global stage.**

Malign forces are testing U.S. national deterrence and resolve. Two years ago, Russia initiated an illegal and vicious invasion of its sovereign neighbor. In the last year, the PRC conducted unsafe, unprofessional, and dangerous maneuvers against U.S. military aircraft and repeatedly sent fighter jets and warships into the Taiwan Strait. Six months ago, Israel experienced the horror of the sadistic slaying of its civilian population at the hands of terrorists. In the last few months, attention has turned to the Houthis, a political and military organization in Yemen, who menace global commercial shipping and regional stability. And heartbreakingly, in 2023 and 2024, the nation mourned the loss of U.S. military service personnel, both at home and abroad. In a saturated 24-hour news cycle, it is important to maintain focus on the aggregate big picture amid global chaos and violence.

The consequences to human life in the conflicts described above offer significant and stark reminders of why a strong alliance of democracies protecting and respecting individual lives has been the U.S.' guiding principle and an integral part of the global security framework for almost 80 years. This values-based security architecture was born out of the devastation of a 30-year period of two global wars resulting in the loss of human life on a scale that recent generations struggle to comprehend.

In addition to the values-based consequences, **these tests are forcing policymakers to evaluate the duration of conflict in the context of the ability of the U.S. military and U.S. DIB to sustain supporting simultaneous contingencies in different regions.**[12] In the aftermath of the attack on Israel, for example, the United States government and defense industry responded rapidly with disruptive technological capabilities, munitions, and additional force deployments to the region.[13] The U.S. also diplomatically engaged with allies and partners to deter further aggression, bolster regional defense capabilities, and enhance force protection measures for U.S. personnel.[14] But these decisions occurred against the backdrop of tension and challenges stemming from re-aligning the prioritization of DoD's resources and force elements for a global competition against near-peer competitors.[15]

The U.S. is also working through how to balance the requirements for expanding its competitive advantage in capabilities required for the future character of war and ensuring sufficient capacity for the enduring nature of war. The Department must continue to accelerate the development and employment of new technologies essential to rebuilding our military's technological competitive advantage using both traditional U.S. DIB companies and nontraditional commercial companies. At the same time, neither government nor industry can afford to ignore the enduring nature of war, which is the direct and brutal contact with adversarial forces that U.S. military personnel will encounter if conflict erupts. This necessitates continuing to make disciplined investments to expand capacity in strategic platforms and munitions.

This is all happening within the context of political division, budget instability, credit downgrading, tightening credit markets, and historically high inflation rates[16] making capital expensive. **This strategic environment is therefore creating uncertainty for U.S. DIB companies trying to discern future DoD acquisition priorities.** During this transition phase to great power competition and the Department's focus on the future character of war, many in the U.S. defense industry are trying to pace with the practical implications of integrated deterrence,[17] campaigning, and the development of future concepts, doctrine, and requirements. Many companies, including their fiduciary boards, are trying to interpret how these future requirements should inform strategic investment decisions regarding everything from independent research and development (IRAD) funding for the development of new capabilities to planned, long-lead time CapEx to expand existing production lines or to add new production lines. *Vital Signs 2024* explains how U.S. DIB companies' managements must make the business case for the return on investment for both IRAD and CapEx.

The capacity of the U.S. DIB to grow its output, fulfill a surge in military demands, and reconstitute in a major conflict stands as a key test of its health and readiness. Currently, U.S. policies and financial investments are not oriented to supporting a defense ecosystem built for peer conflict. Today's policymakers inherited the defense industrial base the executive and legislative branches collectively shaped over the last three decades. This report focuses on ways to rebuild a resilient U.S. DIB postured for strategic competition.

Congressional Testimony by the Previous Two Chairmen of the Joint Chiefs of Staff

"The competitive military advantage we enjoy today is the result of capabilities developed by our Services in an era of unchallenged technological dominance. That era has now passed … Meanwhile, our adversaries' investments in modernization have outpaced our own."

– General Joseph F. Dunford, Jr., USMC (Ret),
19th Chairman, Joint Chiefs of Staff

"Preventing great power war through readiness and deterrence is very expensive but not as expensive as fighting a war and the only thing more expensive than fighting a war is losing a war."

– General Mark A. Milley, USA (Ret),
20th Chairman, Joint Chiefs of Staff

What is at Stake

While the U.S. talks about the re-emergence of great power competition, its global competitors actively work to erode U.S. economic and military competitive advantage. In 1985, at the height of the U.S. military build-up for peer competition against the former Union of Soviet Socialist Republics (USSR), the PRC had a gross domestic product (GDP) that was 15% of the U.S. In 2016, the PRC surpassed the U.S. and, by 2021, the PRC's GDP was 118% of U.S. GDP (adjusted for purchasing power parity (PPP)).[18] From this position of economic strength, the PRC is taking a disciplined approach to re-order the international system – its rules, norms, standards, and values – on terms favorable to itself.

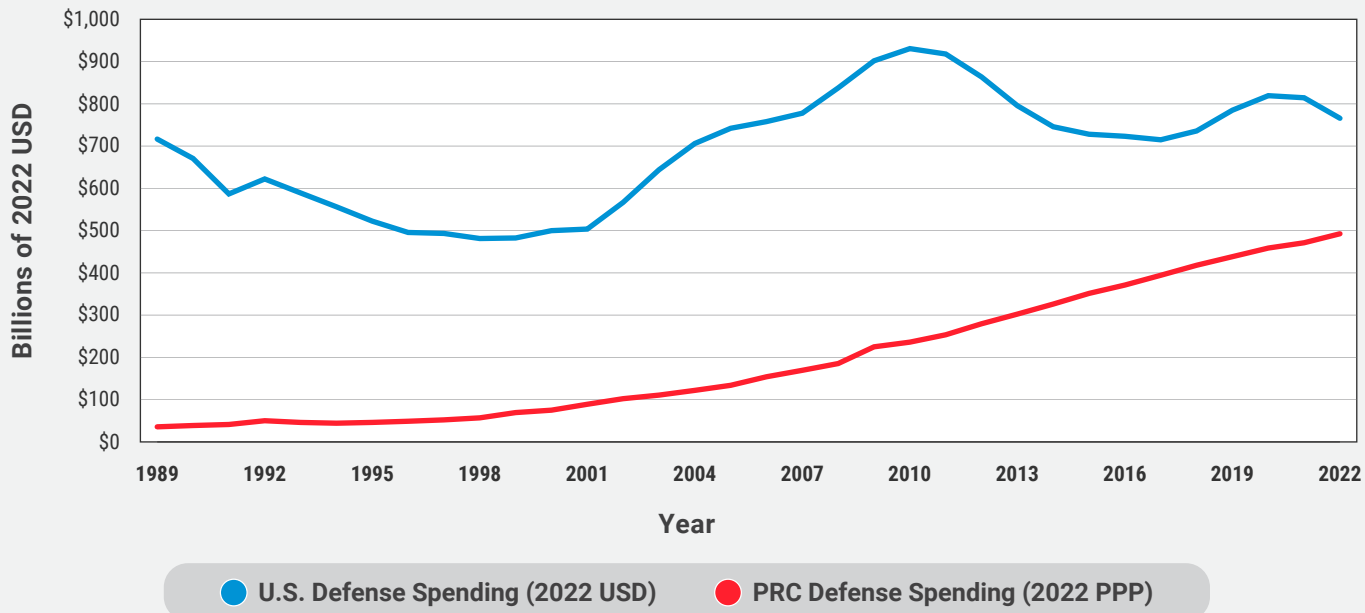
The Chinese Communist Party (CCP), which controls the PRC government, also shifted its economic and national security policies under an ideological reorientation back to the CCP's official ideology promulgated in 1949. President Xi Jinping departed from his predecessors by pursuing a more forceful approach to achieving the party's vision for both its domestic affairs and its regional and global security posture. Under his leadership, across all dimensions of diplomatic, economic, informational, and military power, the PRC is more assertive and less risk-averse.

> President Xi's strategic goal is for China to become the preeminent regional power in Asia and the unchallenged global power by 2049. In 2017, President Xi identified benchmarks to achieve this goal, including the modernization of China's national defense and armed forces by 2035.[19] These modernization benchmarks include capabilities and capacity to execute a successful incursion of Taiwan by 2027.[20]

As part of this effort, the CCP is focused on comprehensive national power, a term the CCP uses to quantify the PRC's combined military, economic, and technological power as well as its foreign policy influence. President Xi also revitalized the

U.S. vs PRC: Defense Spending Gap Closing

Inflation and PPP Adjusted



Source: OMB Budget Table 1.2; Federal Reserve Bank of St. Louis – FRED database; Stockholm International Peace Research Institute; IMF World Economic Outlook Database

phrase "the rise of the East and the decline of the West" as a euphemism for China surpassing the United States.

As part of the CCP strategy, the PRC is steadily increasing its defense spending and advancing its military capabilities. With strategic discipline, the PRC is using those financial investments to steadily modernize its nuclear capabilities; hone sophisticated strike, space, and cyber capabilities; and build out its navy in "one of the most remarkable and strategically disruptive global defense spending trends in the last two decades."[21] Publicly available measurements of PRC defense spending provide only one part of the story. The PRC also demonstrates its intentions by harnessing its significant investment in industrial power, which provides it with formidable capacity. Financial investments in its defense industrial base jumped from $10 billion in 1999 to $293 billion in 2021.[22] As part of this financial strategy, the CCP has worked to erase the line between the government and the private sector through state-owned enterprises, government equity in private firms, and opaque but troubling purges of government and business leaders. These facts are why the pattern of year-over-year growth of PRC overall defense capabilities are of grave concern to U.S. policymakers.

The CCP leadership is also focused on building internal resiliency and decreasing dependence on external entities, with attention and investment given to the country's "productive forces," especially in the sectors of industry, infrastructure, human capital, and technology.[23] Through its dual circulation policy,[24] the CCP is determined to reduce its vulnerability to being interconnected with and dependent on an international economy. Simultaneously, the CCP also intends to increase the vulnerability of other countries, especially those in its region, by deepening their economic dependence on China in the ultimate expression of national self-protection. **The CCP strategy has profound implications for U.S. export control policies and U.S. DIB supply chains.**

A Synergistic Partnership

Current U.S. policymakers inherited the U.S. DIB that government policy and funding decisions shaped during the past 35 years of U.S. strategic hegemony followed by counterterrorism and counterinsurgency campaigns. The present U.S. DIB reflects a premium policymakers place on just-in time supply chains, lowest-cost technically acceptable contract awards, and outdated assumptions regarding workforce availability. It is a U.S. DIB built for convenience and predictability, and it is a U.S. DIB the U.S. government resourced for low-intensity conflict.[25] To foundationally transform the U.S. DIB, the government and the private sector must embrace a synergistic partnership and disruptive thinking.

Assessing the Challenges

The DoD and U.S. DIB need to create a synergistic partnership to operationalize a common endeavor to achieve a desired end state.[26] Fully realizing a healthy, synergistic partnership will involve strengthening areas of alignment, constructively addressing areas of misalignment, and taking bold steps to change systemic patterns of behavior. A significant first step occurred since the *Vital Signs 2024 Survey* closed.

In January 2024, the Department released its inaugural NDIS, designed as a framework to "coordinate and prioritize actions to build a modern defense industrial ecosystem that is fully aligned" with the 2022 National Defense Strategy (NDS).[27] DoD's stated context for the NDIS is emerging geopolitical threats, rapidly accelerating technological change, instability and uncertainty in government funding processes, increasing regulation, changing workforce demographics, and significant supply chain disruptions, which necessitate a framework for the Department and industry to work together to ensure the U.S. military has a sustained competitive advantage. **The strategy will require time, resources, a shared understanding of managing risk, and disciplined alignment between government and industry on implementation to achieve its intended outcomes,** but these realities do not detract from the credit the Department deserves for pursuing this ambitious undertaking.

The NDIS has many notable strengths. The strategy clearly identifies the challenges facing the U.S. DIB and describes the history and the events that drive these challenges. Most importantly, the NDIS highlights the dangerous gaps between the robust and resilient industrial base called for in the 2022

NDS and the current capability and capacity of the U.S. DIB. **DoD and Congress must also use the opportunity created by the release of the 2023 NDIS to work on areas where both branches can support improving the relationship between government and industry.**

Areas of Alignment

In a synergistic partnership, it is important to identify areas of alignment and areas of nonalignment. Therefore, the *Vital Signs 2024 Survey* included a select number of questions NDIA asked both federal government and private sector respondents. Of note, there was significant alignment by both government and private sector respondents on the most pressing issues facing the U.S. DIB (see Q4/21 Chart):

The federal government ranked:

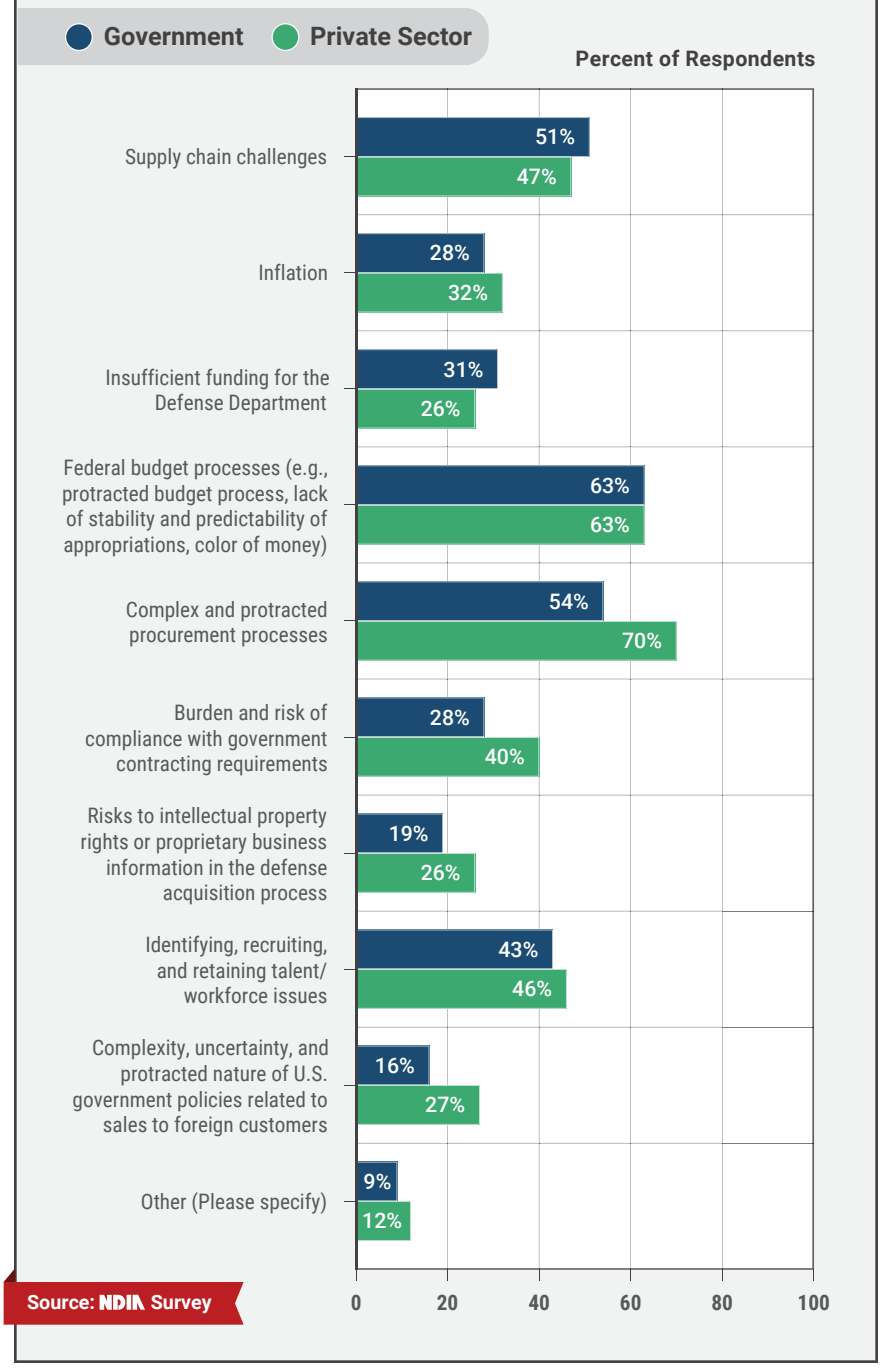
- Federal budget processes (63%)
- Complex and protracted procurement processes (54%)
- Supply chain challenges (51%)
- Identifying, recruiting, and retaining talent/workforce issues (43%)

The private sector ranked:

- Complex and protracted procurement processes (70%)
- Federal budget processes (63%)
- Supply chain challenges (47%)
- Identifying, recruiting, and retaining talent/workforce issues (46%)

Question 4 & 21:

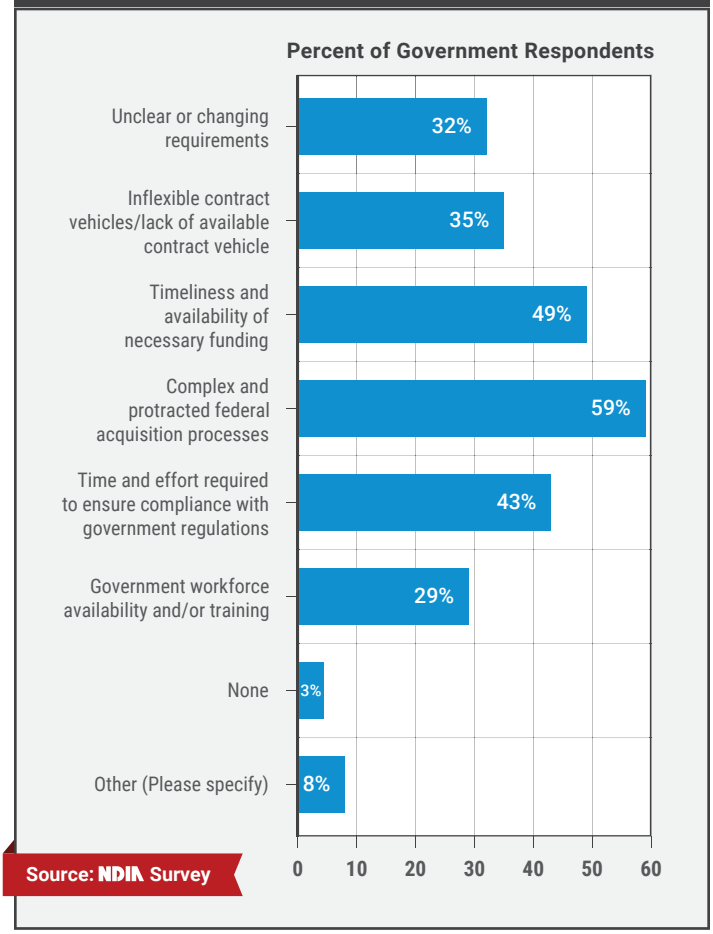
Government and Private Sector U.S. DIB Alignment Areas



Source: NDIA Survey

Question 5:

Government Challenges with Contracting



The *Vital Signs 2024 Survey* also asked federal government respondents to identify what was most difficult about government processes when working with industry. The federal government ranked (see Q5 Chart):

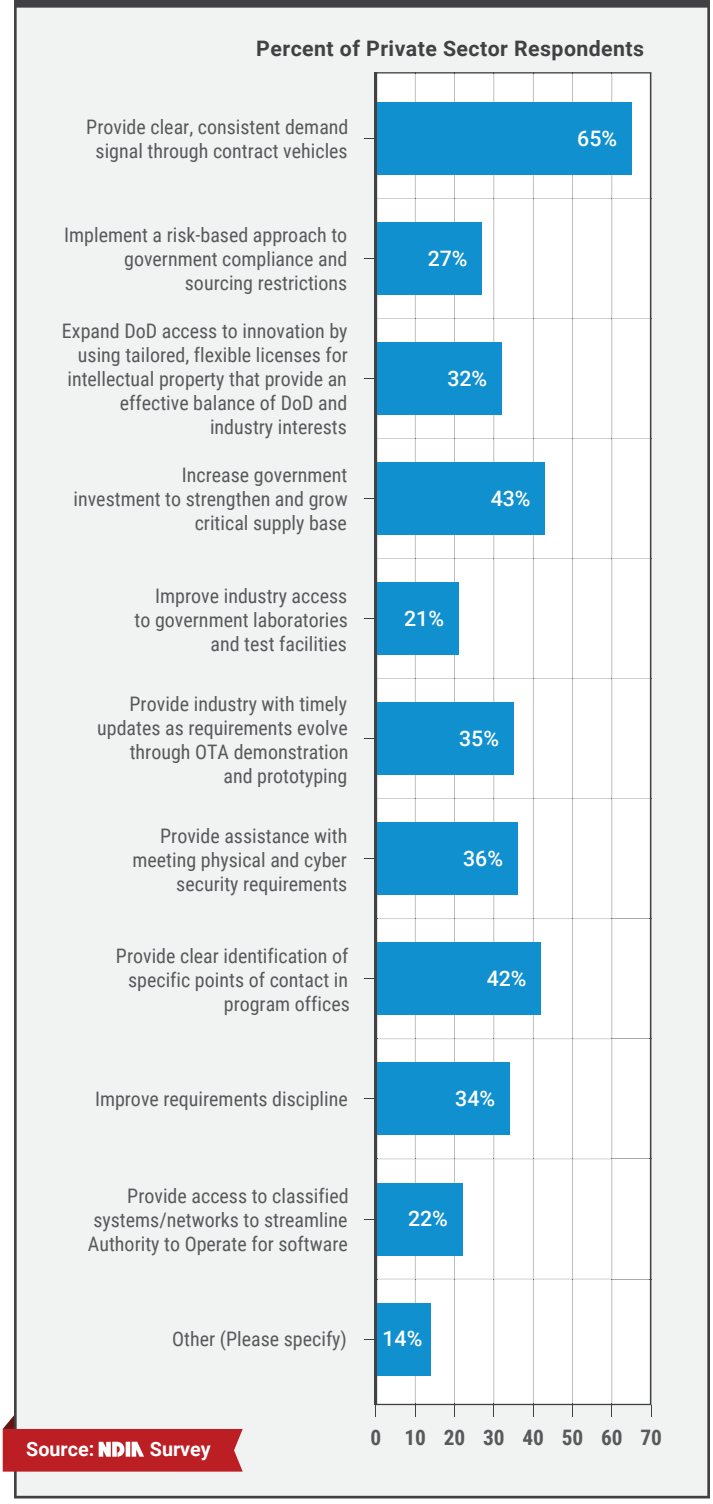
- Complex and protracted acquisition processes (59%)
- Timeliness and availability of necessary funding (49%)
- Time and effort required to ensure compliance with government regulations (43%)

The *Vital Signs 2024 Survey* asked private sector respondents what the best steps were for the government to take to improve the ability of industry to work with DoD (see Q22 Chart):

- Provide a clear, consistent demand signal through contract vehicles (65%)

Question 22:

Steps to Improve Working with DoD



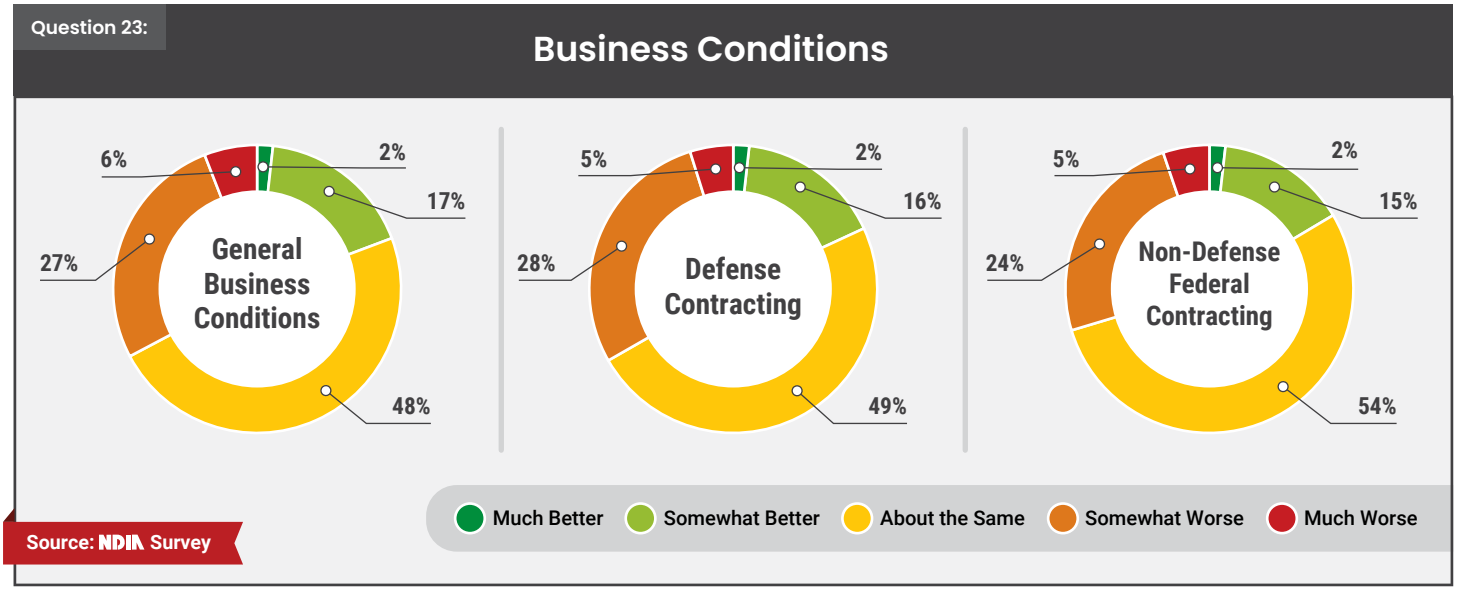
- Increase government investment to strengthen and grow critical supply base (43%)
- Provide clear identification of specific points of contact in program offices (42%)

Recommendations

1. The biggest challenge for the 2023 NDIS is its silence on the specific additional resources required to implement the actions defined in the strategy. DoD and Congress must make more substantial, sustained, and predictable financial investments to rebuild the U.S. DIB's strategic endurance and resilience. As reasserted in the 2021 DoD report cited elsewhere in this report, the order of magnitude of financial investment is in the billions, not millions, of dollars.
2. The Office of the Under Secretary for Acquisition and Sustainment (OUSD(A&S)) should engage with industry before finalizing the expected unclassified Operational Annex and the classified Implementation Plan for the 2023 NDIS. The Department intends for these two documents to track progress metrics for rebuilding U.S. DIB resiliency and to inform resourcing decisions for additional financial investments in the U.S. DIB. Many NDIA companies report there has been limited opportunity to provide input to either document.
3. While outside the scope of this report, the Planning, Programming, Budgeting, and Execution (PPBE) Reform Commission recently completed its work. DoD and Congress are encouraged to tackle the Commission's recommendations to transform the inflexible programming, budgeting, and appropriations process.
4. One of the most particularly cumbersome regulations for NDIA member companies of all sizes is the requirement for certified cost or pricing data. The burden of cost or pricing requirements could be ameliorated either by raising the Truthful Cost or Pricing Data Act (formerly known as the Truth in Negotiations Act (TINA)) threshold or by granting contracting officers additional authorities to tailor these requirements to specific procurements, including allowing contracting officers to rely on historical data of recent prices paid in determining costs of a subcontract, a purchase order, or a modification of either.
5. The appropriate contract type should be selected after reviewing the complexity and maturity of requirements and the level of financial and technical risk in the program. NDIA companies of all sizes note the Department and Military Services are preferencing firm-fixed price (FFP) contracts, even when it is not the most appropriate contract vehicle. In the FY2022 National Defense Authorization Act (NDAA) (P.L. 117-81), Congress repealed the statutory preference for FFP contracts. OUSD(A&S) should conduct a review of all policies, guidance, instructions, and training curricula to ensure they reflect the current policy provided by the Adaptive Acquisition Framework (DoD Instruction 5000.85), and the Military Services should also review whether they are following current policy.
6. Experienced DoD acquisition executives note significant work has been undertaken to reform acquisition and PPBE processes. However, the third leg – the requirements process – has not been reformed. This is an important area for additional work.

Areas of Nonalignment

Unfortunately, the *Vital Signs Survey* questions regarding the private sector's views on business conditions also highlight that there remains nonalignment between the federal government and industry. For example, in the *2023 Vital Signs Survey,* 78% of private sector respondents assessed general business conditions would remain the same or get worse. In the *2024 Vital Signs Survey*, 81% assessed general business conditions would remain the same or get worse. The private sector respondents also gave consistent answers for defense contracting conditions and non-defense federal contracting decisions. **The top three factors cited for influencing their answer were stability and sufficiency of defense spending (32%), economic factors, including inflation and consumer demand (23%), and government regulation and compliance burden (17%).** These results highlight the consequences of the ongoing congressional delays in completing the appropriations bills and the ongoing Federal Reserve economic management policies to manage the de-escalation of historically high inflation levels (see Q23 Chart).



*Due to rounding, the sum of the figures may not equal 100%

NDIA spent the past year looking at the factors driving last year's and this year's survey results. Specifically, NDIA wanted to understand why the private sector outlook was not improving, even with the renewed focus on the U.S. DIB. Two of the most significant drivers of this outlook are the changing environment for the private sector's access to capital and the compounding impact of legislative, regulatory, and compliance requirements.

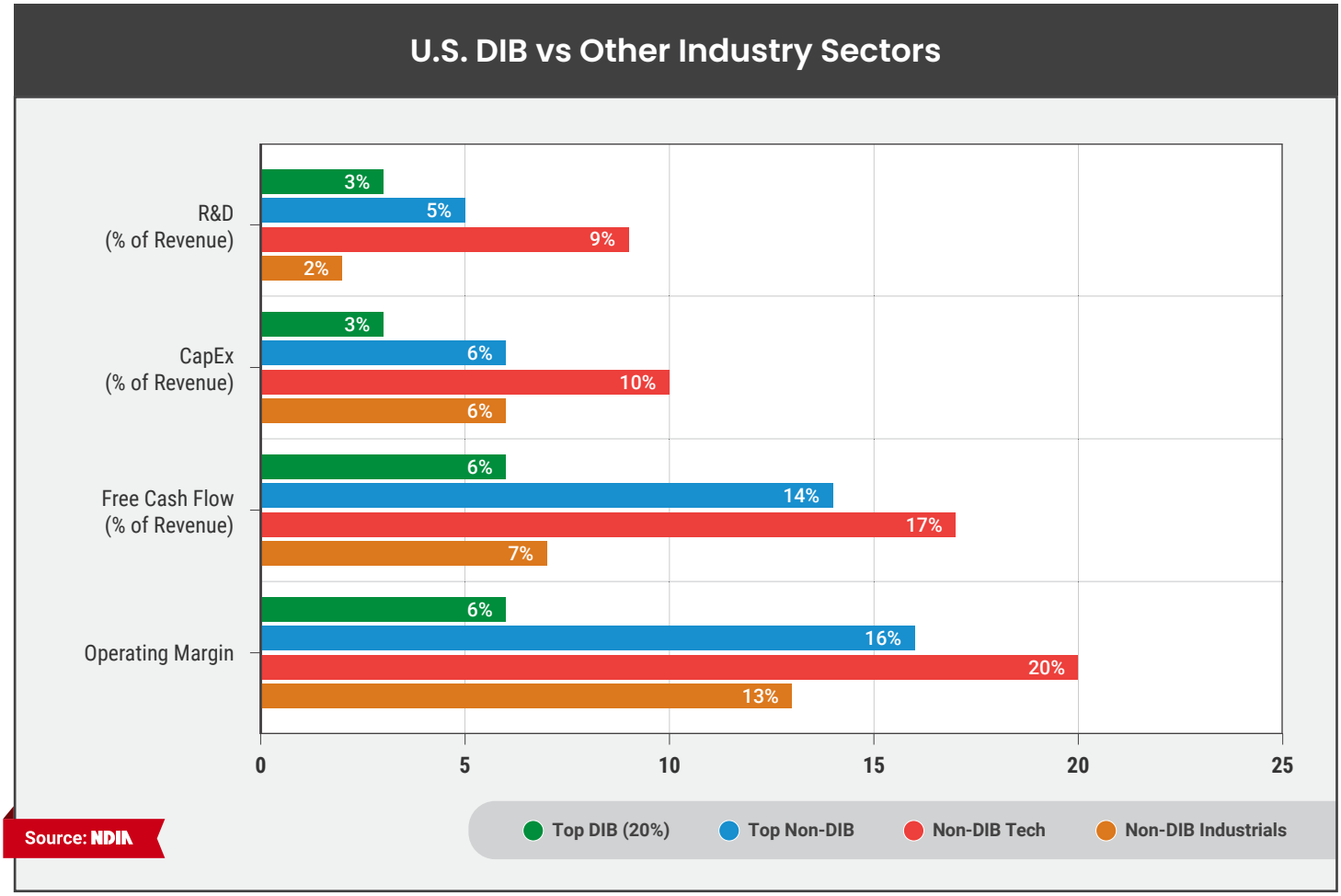
Changing Access to Capital

All publicly traded companies, including those in the U.S. DIB and nontraditional defense companies, compete for access to capital. Shareholder influence on public companies' managements and investor influence on private companies impacts business strategy decisions. **Within the traditional U.S. DIB, most shareholders are now institutional investors who own between 64-100% of the larger U.S. defense companies' shares.**[28] Institutional shareholders typically invest globally and across multiple market sectors, and their focus is on measuring positive returns on invested capital. As a result, publicly traded defense companies are in competition not just with each other but with purely commercial companies for capital. Many of the institutional investors have target rates of return, otherwise known as "hurdle rates," they must attain to stay invested. In addition, institutional investors are more likely to sell their equity holdings if the company is performing below annual return target rates. In this context, the executive managements of U.S. DIB companies are evaluated by their fiduciary boards and investors not only by how the company is performing against peers within the defense sector, but also by how the company is performing financially compared with other sectors.

U.S. DIB companies' business strategies are driven by their legal fiduciary responsibilities to shareholders. Publicly traded companies' managements utilize multiple tools to maintain a competitive return on investment to meet investors', especially institutional investors', expectations. **Companies balance free cash flow across company growth, company investors, company employees, and company suppliers.** CapEx, IRAD, and mergers and acquisitions (M&A) are types of growth activities. Companies address investor obligations through re-purchasing stocks and paying dividends. Companies support employees through pay raises and personnel benefits, which are subject to government regulation and oversight. Finally, companies look for opportunities to make investments in supplier stability. At any given time, companies are trying to optimize the right balance of free cash flow across all four stakeholder communities.

In the evolving strategic environment, **institutional investors assess the risk to U.S. DIB companies selling to DoD is increasing.** Financial markets historically assessed the U.S. DIB with higher multiples[29] and share prices because there was less revenue risk when DoD was the primary customer. However, over the last three decades, near-term revenue volatility has increased, causing financial markets to reassess. The three top drivers of revenue volatility include 15 years

U.S. DIB vs Other Industry Sectors



Source: Bloomberg Government's Historical Spending Database, Corporate Annual Financial Reports retrieved from The Wall Street Journal

of budget instability,[30] year-over-year major variations in the funding priorities in the defense budget, and significant fluctuations in high value FMS transactions.

In recent years, concerns have been expressed as to whether U.S. DIB companies manage their free cash flow in a responsible way. These concerns merit a thoughtful response due to the impact on the ultimate customer – U.S. military personnel. *Vital Signs 2024* focused on analyzing the R&D,[31] CapEx,[32] Free Cash Flow,[33] and Operating Margin[34] to compare with the largest non-DIB companies, non-DIB technology companies, and non-DIB industrial companies. These metrics were all taken as a percentage of revenue to normalize across companies of different sizes.

There are important observations to be made from this chart. First, while there are year-over-year variations, the U.S. DIB consistently operates under a lower margin construct than non-DIB technology companies and non-DIB industrial companies. Lower margins result in less free cash flow, which results in less discretionary company spending on CapEx and IRAD. Second, the U.S. DIB has a different business model than the non-DIB technology sector. Commercial technology companies will spend a higher percentage on R&D to remain viable and competitive. U.S. DIB companies' IRAD is consistently in the range reflected in the chart above for reasons addressed in the IRAD section (page 17). The same business strategy calculations for IRAD also apply for CapEx.

When there is strong, consistent customer demand signal from DoD, U.S. DIB companies are incentivized to build additional capacity or to make targeted IRAD investments. This is why it is important to note **65% of private sector respondents in the *Vital Signs 2024 Survey* identified providing a clear, consistent demand signal through contract vehicles as the best step government could take to improve the ability of industry to support DoD strategy and objectives.** When the government contracts and funding is inconsistent, U.S. DIB company managements will most likely respond by pursuing inorganic growth opportunities through mergers and acquisitions, or managements will return cash to shareholders through share repurchases and dividends.

Compounding Legislative, Regulatory, and Compliance Requirements

In *Vital Signs 2023*, NDIA noted the U.S. DIB lost 17,045 independent companies during the last five years.[35] In addition, DoD estimates the number of small businesses participating in the U.S. DIB declined by more than 40% during the past decade.[36] In this context, it is important to note the compounding impact of legislative, regulatory, and compliance requirements. For example, from FY2006-FY2018, the NDAAs included 700 provisions related to defense regulation.[37] DoD is still working on Defense Federal Acquisition Regulatory Supplement (DFARS) cases dating to 2017,[38] and, in the interim, Congress is legislating on cases not yet implemented. The sharp increase does not tell the whole story, but it provides a good place to start. The accumulation of these requirements handicaps a defense ecosystem that is shrinking, not expanding and diversifying.

Independent Research and Development

The National Science Foundation has done extensive work tracking the trends in R&D expenditures. Over the last 60 years, there has been a significant shift in R&D investments made by the federal government and the private sector. In 1964, federal R&D expenditures accounted for 67% of all domestic R&D investment and private sector R&D accounted for 31% of the investments.[1] By 2020, the roles had reversed, with private sector business accounting for 73% of domestic R&D and federal government investment accounting for 21%.[2]

This significant shift in R&D investments to the private sector has renewed public policy interest regarding U.S. DIB IRAD investments. The chart on page 16 shows the data regarding how the largest U.S. DIB companies compare with the largest non-DIB companies, non-DIB technology companies, and non-DIB industrial companies. The data shows a very different research & development strategy for top U.S. DIB companies compared to the top non-DIB companies and the top non-DIB technology companies. Taken out of context, inaccurate or incomplete conclusions could be drawn.

IRAD is work that companies invest in with their own funding to pursue strategic projects that have been identified as having high potential interest to DoD. There are two important factors that influence how and the extent to which U.S. DIB companies make IRAD investment decisions: DoD, not the commercial market, is the customer, and legal and competitive constraints.

First, U.S. DIB companies' IRAD investment decisions are tethered to DoD, its customer. Specifically, when searching for R&D opportunities, the U.S. DIB references the Defense Technical Information Center (DTIC), which identifies the top defense research priorities. Unlike the purely commercial sector, U.S. DIB companies' R&D investment decisions are driven by its customer, not by market forces. More directly, from a business perspective, U.S. DIB companies will only pursue the research opportunities their government customer identifies. This not only limits the research options, but it also in most cases precludes the ability to recoup R&D costs by selling the realized development to the commercial sector.

Dating back to 1970, Congress recognized the validity of defense companies' business decisions regarding IRAD, which is why current law provides for reasonable costs for certain IRAD to be charged as indirect costs on a government contract.[3] But there are legal and competitive boundaries on the invoiced costs. To protect taxpayer interests, U.S. DIB companies operate under regulations governing these invoiced costs. Legally, the invoiced costs must be found to be "allocable and reasonable" by both the contracting officer and the relevant audit authorities.[4]

1 National Center for Science and Engineering Statistics. "National Patterns of R&D Resources: 2021–22 Data Update." NSF 24-318. *National Science Foundation*. https://ncses.nsf.gov/data-collections/national-patterns/2021-2022#data (accessed February 22, 2024).

2 Ibid.

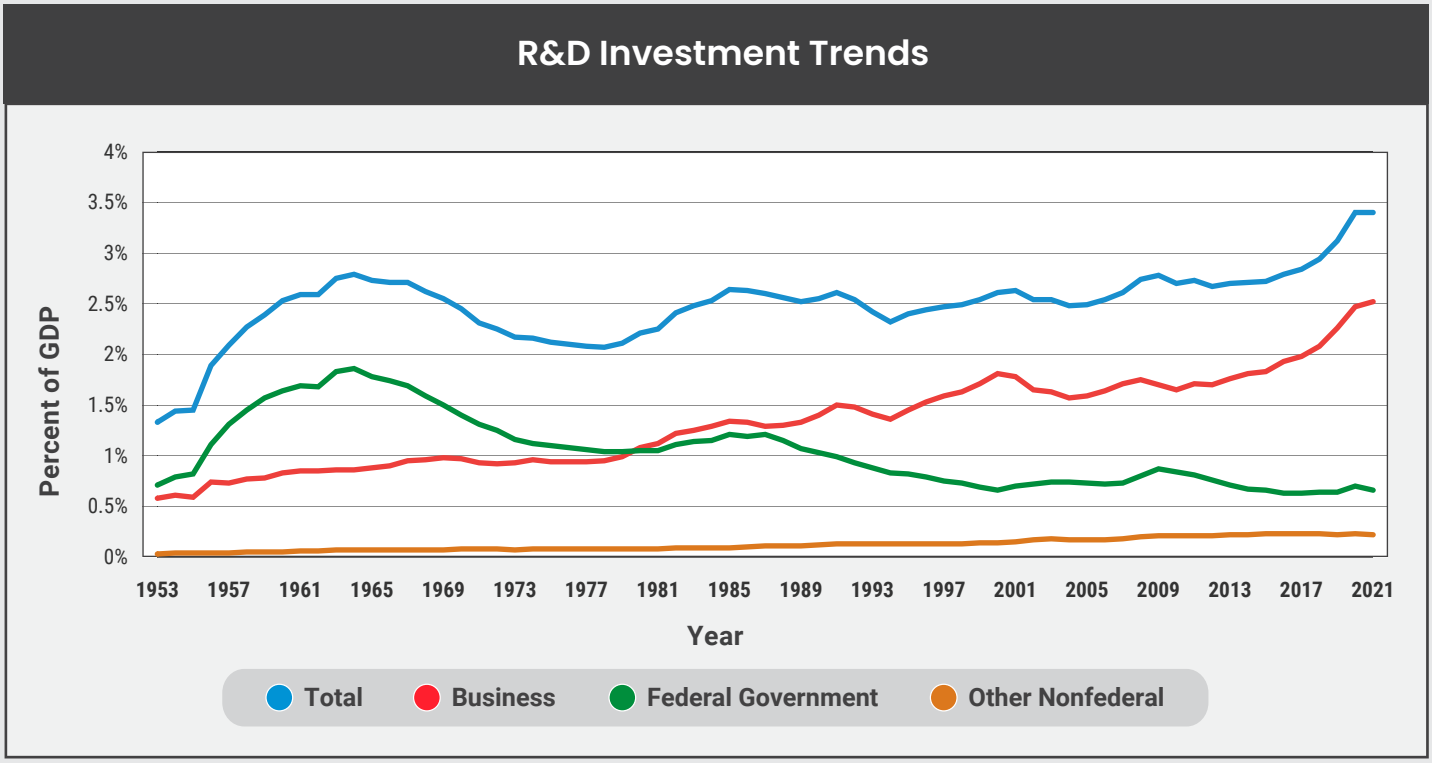
3 P.L. 91-441. Covered activities include: basic research; applied research; development; and systems and other concept studies that has a potential relationship to military function or operations. For further information, see: FAR 31.205-18.

4 FAR 31.205-18(c). "Independent research and development and bid and proposal costs."

In addition, there are also competitive factors that influence how much U.S. DIB companies invoice IRAD costs. Specifically, IRAD is recovered through the price U.S. DIB companies charge the government. Therefore, even if the contracting officer and audit authorities deem the invoiced costs "allocable and reasonable," if the defense company does not manage the price well, the company risks losing in its competitive bids to a lower-price bidder.

The combination of government oversight and competitive restraint provides effective governance in the application of this decades-old authority.

R&D Investment Trends



Source: National Center for Science and Engineering Statistics, National Patterns of R&D Resources (annual series).

The Strategic Pillars: Progress, Barriers, and Recommendations

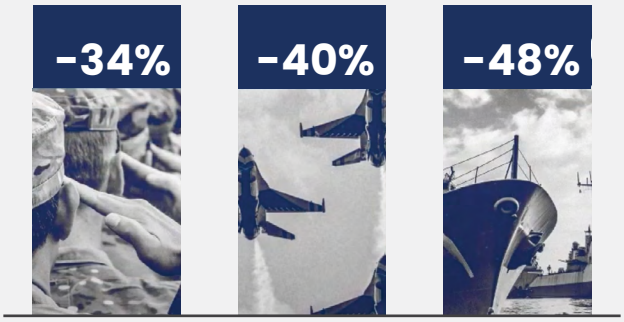
Since the start of 2023, NDIA has prioritized working on securing budget stability and sufficiency; advancing DoD digital modernization and transformation; facilitating foreign military sales modernization and technology integration with allies and partners; restoring industrial readiness, capacity, and infrastructure; and enabling more resilient supply chains. Building upon progress made in 2023, these five pillars remain NDIA's focus throughout 2024, as they form a strong foundation upon which to build a modern, diverse, and resilient U.S. DIB.

Pillar 1: Prioritizing Sufficient and Stable Budgets

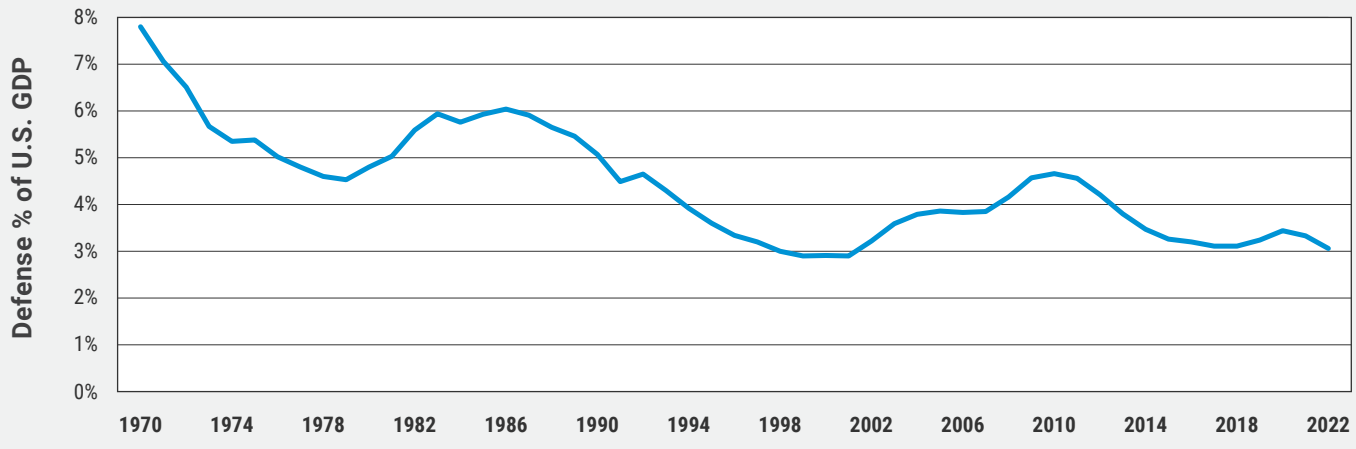
Unlike their peers in the commercial sector, U.S. defense companies are tethered to annual defense resourcing decisions. While defense spending is sizeable, it is a near-record low as a percentage of the U.S. economy. Since the conclusion of the Cold War, the U.S. has significantly decreased defense spending as a percent of the U.S. federal budget[39] and U.S. GDP.[40] For example, observing the trend line from 1985 to 2021, national defense spending dropped from 5.8% to 3.2% of U.S. GDP. The current five-year outlook is even more challenging. The Congressional Budget Office (CBO) forecasts defense spending as a percentage of GDP dropping to 2.7% by 2032.[41]

In addition, DoD and the U.S. DIB have endured budget instability for 14 of the last 15 years as the federal government operated under a continuing resolution (CR) for part of the year. Under a CR, the federal government's resourcing authority, including DoD's, allows maintaining the same rate of spending for current activities but provides no authority to begin new programs or initiatives. For FY2024, while being under a potential full-year CR, the Department expected overall shortfalls of $5.8 billion in military personnel accounts, $9.7 billion in operations and maintenance accounts, $6.3 billion in procurement accounts, and $5.2 billion in Research, Development, Test, and Evaluation (RDT&E) accounts.[42] **The parts of the budget most crucial to re-orient DoD to prepare for, deter, and – if necessary – respond to peer conflict are the accounts most vulnerable to being cut or squeezed during budget instability: R&D for emerging technologies, as well as procurement and sustainment of current and next generational major platforms.**

Military Reductions Since End of Cold War



Decades of Declining DoD Spending



Source: OMB Historical Tables

> "The CR stopgap measures are wasteful to the taxpayer … [and] damage the gains our military has made in readiness and modernization. Ultimately, a CR is good for the enemy, not for the men and women of the U.S. military."[43]
>
> –The Honorable David L. Norquist, 34th Deputy Secretary of Defense

In addition to wasting money, CRs also waste time. Since FY2010, Congress has included additional language in every CR to further restrict "DoD's use of amounts appropriated through the CR to initiate new production of items, increase production rates above those sustained in the prior fiscal year, or initiate multi-year procurements (MYP) using advance procurement funding for economic quantity orders."[44] Multi-year contracts and procurement authorities for long-lead parts are essential contracting mechanisms to replenish and increase munition stockpiles. These contracting mechanisms are also critical to keeping strategic submarine construction schedules – which have little margin for error in replacing legacy capacity – on track. For FY2024, the Department noted the series of CRs inhibited 156 new start efforts and 180 procurement rate increases for the first half of the year.[45]

The war in Ukraine highlights opportunity costs of CRs. One example is precision-guided munitions. In 2017 and 2018, the administration requested a ramp-up in the production of Guided Multiple Launch Rocket Systems (GMLRS).[46] A series of CRs delayed ramping up production, and the U.S. is now trying to catch-up. This serves as a cautionary tale. During the series of FY2024 CRs, DoD highlighted its lack of authority to proceed with the award of MYP contracts for the following critical precision-guided munitions: Long-Range Anti-Ship Missiles (LRASM), Joint Air-to-Surface Standoff Missile-Extended Range (JASSM/ER), GMLRS, PATRIOT Advanced Capability – 3 (PAC-3) Missile Segment Enhancement (MSE), and Naval Strike Missile (NSM).[47] The Department also noted a long-term CR would have denied the Department nearly $3.4 billion in funding to modernize the U.S. nuclear triad. This figure includes $2.99 billion in advanced procurement funding for the *Columbia*-class ballistic missile submarine program, critical to U.S. submarine industrial base (SIB) suppliers, as well as procurement of the B-21 Raider.[48] In addition, the Department of the Navy estimated 30% of its shipbuilding account would have been inexecutable under a year-long CR. **If the budget instability does not change, five years from now the U.S. will be dealing with the failed opportunity costs from this year's series of CRs. Those opportunity costs translate into inherited risk for future leaders.**

FY2024 also presents new and compounding challenges. First, under the Fiscal Responsibility Act (FRA), colloquially known as the debt ceiling deal, Congress included a provision to direct a 1% sequester of all 12 federal departments and agencies if all 12 federal appropriations bills were not signed into law before January 1, 2024.[49] For DoD, if the 1% sequester had gone into effect in FY2024, it would have cost the Department an additional $10 billion off its topline.[50] The Department has never operated under a year-long CR in lieu of a defense appropriations bill,[51] and Senate and House Leadership and Senate and House Appropriations Committees deserve credit for working with the White House to finally complete the long-delayed FY2024 appropriations bills in March 2024.

At the same time, the FRA also placed spending caps on the federal departments and agencies, including DoD. Therefore, the FY2025 budget request for DoD is billions of dollars less than originally projected. In addition, the budget request does not account for inflation. The result is an actual cut to defense spending. Finally, the FY2025 budget request was built on an assumption that Congress would pass the pending national security supplemental to support U.S. policy objectives for the crises in Ukraine and Israel, to strengthen Taiwan's defensive capabilities, and to make significant investments in the U.S. DIB. At the time of the publication of this report, the Department is in the process of executing funding budgeted to be spent during 12 months during a window of six months, waiting for Congress to pass the pending national security supplemental, and explaining procurement and RDT&E budget decisions that are based on spending caps, not strategy or requirements. It will be important for Congress to address gaps in the FY2025 budget process based on the lengthy timeline required to resolve the FY2024 appropriations bills, the delay in passing the national security supplemental, and the budget-driven trade-off choices made due to the FRA mandatory spending caps.

Continuing Resolutions, Government Shutdowns, and Stop Work Orders

The federal government narrowly avoided a government shutdown in October 2023. Since there were serious concerns a government shutdown would occur, NDIA asked private sector respondents in the *Vital Signs 2024 Survey* about the challenges their companies experienced as a direct result of preparing for government shutdowns. The top challenges reported were (see Q25 Chart):

- Expenditure of your company's time and resources to execute planning and preparation for potential shutdown (35%)
- Postponed or delayed ordering/delivery schedule (34%)
- Loss of planned sales (13%)

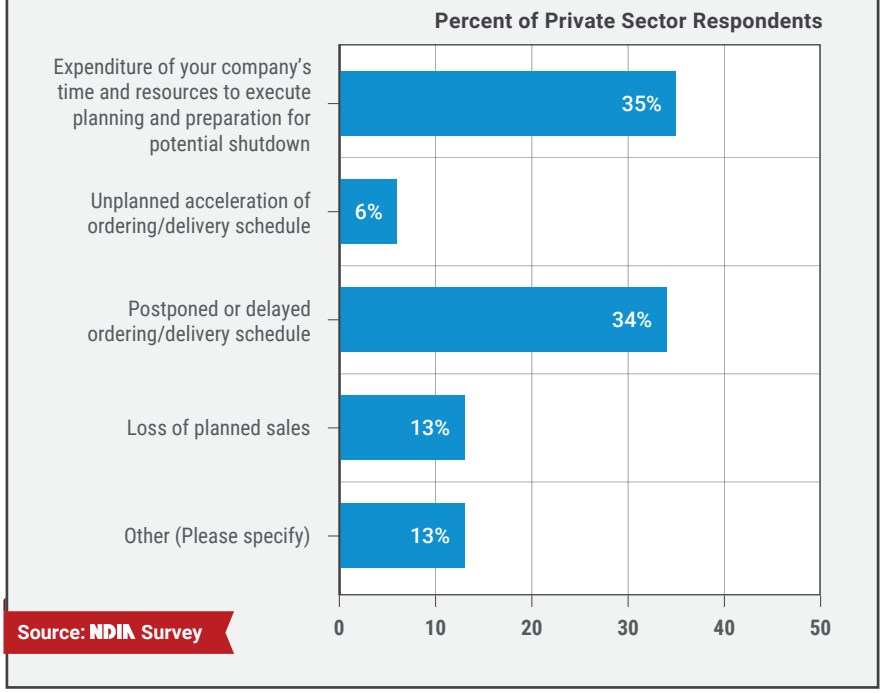
Resolution of political budget battles in Washington do not necessarily translate into viable business solutions for defense companies. While companies prefer a CR to a government shutdown, the hidden cognitive trap is **while government institutions, including the Pentagon, have adjusted their processes to insulate themselves – to the extent possible – from instability, the impact on the U.S. DIB remains acute.** A CR puts pressure on the entire defense ecosystem, especially for technology start-ups, small businesses, and middle-tier suppliers, as DoD's planning assumption under CRs is to build a six-month delay into contract obligations after the final budget is approved.

The combination of CRs and DoD planning assumptions creates unpredictable free cash flow situations for U.S. DIB companies, requiring them to stretch their reserves to pay their employees and to keep critical nodes of their supply chains viable. In addition, current inflation rates are historically high, making the cost of capital expensive and limiting options for U.S. DIB companies seeking loans. Therefore, the current appropriations environment complicates decision-making for many U.S. DIB companies. These circumstances leave companies with little flexibility in resolving their cash flow challenges other than temporarily or permanently laying off employees. The challenges are compounded when companies receive stop work orders from DoD. While some companies can shift employees to other work or to assign them to complete paid training requirements, not all companies can do so, and no company can do so indefinitely.

NDIA focused on how budget instability caused cyclical employment dysfunction in *Vital Signs 2023*. Therefore, in the *Vital Signs 2024 Survey*, NDIA asked both government and private sector respondents about stop work orders under CRs and government shutdowns. It is noteworthy that 11% of government respondents answered they issued stop work orders, and 52% of government respondents said they had not issued stop work orders (see Q13 Chart). On the private sector side, 22% of respondents answered they had received a stop work order, while 64% said they had not. In addition, 15% of private sector respondents reported they laid-off employees during a CR or government shutdown. When asked if the laid-off employees were rehired, 72% responded employees were rehired and 26% responded employees were not rehired.

Question 25:

Opportunity Costs of Government Shutdowns

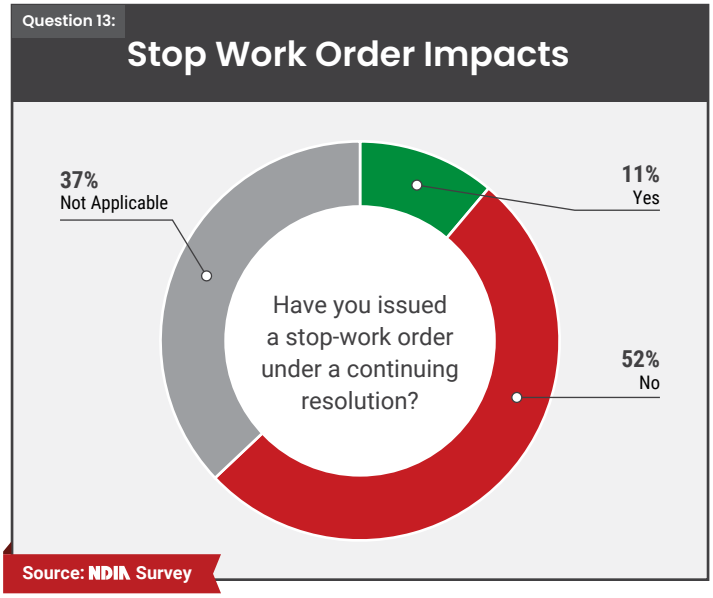


Source: NDIA Survey

*Due to rounding, the sum of the figures may not equal 100%

Question 13:

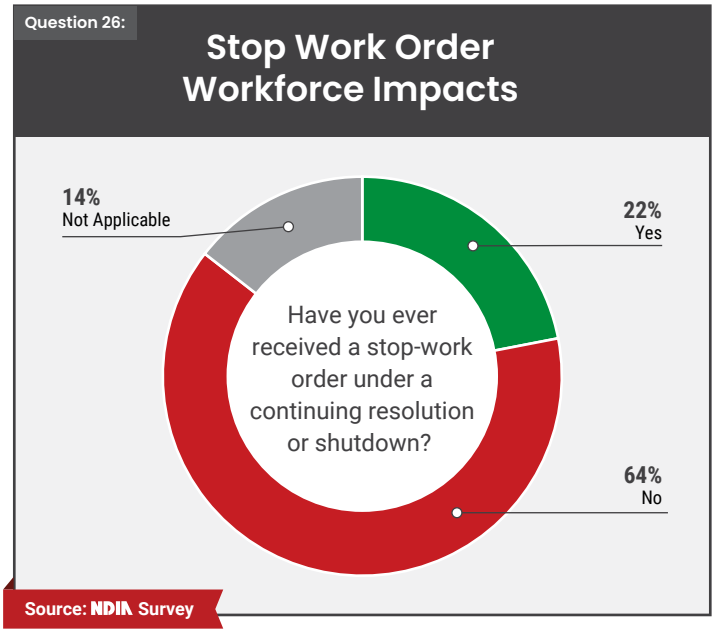
Stop Work Order Impacts



Source: NDIA Survey

Question 26:

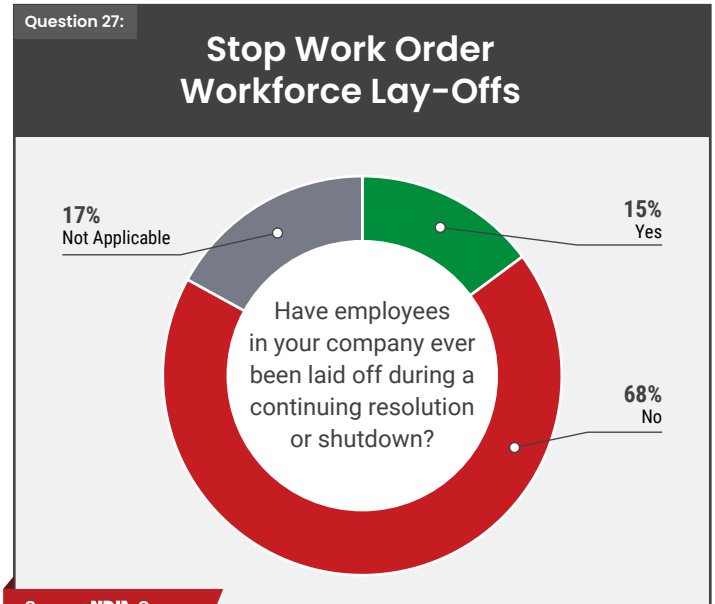
Stop Work Order Workforce Impacts



Source: NDIA Survey

Question 27:

Stop Work Order Workforce Lay-Offs



Source: NDIA Survey

*Due to rounding, the sum of the figures may not equal 100%

It is important to remember the individual workers behind these impersonal numbers. When companies lay-off employees, they pay out unused vacation and sick leave. But many companies operate in areas with few alternative employment opportunities. The cyclical pattern of laying off and re-hiring workers causes many workers to apply for unemployment benefits and, increasingly, workers' compensation benefits. Each time this cycle is repeated, companies end up permanently losing some employees, but the cost to the company can increase for re-hired employees because insurance premiums to state worker compensation funds increase each time a company's employment stability decreases. Therefore, NDIA will continue to track this issue to highlight the unforced burden government funding disruptions place on the U.S. DIB workforce.

Recommendations:

7. The government's fiscal challenges are serious, but they are not driven by defense spending. NDIA member companies of all sizes are negatively impacted by 15 years of unstable funding for DoD. Congress needs to renew its commitment to return to regular order and pass on-time annual defense appropriations bills.
8. When DoD must operate under a CR, Congress should include provisions to address inflation impacts on personnel pay and military programs and to allow for new starts and procurement quantity changes to avoid creating further program delays.
9. Congress should immediately pass the pending national security supplemental funding request to support ongoing U.S. policy objectives for Ukraine and Israel, to strengthen Taiwan's defense capabilities, and to provide billions in additional support to the U.S. DIB.
10. The FY2025 President's Budget Request (PBR) was released in March 2024. It is already clear that the mandatory FRA caps forced procurement and RDT&E budget decisions that do not align with planned acquisition strategies and military requirements. The Administration and Congress need to work together to make necessary adjustments to the FRA caps to ensure the U.S. military is properly resourced.

Pillar 2: Advancing DoD Digital Modernization and Transformation

The future character of war focuses on the use of emerging and disruptive technology, such as artificial intelligence (AI); offensive and defensive cyber security; autonomy for unmanned platforms; fifth generation (5G) and future generation (FutureG) communications and information technology; hypersonics; quantum computing; and directed energy. There will also be a shift from a single domain being the predominant domain of conflict to multi-domain conflict, including in space and cyberspace, which will play more prominent roles in the initial phases of any potential conflict. This will drive significant shifts in DoD's budget prioritization including: new concepts of operations ("how we fight"); more experimentation and prototyping; and renewed focus on partnerships with cutting-edge technology leaders, especially those adjacent to the traditional defense industrial base.

Winning the race to maintain the U.S.' technological competitive advantage requires deeper analysis of debates around the policies and authorities for these technologies. Getting the balance right will make or break whether DoD can successfully buy and integrate new technology at speed and scale fast enough to preserve and, where necessary, expand the U.S. military's technological competitive advantage. It will also have profound impacts on the ethical use of technology and whether the laws, policies, and regulations governing U.S. DIB companies incentivize both current business efforts and attract new entrants.

Intellectual Property and Data Rights Issues

IP and data rights are crucial to the companies that design, manufacture, apply, and maintain the cutting-edge technologies, systems, and platforms our armed forces rely upon to deter aggression and defend our nation and its interests. Protection of these rights is also essential to the Department's ability to incentivize investment in innovation, to gain access to new suppliers at the prime and subcontractor levels, and to maintain access to the information and technical data necessary to support military equipment throughout its lifecycle. Simply put, respecting the private sector's IP rights protects the long-term interests of the Department.

Over the last eight years, the legal and regulatory landscape related to the allocation of IP rights and to the Department's approach toward managing IP has been carefully reformed[52] in the pursuit of balancing the legitimate needs of both DoD and industry. The importance of this balance is reflected in the core principles of DoD's IP policy, which directs the Department to "negotiate specialized provisions…whenever doing so will more effectively balance DoD and industry interests" and "respect and protect IP resulting from technology development investments."[53]

Recently, the Department has been working to implement the statutory changes to IP rights contained in the FY2017 and FY2018 NDAAs.[54] However, more work is needed, including promulgating these statutes in regulation,[55] staffing and resourcing the Department's IP cadres to support the acquisition workforce, and training and educating the workforce on new approaches and best practices for IP. This work will continue to be supported by a growing body of study examining IP issues and exploring new models and techniques for managing IP. This includes the Section 813 Panel,[56] various studies by the Acquisition Innovation Research Center (AIRC),[57] and several congressionally directed pilot programs.[58]

The Department has also outlined goals to increase access to IP and data rights within the flexible acquisition[59] pillar of the 2023 NDIS.[60] The Department seeks to implement its goals by fully integrating IP planning into acquisition strategies that will protect core DoD interests over the entire lifecycle of the acquisition.[61] The means by which the Department seeks to implement these actions is through the use of modular open systems approaches (MOSA)[62] and mitigating IP restrictions on proprietary components by negotiating specialized license agreements.[63] The Department is also focusing on modernizing IP acquisition regulations and related guidance, updating and approving the delivery of IP training for the acquisition workforce, and expanding the IP knowledge base of the acquisition workforce.[64] The Department also intends to augment the recent creation of the IP Cadre offices in the Office of the Secretary of Defense (OSD) and the Military Services.[65]

Furthermore, Congress remains actively engaged on IP rights and deliverables for a range of issues, including maintaining equipment in conflict zones and austere operating environments,[66] ensuring the proper return on investments in federal R&D, retaining the ability to re-compete sustainment of programs to control costs or improve quality, exercising better control over program sustainment costs, and helping DoD better leverage industry's faster pace of innovation.[67]

As the discussions around IP and data rights continue and the Department moves towards implementation of the 2023 NDIS, it is essential to maintain the balance of serving the needs of the DoD without unduly harming and driving away industry. NDIA is diligently working through public rulemaking[68] and legislative engagement[69] to ensure the delicate balance that serves the needs of both government and industry is maintained while adapting to changes in technology and industry best practices. Failure to fairly protect and secure the IP of small and large organizations will almost certainly limit the Department's access to game-changing innovation.

For example, many small businesses develop and provide cutting-edge technology through the Small Business Innovation Research (SBIR), Small Business Technology Transfer (STTR), or other programs, which in turn feed into larger procurements and operations and maintenance (O&M) efforts. The SBIR program has specific rights that protect IP, and small businesses can usually commercialize and/or adapt these solutions for large government programs of record, creating real value for the Department and small businesses. However, **without acceptable protections, small businesses—whose participation in the DIB has declined by over 40% in the last decade[70]—will be disincentivized to develop new ideas and/or will simply decline to do business with the federal government altogether, depriving DoD from accessing innovative capabilities and technologies.**

Inadequate IP and data rights protections can also have unintended consequences for the Department's ability to utilize innovative commercial products. Companies that supply products with both military and commercial applications often develop and rely upon the same detailed manufacturing and process data to manufacture both military and commercial products. **Policies that compel commercial companies to disclose sensitive IP data increase the risk of IP leaking to competitors and disincentivize participation in the federal market.**

Commercial companies and nontraditional contractors at all tiers of the supply chain prioritize protecting their sensitive trade secrets against disclosure. Faced with the choice of disclosing IP and putting future revenue streams at risk or walking away from certain government contracts, many of these companies will choose to protect their IP and commercial business. For example, at a recent government-industry forum, one small business succinctly explained the challenge. First, the company representative made it clear small businesses take pride in and do want to meet the unique requirements of U.S. warfighters. At the same time, the company representative explained **it is difficult for small commercial businesses to offer cutting-edge technology when its IP, developed with private funds, could end up in the hands of competitors due to government regulation. In addition, if the small business accepted private investment, the small business would expect its investors to reduce the value of the product or technology in which they are investing because they would assess the value of the company's IP had been diluted.** For companies with this business context, the company may decide to develop two different versions of a product: one for the government and one for the commercial sectors. This could result in a better product going into a commercial offering or to another commercial entity that may or may not be willing to sell to the government, depending on outside investor decisions. Under these circumstances, the company strongly encouraged other participating companies and the government to focus on developing IP policies and regulations comparable to those in the U.S. commercial sector.

The most effective way for DoD to maximize its access to IP is to ensure the Department is a fair, collaborative partner with industry in the shared mission to provide our servicemembers the most advanced, best-maintained equipment possible. The more companies seek to work with the DoD, the more access the Department will have to capabilities that are innovative, cutting-edge, and driven by IP. Without consistent policies that proportionally protect the IP and data rights of industry, companies are driven away from their ability to partner with the DoD, further shrinking the U.S. DIB and the Department's capabilities.

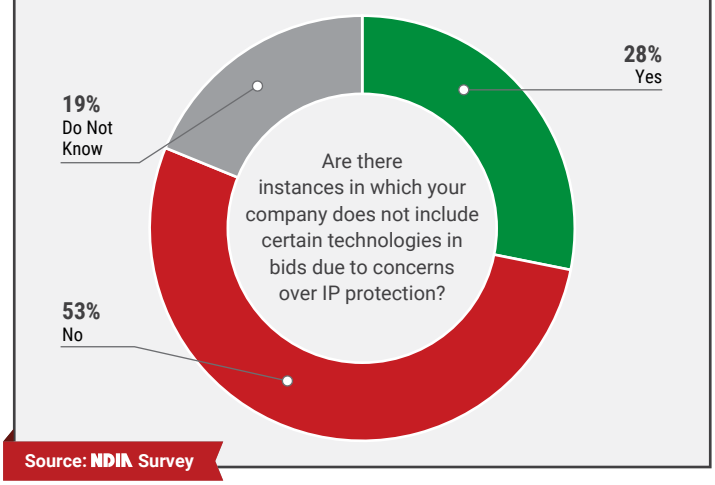
Question 55:

Intellectual Property Rights Concerns

Source: NDIA Survey

Question 56:

Excluding Technologies to Protect Intellectual Property



Source: NDIA Survey

*Due to rounding, the sum of the figures may not equal 100%

Given the profound importance of this issue, NDIA tracked industry views on IP in the *Vital Signs 2024 Survey*. Even considering the changes in statute and DoD policy intended to balance the interests of DoD and industry over the last eight years, the results of the *Vital Signs 2024 Survey* demonstrate companies within the DIB still fear significant risks to their IP when contracting with the DoD. Nearly a quarter (21%) of private sector respondents chose not to bid on certain DoD contracts out of fear DoD requirements for IP would put a company's rights at risk (see Q55 and Q56 Charts). In addition, in the follow-up question asking if there were instances in which companies did not include certain technologies in bids due to concerns over IP protection, 28% of private sector respondents said their company decided **not** to include certain technologies in bids because of IP concerns. **Most alarming, 61% of the private sector respondents in the *Vital Signs 2024 Survey* who choose not to bid on certain DoD contracts out of fear that DoD requirements for IP will put their company's rights at risk identified as small businesses.**

Recommendation

11. Congress and the DoD should continue to work with industry, academia, and research institutions as the executive branch implements recent statutory changes, considers refinements to the system, and explores new innovative IP techniques that support digitally based weapon systems. This will help ensure the DoD has access to the IP necessary to complete its mission without stifling innovation or the ability of companies, especially innovative small businesses and startups, to partner with the Department. As an immediate next step, the newly created pilot programs in the FY2024 NDAA for innovative IP strategies (Section 808) and anything as-a-service (Section 809) can be harnessed towards this joint effort.

Cybersecurity

Technological advancements offer tremendous economic and national security benefits to our nation, but our increasingly interconnected world also incentivizes sophisticated adversaries to hunt for opportunities to exploit vulnerabilities to their advantage. Last year, a PRC state-sponsored actor, Volt Typhoon, was exposed for targeting critical infrastructure sectors, including military infrastructure, in the U.S. territory of Guam and across the U.S. At the time, U.S. federal agencies reported the attacks suggested preparation for a future attack on U.S. critical infrastructure. This is an important development because it would represent a strategic shift from previous tactics of long-term surveillance to the development of an offensive capability purposefully designed to disrupt critical communications infrastructure.

From an economic and security perspective, the U.S. must protect our nation's critical data and networks. Our

pacing competitor and near-peer competitors work every day to steal commercial and personal IP, financial and health information, and to undercut the U.S. military's competitive advantage on the battlefield. For these reasons, **NDIA and our member companies long ago committed to the necessity of security for the data and systems that power the U.S. DIB, as well as the platforms, infrastructure, and services that support our nation's warfighters**. Simultaneously, to avoid extraneous costs and burdens on industry, NDIA has been attentive to focusing resources and efforts to prioritize protecting the critical information and systems that truly matter.

The continued flux and uncertainty in the scope and application of DoD cybersecurity requirements and the lack of a well-understood implementation plan have been a longstanding cause of uncertainty for NDIA member companies, especially around estimating the costs of (1) establishing, (2) maintaining, and (3) certifying the mandated safeguards. For example, since 2017, defense contractors have been required to protect controlled unclassified information (CUI) in accordance with requirements defined in NIST SP 800-171, *Protecting Controlled Unclassified Information in Nonfederal Systems and Organizations*. However, when implementing this directive under DFARS 252.204-7012, DoD did not release a cost estimate to assess the impact on the U.S. DIB, even though the Department knew that costs would increase. In response to questions about cost, the final rule[71] stated the compliance costs are "unknown" but "deemed necessary."

Subsequently, in 2019, DoD sought to require third-party verification that a company complied with the required cybersecurity standards through the Cybersecurity Maturity Model Certification (CMMC) program. On the surface, the concept appeared straightforward. Specifically, the CMMC program was designed to ensure defense contractors fully comply with their contractual obligations to protect controlled CUI by moving away from a self-attestation model to a model requiring companies to hire third-party assessors to certify compliance. **The path to implementing the CMMC program, however, has been characterized by uncertainty.** In September 2020, the DoD published an interim rule, DFARS Case 2019-D041, implementing CMMC.[72] The interim rule became effective on November 30, 2020, establishing a five-year phase-in period. Although the interim rule provided cost estimates for CMMC assessments and certifications, the estimates have been a controversial issue for companies of all sizes with some reaching six-figure compliance expenses. The rule itself, for example, estimated a cost of more than $100,000 for three years of compliance for small companies.[73]

On December 26, 2023, the Department released a new proposed rule to implement CMMC 2.0.[74] The new rule is intended to respond to industry's experience with CMMC's first version in several ways. The CMMC 2.0 proposed rule reduces the number of compliance levels from five levels to three levels, aligns Level 2 compliance with NIST SP 800-171, and aligns Level 3 compliance with NIST SP 800-171 & SP 800-172.[75] The proposed rule acknowledged public feedback that the government cost estimates for CMMC 1.0 were too low and that "some CMMC 2.0 costs may be higher than those included in CMMC 1.0."[76] **This is a consequential acknowledgment by DoD as the costs to implement CMMC 2.0 are significant. According to DoD's estimates, the private sector will face an annualized cost of $4 billion to implement the program.**[77] These cost estimates include nonrecurring engineering costs, recurring engineering costs, assessment costs, and affirmation costs. The private sector still faces uncertainty as NIST SP 800-171 is also currently undergoing a separate rulemaking update from Revision 2 to Revision 3.[78] This complicates industry's ability to provide feedback on the new pending rule, especially given the short timeline the Department provided for comments.

Compounding the challenges to industry, the proposed rule does not include the costs associated with implementing the underlying cybersecurity controls, specifically the security requirements outlined in FAR clause 52.204-21 for CMMC Level 1 and the security requirements outlined in NIST SP 800-181 Rev 2 for CMMC Level 2. As mentioned previously, the Department states the costs are "unknown" but "deemed necessary." When it released the CMMC 2.0 proposed rule, the Department indicated it did not consider the costs of the underlying requirements for CMMC Level 1 and Level 2 because they "should have already been incurred."[79] While this may be true for existing companies within the U.S. DIB, **new entrants, including small companies, nontraditional companies, and technology start-up companies, will likely need credible cost estimates to fully assess the requirements of doing business with DoD.**

In addition to significant open questions regarding the costs of CMMC 2.0, the scope of the proposed rule goes well

beyond companies simply complying with existing requirements. For example, the proposed rule expands CMMC 2.0 requirements to the application of all NIST SP 800-171 controls and certification assessments to External Service Providers (ESPs),[80] a new category of organization. The practical implementation means all Managed Service Providers (MSPs)[81] and Managed Security Service Providers (MSSPs)[82] – the companies who provide information technology and cybersecurity services to defense firms – must certify before the companies they support can seek an assessment.

The Department also expanded the scope of CMMC requirements by creating a new category of information called Security Protection Data, but did not clearly define "data." In addition, the proposed rule effectively mandates every security tool delivered as a cloud service must be Federal Risk and Authorization Management Program (FedRAMP)[83] authorized or equivalent. As companies evaluate buying additional security tools, this mandate in the proposed rule could drive them to purchase the more expensive FedRAMP options wherever possible.

The proposed rule also expanded the affirmation requirements for CMMC Level 1, Level 2, and Level 3. A senior company official must affirm continuing compliance with the requirements of all systems within scope of the CMMC 2.0 program. It is not clear whether this affirmation is just for a specific point in time or whether it is continuous. While companies can undoubtedly certify at a point in time that all controls are in place and working, company officials will face new potential liability and an almost impossible task if the purpose of the affirmation requirement is to affirm after a set point in time continuing compliance that systems will not break, controls will not fail, and cyber threats will not change.

Finally, companies include their compliance costs into the pricing of their services. As currently proposed, CMMC could add significant cost to every major weapons system and service contract. Since the DoD topline is not expected to increase significantly over the next several years, this will reduce funds available for other important priorities. **Therefore, understanding the costs to contractors to safeguard information is an essential element to ensure that companies, especially small businesses and start-up companies, are not regulated out of their ability to support the Department and its missions.** The cost and scope uncertainty make it difficult for many defense companies to plan their cybersecurity initiatives, operations, and financial investments.

Recommendations

12. DoD must engage in a formalized process with industry and across the government to establish clear and consistent CUI identification and marking guidance. The risk management goals of CMMC 2.0 are fully dependent upon the ability of government and industry to effectively manage and safeguard defense-sensitive CUI. Effective management, however, is only possible with clear, accurate identification of what information requires protection and consistent government marking of CUI prior to the transmission of such CUI or clear instruction to the contractor when their performance under a contract will create defense-sensitive CUI.
13. DoD should partner with industry to develop and implement a plan to help U.S. DIB companies transition between NIST SP 800-171 Revision 2 and Revision 3. This is essential to help companies meet contractual obligations under the DFARS.
14. DoD must engage with industry to provide further refinement around the scope and application of the proposed CMMC 2.0 requirements. This will be essential to prevent overregulating current companies out of working with DoD and serving as prohibitive barriers for new entrants and nontraditional companies, the very companies DoD's strategic policy objectives aim to attract.
15. The 2023 NDIS highlights the need to mitigate cybersecurity costs of entry to help diversify the supplier base with small companies, sub-tier suppliers, and nontraditional companies and industries.[84] As part of this effort, the Department should partner with industry to understand the actual costs of DoD's cybersecurity requirements so that new entrants can assess the costs of doing business with the Department.

Areas of Concern for Small Businesses

Small businesses, defined in the *Vital Signs 2024 Survey* as generating total revenue between $0-$25 million each year or registered as a small business with the government, drive innovation broadly in the U.S. economy and specifically in the U.S. DIB. As the most recent DoD *Small Business Strategy* notes, in Fiscal Year 2021 small businesses made up 73% of all companies that did business with DoD and 77% of the R&D companies that did business with DoD.[5] However, there are troubling indications that more structural support needs to be provided to keep this important population of companies in the U.S. DIB thriving. As noted in *Vital Signs 2023,* in recent years the overall number of companies in the U.S. DIB has declined, and DoD estimates the number of small businesses participating in the DIB has declined by over 40% in the past decade.[6] In addition, small businesses have been under additional increasing pressure over the last three years. The residual effects of the pandemic, including supply chain disruptions and workforce shortages and historically high inflation and interest rates, have combined to increase liquidity risk to small businesses.

The *Vital Signs 2024 Survey* included tailored questions for small business private sector respondents.

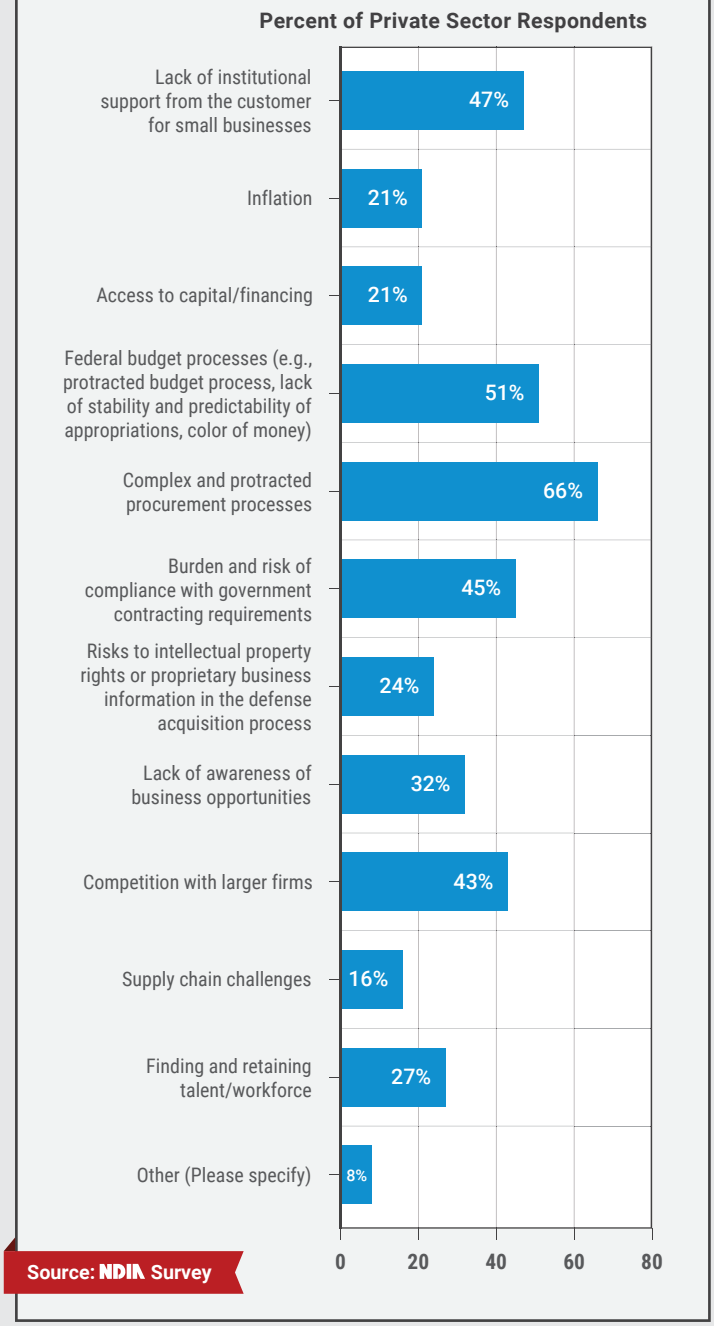
Of the most significant difficulties faced by small businesses in government contracting, private sector respondents highlight (see Q14 Chart):

- Complex and protracted procurement processes (66%)
- Federal budget processes (51%)
- Lack of institutional support from the customer for small businesses (47%)
- Burden and risk of compliance with government contracting requirements (45%)
- Competition with larger firms (43%)

NDIA focused this past year on cash flow as a key issue for U.S. DIB companies of all sizes. The 2023 NDIS states the Department will seek to support U.S. DIB small businesses by "accelerating payments to small businesses and seek ways to incentivize large prime contractors to do the same with small business subcontractors, to include assessment of ways to address slow cash flow through

Question 14:

Small Business Contracting Challenges



*Due to rounding, the sum of the figures may not equal 100%

5 U.S. Department of Defense, "Small Business Strategy." January 26, 2023. https://media.defense.gov/2023/Jan/26/2003150429/-1/-1/0/SMALL-BUSINESS-STRATEGY.PDF (accessed February 24, 2024). Page 5.

6 Ibid.

existing accounting practices and business systems." *Vital Signs 2024* takes a deeper look at this issue here for small businesses. Through the process of soliciting feedback on how DoD could support accelerating payments to small businesses,[7] NDIA small business members provided specific feedback on ways DoD itself could provide better support for small businesses. They noted that numerous small businesses in the U.S. DIB report significant payment delays attributable to technical issues within the Wide Area Workflow (WAWF)[8] and Procurement Integrated Enterprise Environment (PIEE)[9] systems. These systems' glitches not only delay the initiation of the payment clock with the Defense Finance and Accounting Service (DFAS) for both prime and subcontractors, but they also have a ripple effect on overall DIB cash flow.

Recommendations:

16. DoD should enhance the accuracy of Department of Defense Activity Address Code (DODAAC) information in the WAWF and PIEE systems.
17. DoD should clarify the roles and responsibilities of contract administrators, particularly those in the acceptor role, and provide clear points of contact information.
18. DoD should increase training initiatives for DoD personnel acting as acceptors within the WAWF and PIEE systems.
19. DoD should introduce performance metrics and incentives designed to expedite the WAWF acceptance process, which accounts for protracted delays.

In addition to cash flow, there are two additional NDIA small business priority concerns: (1) the current statutory R&D amortization requirement, and (2) the importance of SBIR and STTR programs.

Tax R&D Amortization

In 2023, small businesses encountered a new and significant cash flow challenge – the statutory R&D amortization requirement.[10] While the policy discussions regarding R&D amortization have been active over the last few years, small businesses saw the evidence of the additional impact to their cash flow challenges in the 2022 tax return filings.[11] Rather than receiving the full deduction for qualified R&D expenses in the year incurred, all companies, including small businesses, are required to amortize the deduction over five years and are only allowed to deduct up to 10% of the company's expenses in the year they are incurred. This resulted in a dramatically higher tax bill for small businesses, which reduced companies' ability to maintain a highly qualified and specialized workforce as well as to make further R&D investments.

While the current statutory R&D amortization requirement is a brake on the U.S. DIB's ability to innovate or even remain in the defense industrial base, countries such as the PRC are using their tax policies as an accelerator. The PRC uses a "super deduction" (200%) of qualified R&D expenses for innovative manufacturers of all sizes and sectors, including those in its defense industrial base. In total, there are 17 countries, including 10 Organization for Economic Cooperation and Development (OECD) countries, that provide immediate recovery of more than 100% of eligible R&D expenses.[12]

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7 National Defense Industrial Association. "Comment on FR Doc # 2022-13047." July 18, 2022. https://www.regulations.gov/comment/DARS-2022-0012-0005 (accessed February 22, 2024).

8 The Wide Area Workflow (WAWF) is a secure, web-based system for electronic invoicing, receipt, and acceptance. As of March 3, 2008, DoD issued a final rule amending the DFARS to require use of the WAWF as the only acceptable electronic system for submitting requests for payment (invoices and receiving reports) under DoD Contracts. www.dla.mil

9 The Procurement Integrated Enterprise Environment (PIEE) is a cloud-based enterprise platform, managed by the U.S. Defense Logistics Agency, that hosts many of DoD's enterprise procurement capabilities. www.acq.osd.mil

10 In 2017, the *Tax Cuts and Jobs Act (TCJA)* (P.L. 115-97) was signed into law. The TCJA repealed the option to deduct the entire amount of research and experimental expenses incurred in a given year. The repeal was made effective with tax years beginning after December 31, 2021. Companies are therefore currently required to capital these expenses and amortize them over a minimum of five years. Further educational material on this topic can be found at: https://crsreports.congress.gov/product/pdf/IN/IN11887

11 Most small businesses are so-called "pass through" entities, where the income from the business and the income from the individual owner(s) are combined for federal income tax filing purposes.

12 OECD. "Tax Incentives for R&D and Innovation." https://www.oecd.org/innovation/tax-incentives-RD-innovation/ (accessed February 23, 2024).

NDIA therefore supports a R&D amortization patch extender deal to provide a bridge for companies until 2025 when a larger tax package is expected to be negotiated. In January 2024, the House Ways & Means Committee passed H.R. 7024, the Tax Relief for American Families and Workers Act of 2024, by a vote of 40-3, and the U.S. House of Representatives passed H.R. 7024 by a vote of 357-70.[13] The legislation promotes U.S. innovation by allowing companies to immediately deduct the cost of their U.S.-based R&D investments rather than to deduct those costs over a five-year period through 2025. At the time of the publication of this report, the legislation is under consideration in the Senate.

Recommendation:

20. Congress should provide immediate relief to the statutory R&D amortization requirement.

SBIR and STTR Programs

The SBIR program was established in 1982 by the Small Business Innovation Development Act.[14] The four goals of the SBIR program are to stimulate technological innovation; use small businesses to meet federal R&D requirements; foster and encourage participation by socially and economically disadvantaged small businesses, as well as those that are 51% owned and controlled by women, in technological innovation; and increase private sector commercialization of innovations derived from federal R&D. The STTR program, created by the Small Business Research and Development Enhancement Act of 1992,[15] was established to facilitate the commercialization of university and federal R&D by small businesses. These programs are intended to facilitate and streamline the participation of competitive small businesses to work in coordination with the federal government on agency-specific R&D needs. By extension, the SBIR and STTR programs expand the economic impact of federal investments in small businesses by actively supporting private sector commercialization of the innovations stemming from this research.

Both the SBIR and STTR programs have three phases. Phase I funds feasibility-related R&D feasibility-R&D related to the participating federal departments' and agencies' requirements.[16] Phase II supports additional R&D efforts initiated under Phase I with a focus on meeting specific program requirements and exhibiting potential for commercial application. Finally, Phase III focuses on commercialization of the results of Phase I and Phase II grants. It is important to note the SBIR and STTR programs do not provide funding under Phase III.

The SBIR and STTR programs have been extended and reauthorized several times. Both programs are currently authorized through September 30, 2025 (FY2025). In the latest legislative process to extend the programs, congressional oversight focused on several issues, including how to improve commercialization outcomes, the geographical distribution of awards and funding, the amount of agency funding set aside for the programs, and the participation by socially, economically disadvantaged, and women-owned businesses.[17] In the reauthorization of the programs, Congress included provisions to address research security concerns and the potential for malign foreign influence; increased performance standards in programs by multiple award recipients; a requirement for DoD to create an open innovation topic for each DoD component solicitation; and directed the U.S. Government Accountability Office (GAO) to conduct a number of studies.[18]

Recommendation:

21. Congress should permanently reauthorize SBIR and STTR when both programs come up for reauthorization in calendar year 2025.

13 U.S. House of Representatives. "Roll Call 30, 118th Congress, 2nd Session." Clerk of the House. January 31, 2024. https://clerk.house.gov/Votes/202430 (accessed March 30, 2024).

14 P.L. 97-219

15 P.L. 102-564

16 Small Business Administration. "The SBIR and STTR Programs." *About.* https://www.sbir.gov/about (accessed February 22, 2024).

17 Gallo, Marcy E. "Small Business Research Programs: SBIR and STTR." *Congressional Research Service.* October 21, 2022. https://crsreports.congress.gov/product/pdf/R/R43695 (accessed February 22, 2024).

18 Ibid.

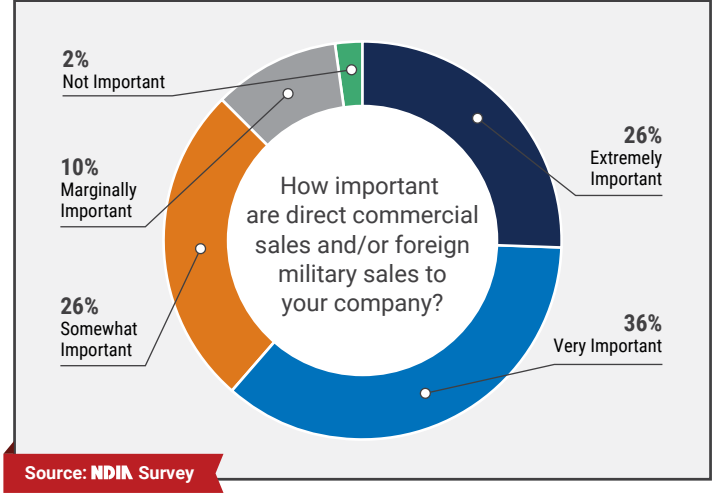
Pillar 3: Foreign Military Sales Modernization and Technology Cooperation

As noted earlier in the report, significant fluctuations in high-value FMS transactions are one of the three top drivers of U.S. DIB revenue volatility. In *Vital Signs 2023*, NDIA committed to working on FMS modernization and improved technology integration with U.S. allies and partners. In the *Vital Signs 2024 Survey*, **62% of private sector respondents stated that direct commercial sales (DCS) and FMS were either extremely or very important** (see Q36 Chart). NDIA spent the last year working on the biggest barriers to better government-industry alignment under this pillar.

The strong regional and global networks of alliances and partnerships the U.S. built and maintained since the end of World War II serve as diplomatic and military operational centers of gravity in national deterrence and, should conflict erupt, will help provide our decisive advantage in ultimately prevailing in conflict. At the operational level of warfare, these alliances and partnerships require assured access, basing, and overflight agreements; trusted and resilient command and control architectures; and interoperable and interchangeable platforms, systems, and infrastructure. To keep them strong, **the U.S. must also focus on updating the policy, legal, regulatory, and technology security framework governing U.S. defense trade.** This includes modernizing our FMS processes, deepening our technological cooperation and integration with our closest allies and partners, and having clear parameters around technology releasability and export controls.

Question 36:

Importance of Direct Commercial Sales and Foreign Military Sales



Source: NDIA Survey

*Due to rounding, the sum of the figures may not equal 100%

Current U.S. defense trade's legal, regulatory, and technology security framework was designed in a strategic era when the U.S. enjoyed technological dominance. But this legal and regulatory framework has "increasingly figured as roadblocks to defense industrial and technology integration" with the United States' closest allies.[85] **U.S. allies and partners around the world are building their own indigenous defense industrial sectors and are becoming centers of innovation and cutting-edge technology. Globalization, the migration of innovation to the commercial sector, and the proliferation of dual-use technologies incentivized them to explore new and innovative ways of doing business.** The inherent tension between protection and competition must be carefully managed, and vigorous controls around what truly needs to be protected must remain in place. At the same time, both military operational and U.S. DIB business challenges provide a compelling case for a clearer, more responsive, framework.

The 2023 NDIS notes international allies and partners, each with their own robust defense industries, will continue to be a cornerstone of DoD's concept of integrated deterrence.[86] The strategy further states "[p]roactively developing, growing, and sustaining multiple, redundant, production lines across a consortium of like-minded nations is imperative for the U.S. to ensure adequate production capability and capacity while mitigating exposure to supply disruptions or changing production requirements."[87] Therefore, NDIA will continue to support modernizing our FMS processes, supporting government-industry engagements to operationalize the Australia–United Kingdom–United States (AUKUS) security pact, and working with Department of Commerce

(Commerce) as it pursues a new model for export controls and reestablishes the President's Export Council Subcommittee on Export Administration (PECSEA), a subcommittee of the President's Export Council (PEC). These efforts address key concerns private sector respondents identified in the *Vital Signs 2024 Survey* including International Traffic in Arms Regulations (ITAR) challenges (55%), transparency with and communication from the U.S. federal government (36%), Export Administration Regulations (EAR) (33%), and insufficient prioritization of U.S. allies and partners in the FMS process (33%).

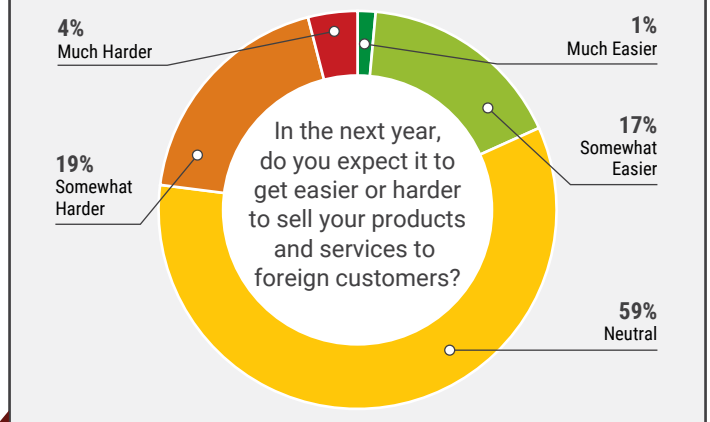
Modernizing and Streamlining FMS

FMS reform and modernization is critical to strengthening the resiliency of the U.S. DIB in an era of great power competition, to enhancing diplomatic ties by strengthening our network of alliances and partnerships, and to improving the effectiveness of those relationships by enhancing military interoperability at the operational level. Under the current framework, the FMS process, particularly technology release and foreign disclosure, is opaque, disaggregated, and slow. DoD addresses technology security risks by establishing new processes and responsibilities with defined authorities to different offices for each identified risk. Each office, in turn, develops its own internal processes with different decision-making mechanisms. No single office has responsibility for resolving internal disagreement in a timely fashion,[88] and DoD lacks a coordinated technology transfer decision framework aligned to the 2022 NDS.

In August 2022, DoD established the DoD FMS Tiger Team to investigate how to improve the portion of the FMS process handled by DoD. In June 2023, the Department released six areas of reform, including: (1) improving the Department's understanding of ally and partner

Question 38:

International Opportunity Expectations

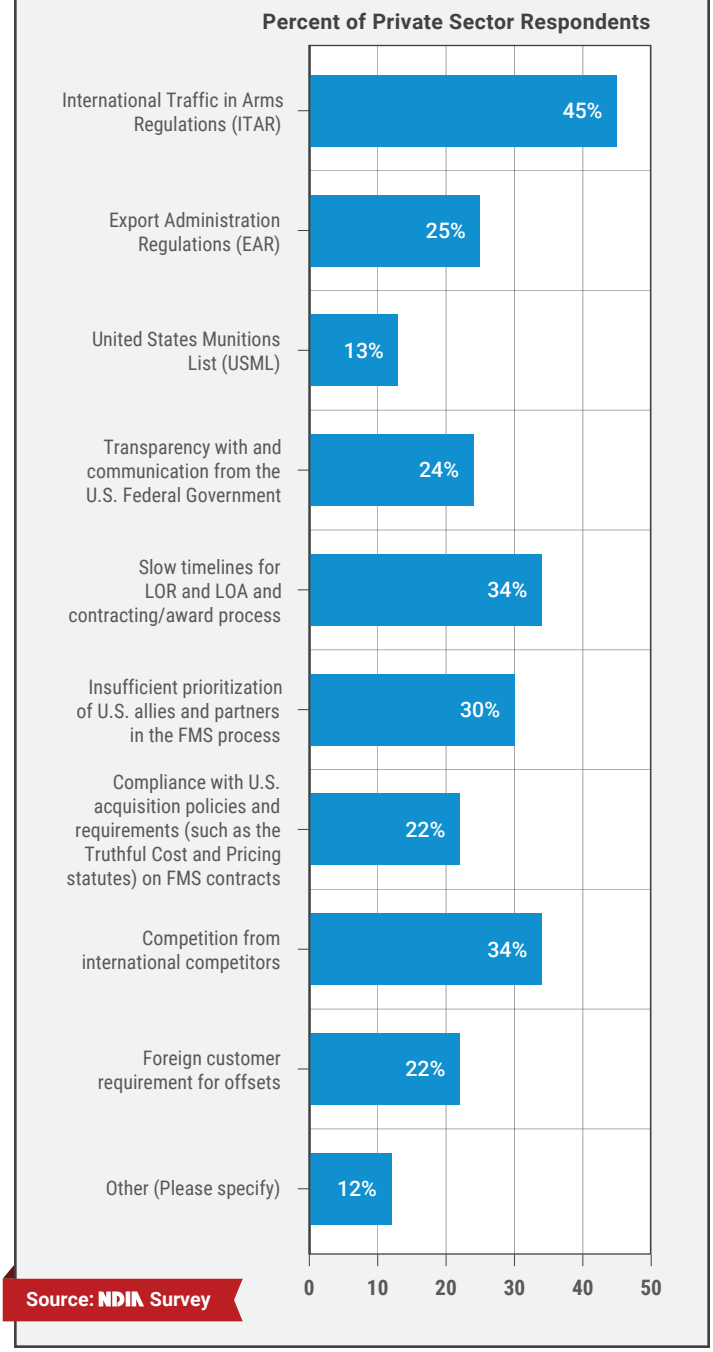


Source: NDIA Survey

*Due to rounding, the sum of the figures may not equal 100%

Question 37:

Barriers to International Sales



Source: NDIA Survey

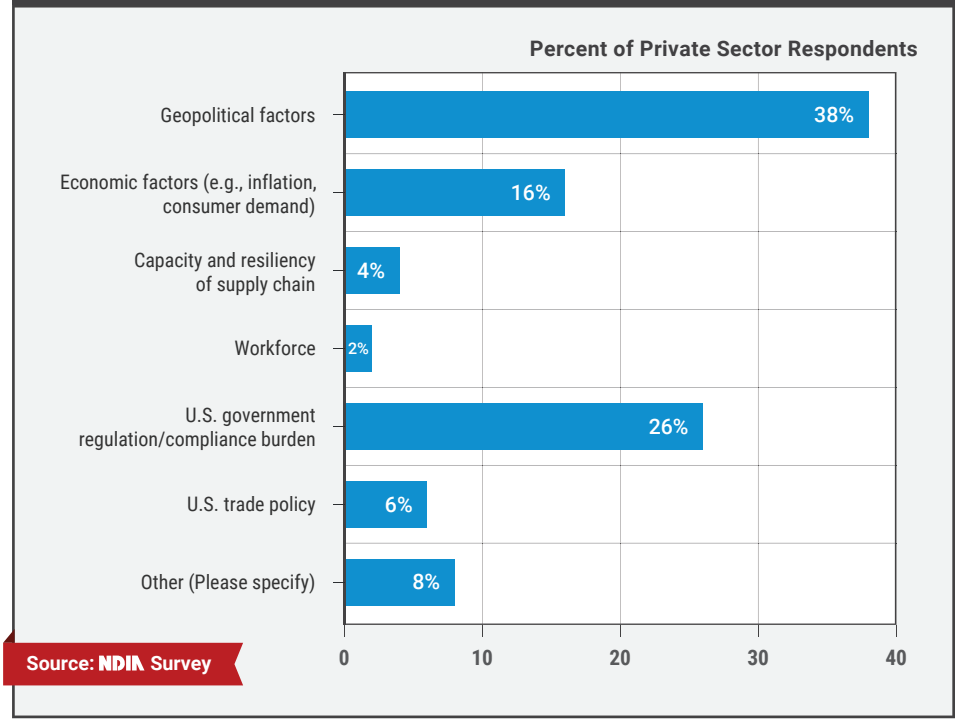
requirements; (2) enabling efficient reviews for technology release; (3) providing allies and partners with relevant priority capabilities; (4) accelerating acquisition and contracting support; (5) expanding DIB capacity; and (6) ensuring broad U.S. government support for improving the FMS process.[89] In addition, in May 2023, the State Department unveiled its own approach to FMS strategic planning, which included ten initiatives focused on improving efficiency and competitiveness in the FMS process.[90]

The 2023 NDIS noted that "FMS has the additional benefit of helping to achieve economies of scale by sharing some of the burden of acquisition and sustainment across the lifecycle of defense platforms, which in turn strengthens the global defense industrial base."[91] The strategy reiterated the six areas of reform from the DoD FMS Tiger Team. It also noted that to incentivize U.S. DIB investment in production capacity and surge capability, total requirements of high-demand, low-supply platforms, systems, munitions, and services must be informed by U.S. and allied partner demand levels.

And yet, **in the next year, private sector respondents do not assess anything will change in their defense trade business operating environment.** When asked if they expect it to get easier or harder to sell their products and services to foreign customers, 69% responded they expect the year-over-year change to remain the same (see Q38 Chart). For those companies expecting change, 23% expected the environment to get either somewhat harder or much harder, while 18% expected the environment to get somewhat easier or much easier.

Question 39:

Drivers of International Sales Barriers



*Due to rounding, the sum of the figures may not equal 100%

To support the ongoing work of NDIA members, the *Vital Signs 2024 Survey* asked private sector respondents to identify the biggest barriers to selling products and services to foreign customers (see Q37 Chart):

- International Traffic in Arms Regulations (ITAR) (45%)
- Slow timelines for Letter of Request (LOR) and Letter of Acceptance (LOA) and contracting/award process (34%)
- Competition from international competitors (34%)

Private sector respondents were also asked to identify the primary factor that influenced their answer on their operating environment (see Q39 Chart):

- Geopolitical factors (38%)
- U.S. government regulation/compliance burden (26%)
- Economic factors (e.g., inflation, consumer demand) (16%)

Last year, NDIA was asked to provide responses for the record[92] on ways to build resiliency within the U.S. and with partners in the Indo-Pacific region. The top three recommendations were to prioritize the U.S.' closest allies and partners when they submit a FMS application rather than processing applications as they are received; to invest in an increased and expertly trained FMS contracting workforce; and to implement a start-to-finish tracking system for FMS contracts to support U.S. allies and partners through the LOR, LOA, and acquisition process.[93]

The FY2024 NDAA[94] contained several important provisions designed to make the FMS process more effective and responsive. First, acknowledging the FMS workforce is overstretched, the conference report included Section 1204, which establishes a Foreign Military Sales Center of Excellence, to improve the training and education of personnel engaged in FMS planning and education.[95]

In addition, Section 873, *Program and Processes Relating to Foreign Acquisition,* mandates that no later than March 1, 2024, and no less frequently than annually thereafter, the Secretary of Defense will hold an industry day to bring together foreign officials, covered embassy staff, and members of the U.S. DIB to raise awareness of DoD's role in the FMS process, ascertain foreign demand for U.S. weapons systems, and identify potential opportunities for foreign industry partnership.[96] This section also requires the OUSD(A&S) and each of the military departments to designate an individual to serve as a single point of contact to coordinate information and outreach on DoD implementation of the FMS process and to respond to inquiries from representatives of the U.S. DIB and partner countries.[97]

Finally, **Section 918, *Technology Release and Foreign Disclosure Reform Initiative*, mandates the Secretary of Defense carry out an initiative to reform and improve policies, processes, and procedures applicable to technology release and foreign disclosure decisions by DoD.**[98] The reform initiative is meant to include the development of recommendations to increase efficiency and reduce timelines for the processing of foreign disclosure decisions, to standardize applicable processing and information-sharing systems, and to continually improve these processes within DoD and across the interagency. The reform initiative is also intended to include the development of metrics for the management of the technology release and foreign disclosure process to provide objective and subjective measures of performance to improve senior leader decision-making.

Recommendations:

22. To date, there has been limited communication from either DoD or State on the progress of implementing their FMS reform efforts. Both DoD and State should prioritize completing their identified areas of FMS reform in the calendar year 2024.

23. DoD should prioritize implementing Section 918, *Technology Release and Foreign Disclosure Reform Initiative*, and the Department's senior leadership should ensure the implementation addresses congressional and industry priorities for an expedited and transparent review process.

Launching AUKUS Implementation

Launched in September 2021, the AUKUS security pact is designed to be part of the strategic deterrent to the PRC's growing military capabilities in the Indo-Pacific region. Although attention initially focused on the proposed transfer of nuclear propulsion technology to Australia, the plan also has ambitions to develop advanced technologies and other military capabilities expected to deliver decisive advantage in the digital era of warfare. In April 2022, for example, AUKUS leaders committed "to commence new trilateral cooperation on hypersonics and counter-hypersonics, and electronic warfare capabilities, as well as to expand information sharing and to deepen cooperation on defense innovation"[99] in response to the PRC's tests of hypersonic missiles. The joint announcement noted hypersonics and electronic warfare cooperation were additions to previous agreements to deepen cooperation on cyber, AI, quantum technologies, and additional undersea capabilities. On December 1, 2023, the AUKUS Defense Ministers released a joint statement highlighting the following priority activities under Pillar II: maritime autonomy experimentation and exercises; trilateral anti-submarine warfare; quantum positioning, navigation, and timing; resilient and autonomous AI technologies; deep space advanced radar capability, and cyber.[100]

The FY2024 NDAA included several important provisions covering the AUKUS security pact.[101] These provisions include the Pillar I authorization of transfer on a sales basis of up to three *Virginia*-class submarines to Australia and the ability to recover incurred expenses from the transfers.

The legislation also included Section 1343,[102] which provides a broad ITAR exemption for Australia and the United Kingdom for AUKUS-related projects should the administration certify the countries have comparable regulatory regimes. There are three areas the Administration will need to address through its interagency decision-making and its regulatory process: it will need to define and determine "comparable regulatory regimes;" establish the mechanisms through which industry partners in all the countries can use the exemptions; and address the challenges the scope of the exemption could create. These are important issues as all three governments and industry have experienced the suboptimal implementation of the 2007 Defense Trade Cooperation Treaties (DTCTs).[103]

Section 1343 is an important provision for the government to get right, and there are concerns in industry regarding how effective it can be under the current defense trade framework, which is not designed to distinguish what is truly important and what is not. The definitions contained in the 1976 Arms Export Control Act (AECA) consider a "defense article" as an item or tangible good, a service, or technical data.[104] The legal definition of defense article is not more clearly defined in this law or any other statute. Historically, the U.S. State Department has applied this definitional construct as broadly as possible, and there is no level of materiality or tiered system or hierarchy of classification for different types of defense articles.

Industry is also expected to closely track how the AUKUS ITAR exemption will address the question of universal extraterritoriality. Under extraterritoriality, the initial exporter has the right to approve or deny any re-export or transfer of those items within a recipient country or outside that country. ITAR is not based on one-time approvals for the export of a defense article or system; rather, the U.S. requires a recipient country to go back to the original approver and ask for permission to re-export the defense item to another end user. This is not a trivial concern as a single non-material item from a supply chain or a transfer of knowledge requires going back to the U.S. for approval. Both Australia and the UK have supply chains and sub-contracts with other U.S. allies and partners who are not currently participating in AUKUS. For example, under the current construct, a UK company must seek permission from the U.S. to subcontract to a company in a NATO member state. Under this example, if the UK company must continue to seek permission, U.S. industry anticipates the implementation of the NDAA AUKUS ITAR exemption could be a repeat of the 2007 DTCTs.

As an initial interim measure, in May 2023, the State Department announced it would implement the AUKUS Trade Authorization Mechanism (ATAM), to establish license exemptions for certain exports to approved entities within AUKUS countries. In making the announcement, the State Department noted the "vast majority of U.S.–Australia defense trade occurs via FMS" and ATAM will permit "most items that would typically be transferred under FMS authorities" to be "transferred under Direct Commercial Sales (DCS) authorities,"[105] which are the only transactions eligible for export license exemptions. The State Department further noted the United States also intends to request commitments from Australia and the UK "on shared standards for the protection of defense information and materials consistent with" applicable U.S. standards.[106]

From a U.S. industry perspective, AUKUS represents at least the third attempt at export control reform.[107] **A vigorous, comprehensive export control regime is essential to preserve U.S. economic security and U.S. national security, including the technological competitive advantage of our military.** At the same time, it is equally important to prioritize what requires protection. A thoughtful piece on these issues highlighted the consequences of failing to implement the ITAR exemption correctly: "the U.S. military may be left guarding second-tier capabilities while the commercial domain races ahead with unclassified and commercially available best-in-class alternatives."[108]

Recommendations:

24. The State Department should finalize the ATAM regulations in late spring or early summer of 2024 to address industry concerns the regulations will not be completed before running into the historical protocol to not issue new regulations within six months of the end of any presidential administration.
25. Fundamentally, U.S. industry is concerned the implementation of Section 1343 could lead to a limited change to the current legal and regulatory environment. As a confidence-building measure for industry, it is important that the administration complete its certification review of Section 1343 of the FY2024 NDAA within the prescribed window in the legislation (spring of 2024).
26. It has been 2 ½ since AUKUS was announced. Industry needs to start seeing viable business opportunities, including a dedicated funding stream and contract vehicles, under Pillar II.

A New Approach for Dual-Use Export Controls

Two very different American administrations in the last decade delivered comparable assessments about the strategic economic and technological competition underway between the U.S. and the PRC. Similar conclusions have been drawn that a business-as-usual mindset will undermine U.S. economic and national security. In 2022, National Security Advisor Jake Sullivan succinctly stated to a convened group of national security and innovation leaders that U.S. "relative advantages" are no longer sufficient.[109] From the point of view of the U.S. government, **the U.S. needs to identify new approaches and solutions to not just protect but to expand U.S. technological competitive advantages.**

One area where the U.S. government is implementing a new, more assertive approach is through its export control policies. Dating back to the aftermath of World War II, federal government controls on U.S.-developed technology and capabilities have been viewed as a powerful tool in U.S. national security strategies. In addition to U.S. unilateral controls, the U.S. also participates in four major multilateral control regimes: the Australia Group (chemical and biological weapons), the Missile Technology Control Regime (MTCR) (missiles and missile technology), the Nuclear Suppliers Group (NSG) (nuclear weapons), and the Wassenaar Arrangement (conventional arms and dual-use goods and technologies).[110]

After the Cold War, the U.S. government prioritized U.S. export control policies on limiting the proliferation of weapons of mass destruction (WMD) and missile technology. However, with the public emphasis, including in both the 2018 and 2022 National Defense Strategies, on the re-emergence of great power competition, U.S. export control policy debates are broadening in scope as both the executive branch and Congress consider export controls a central pillar in preserving U.S. technological leadership. This re-emphasis on technological leadership also has a U.S. values and foreign policy focus, as the current administration, the previous administration, and Congress all emphasized strengthening export controls on items that assist repressive regimes in surveilling and controlling their country's citizens, such as facial and voice recognition technology. **As a result, U.S. policy and political debates regarding dual-use export controls have shifted in a profound way based upon the U.S. government's assessment of PRC capabilities and intent.**

For example, in 2018, Congress passed the Export Control Reform Act (ECRA),[111] which established a permanent authorization for the President to control dual-use goods and certain military parts and components. The law also authorized the President to establish policy requirements for setting controls and to coordinate multilateral export control regimes. It is noteworthy that ECRA was the first export control statute to explicitly state U.S. economic security is an element of U.S. national security.

Importantly, ECRA also required the President to establish an interagency process, led by Commerce, to identify emerging and foundational technologies and for Commerce to establish a licensing process for those technologies. Commerce's Bureau of Industry and Security (BIS) is responsible for administrating these controls through the EAR. The EAR sets licensing policy for specific destinations, end use, and end user controls and includes the Commerce Control List (CCL) of dual-use technologies subject to the controls.

In the process of implementing the requirement to establish a licensing process for emerging and foundational technologies, the U.S. government has been wrestling with

how to define and control AI and quantum computing. **Each technology encapsulates the biggest tension points in export controls: disputes over determining the state of the art and therefore what is worth controlling; scoping what should be controlled; an accurate assessment of foreign availability (items of comparable quality and in sufficient quantity from a non-U.S. source as to render a U.S. export control or denial of an export control license ineffective), including what is available or similar in China; and identifying and controlling technology at the speed of adoption.**

At the same time, both current and former Commerce senior officials emphasized export controls are a time-limited solution and controls are likely to become less effective as technology advances and/or competitors and adversaries find workarounds. Therefore, since the passage of the ECRA, the focus has also been on effective enforcement of U.S. export controls, continuous evaluation of foreign availability, and pursuit of plurilateral cooperation with like-minded nations.

As an illustrative case, in October 2022, the U.S. government issued a rule[112] imposing controls on items that supported the PRC's advanced computing capabilities, which can also support AI applications. The rule also attempted to limit the PRC's indigenous semiconductor companies' production to their current levels, which is roughly two generations behind the current leading-edge semiconductors. Following the unilateral imposition of U.S. export controls, the U.S. government worked to secure plurilateral acceptance from the Japanese and Dutch governments because unilateral U.S. export controls would have been less effective as these countries have companies with some of the most advanced manufacturing equipment covered by the controls.

It is important to note in this context there have been discussions about adding a fifth multilateral export control regime to specifically address the PRC challenge. However, apart from the lack of consensus on the nature and severity of the challenge, some allies and partners lack the legal framework to impose controls comparable to U.S. standards. The speed of technological change also informs the viability assessment of a fifth multilateral control regime because it takes years to get a technology controlled by the current multilateral regimes. In the case of the semiconductor industry, the planning assumption is a new technology node will be available roughly every two years. Therefore, the strategy Commerce pursued with the Japanese and Dutch governments offers important insight into the most likely approach Commerce will pursue in future situations.

In addition, in the aftermath of the October 2022 semiconductor control rule, there were reports Chinese AI companies on the Entity List (a Commerce list of entities acting contrary to the national security and foreign policy interests of the United States) were using intermediaries to rent or otherwise acquire chips that were export-controlled.[113] It would be prudent for industry to assume Commerce will put increasing emphasis moving forward in ensuring companies and their supply chains "know their customers."

The 2022 rule and its aftermath also provide context for additional steps Commerce is currently undertaking. In December, Commerce Secretary Raimondo participated in a public forum[114] to discuss Commerce's strategy to stay ahead of the rapidly growing and evolving technological threat from the PRC. Describing the strategy as an aggressive, new, and innovative approach, the Secretary emphasized that U.S. national security rests on U.S. economic security and highlighted the increased dependence the U.S. military has on technology in the digital age, including AI, spectrum and electronic warfare, supercomputing, cybersecurity, and microelectronics and semiconductors.[115] Therefore, **Commerce is exploring a new model for export controls. Rather than continuing a company-by-company approach to determining issuance or denial of licenses, the Department is pursuing a model of country-specific controls to deny classes of technology to countries deemed as threats.**[116]

In addition, Commerce re-established the PECSEA.[117] Its purpose is to serve as an advisory committee on export controls to the Secretary of Commerce. The PECSEA's membership composition is intended to draw on the expertise and experience of strategic industry sectors to identify ways to protect U.S. economic security and national security and promote U.S. values and foreign policy priorities without unduly harming U.S. technology leadership and commercial trade, including the U.S. defense industrial base. In the re-establishment of the PECSEA, Commerce emphasized it seeks participants who are not only conversant with technological product design and production but who are also involved in their companies' corporate strategy development and who can therefore speak to the time, resources, and challenges involved in identifying foreign availability, diversifying and building increased resilience in

U.S. supply chains, and balancing approaches to de-risking U.S. companies' operations in China.

Finally, given the pace of technological innovation and the PRC's aggressive blending of civil-military fusion of technology, policy conversations have resurfaced in Washington about the potential utility in moving to a single licensing system. Currently, there are multiple federal departments and agencies with responsibility for export controls, and it can be confusing for industry to navigate the byzantine system. For instance, in its FY2021 annual report –its most recent published report – BIS stated it worked with the State Department on more than two hundred requests to determine whether a particular item was subject to the State Department's ITAR or Commerce's EAR.[118] In many cases, those adjudications took months to complete. Back in 2009, there were conversations about reforming how the executive branch handles export controls. The review effort at the time established four goals: a single licensing agency for dual-use items and munitions, a single control list, a single agency for export control enforcement, and a single integrated information technology system.[119]

Recommendations:

27. Both the executive branch and Congress should evaluate the merits of moving to a single licensing agency for dual-use items and munitions, a single control list, and a single agency for export control enforcement.

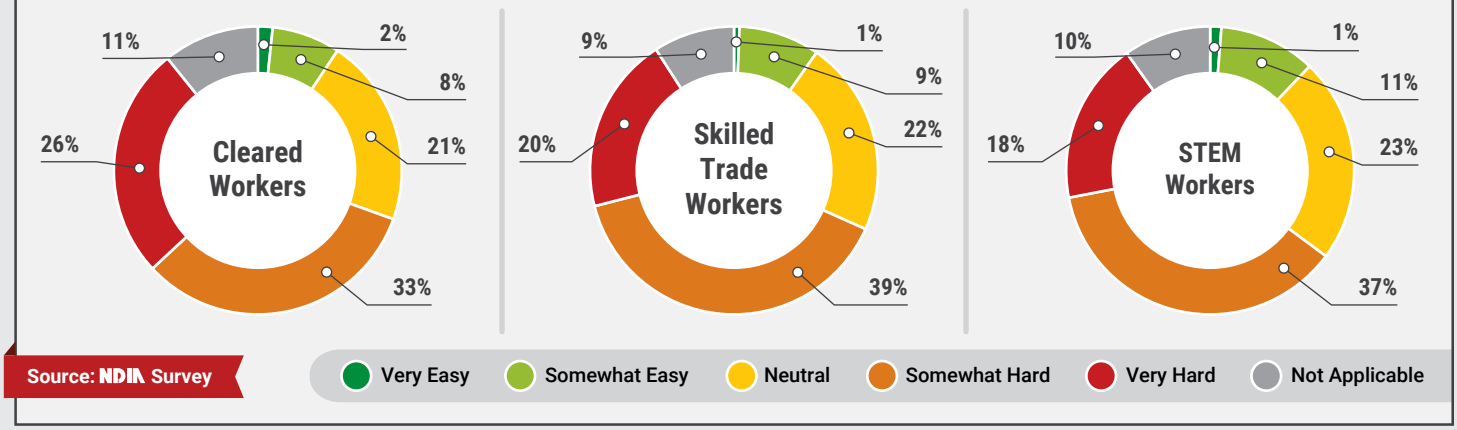
28. Both the executive branch and Congress should assess the long-term impacts of U.S. export controls to U.S. technology leadership, including the risks of "design out" and avoidance of U.S. content.

Workforce Challenges

The recruitment and retention of a highly skilled and trained workforce is a cross-cutting issue across all five strategic pillars on which a modern, diverse, and resilient U.S. DIB is built. In 1985, the U.S. had 3 million workers in the defense industry.[19] **By 2021, the U.S. had 1.1 million workers in the sector, a reduction of nearly two-thirds.** The 2023 NDIS notes the U.S. labor market "lacks sufficient workers with the right skills to meet domestic production and sustainment demand."[20] An experienced workforce meters how quickly different sectors of the U.S. DIB can scale and sustain production. Workforce recruitment and retention issues are also critical factors behind lengthening

Question 52:

Skilled Worker Availability



*Due to rounding, the sum of the figures may not equal 100%

19 Henry, David K., and Richard P. Oliver, "The defense buildup, 1977- 85: effects on production and employment." *Monthly Labor Review.* 1987. https://www.bls.gov/opub/mlr/1987/08/art1full.pdf (accessed February 22, 2024).

20 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.business-defense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 26.

lead times in supply chains because the extended timelines often reflect how long it will take suppliers to increase their workforce to meet demand.

The *Vital Signs 2024 Survey* asked private sector respondents to rate how hard it is to find cleared, skilled trade, and STEM workers. Across all three categories, the majority of the respondents indicated it was somewhat hard or very hard (see Q52 Chart):

- Cleared Workers (59%)
- Skilled Trade Workers (59%)
- STEM Workers (55%)

The *Vital Signs 2024 Survey* also sought to identify the top barriers to filling vacancies. The top four issues identified were (see Q53 Chart):

- Competition with the commercial sector (53%)
- Lack of qualified candidates (48%)
- Defense industry not attractive career option (40%)
- Inability to be competitive at government specified labor rates (39%)

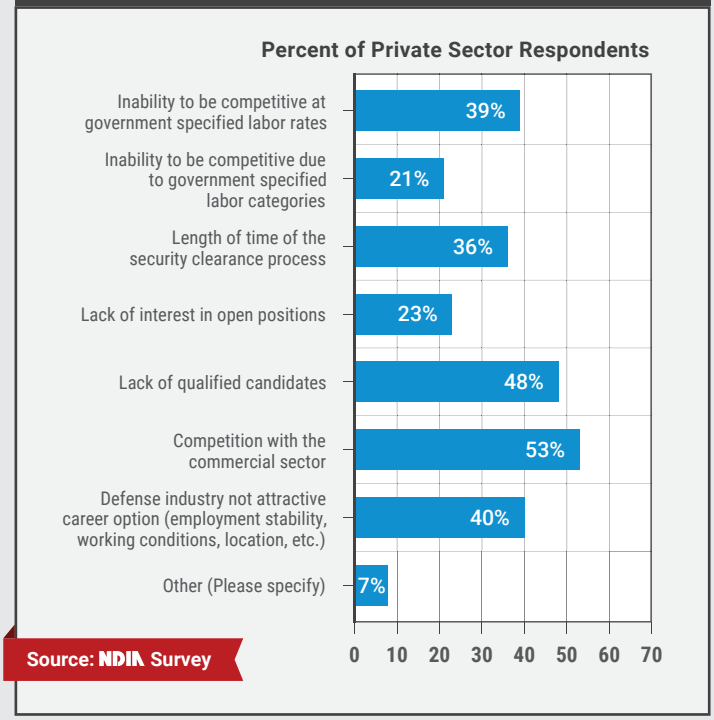
The *Vital Signs 2024 Survey* asked industry to identify the most pressing issues companies are facing regarding its workforce. The recruitment of new workers was the clearest challenge (64%). In addition, 75% of private sector respondents cited the challenge of retaining new and long-term workers (see Q54 Chart).

Over the last year, government-industry forums have also reinforced that the U.S. DIB is not competitive with the commercial sector in the areas of compensation and fringe benefits. One NDIA member company, producing strategic platforms for the U.S. military, provided company proprietary data showing how its wage premium has eroded by 44% since 2014. There are several reasons for this, including increases in hourly wages for fast-food workers in certain states.[21]

Companies note that the U.S. DIB's low profit margin and regulations involving pay and benefits make it hard to recruit and retain professionals who can find higher pay and more attractive benefits in the commercial technology sector. NDIA member companies' human resources departments helped provide data on recent surveys on benefits across the aerospace and defense sectors and

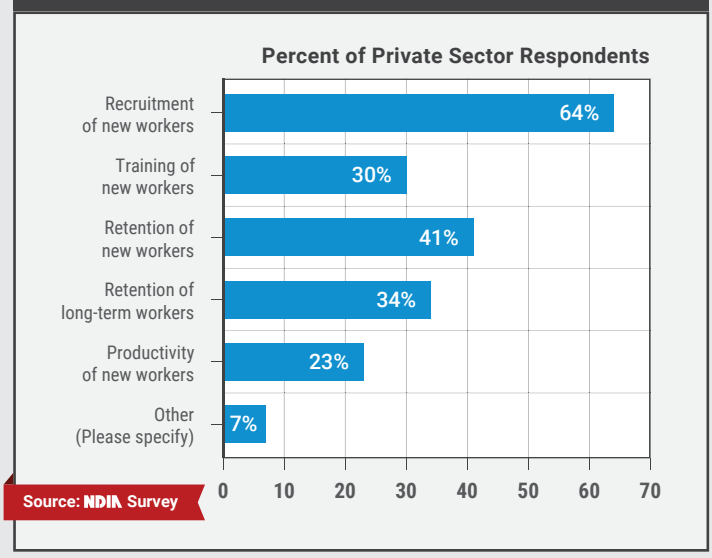
Question 53:

Workforce Hiring Challenges



Question 54:

Pressing Workforce Challenges



*Due to rounding, the sum of the figures may not equal 100%

21 Wage and Hour Division. "State Minimum Wage Laws." *U.S. Department of Labor.* Updated January 1, 2024. https://www.dol.gov/agencies/whd/minimum-wage/state (accessed February 22, 2024).

the commercial technology sector. Respondents in the aerospace and defense sector noted the top four issues that encourage them to stay are, in priority order, pay and bonus (54%), retirement benefits (49%), health benefits (44%), and flexible work arrangements (34%). The survey also asked respondents what factors would cause them to seek new employment. Respondents had the same priority list, but it was noteworthy that for each category – pay and bonus, retirement benefits, health benefits, and flexible work arrangements – the aerospace and defense sector response rate was either double or near double the commercial technology sector.[22]

NDIA did a deeper look at one sector, the U.S. SIB. The two leading challenges to the U.S. SIB are the health of the supplier ecosystem and the shortage of skilled workers. These challenges have been known for several years. There has been a large decrease in the average U.S. SIB workforce experience over the last 10 years, especially for skilled trade workers and for supervisors. The average experience in skilled trades has dropped from 17 years to six years, and the average experience of supervisors has dropped from six years to two years. In addition, companies and technical experts noted that it is not uncommon to see 32-40% first year attrition rates for the training pipeline for the U.S. SIB. Work conditions are the most cited reasons for the attrition, including the tough working conditions in manufacturing and shipyard work environments and the fact that many U.S. DIB positions do not allow for remote work, which as noted above, is a very attractive recruiting tool for the commercial sector. This is consistent with other sectors that have stressed the challenge of retaining talent, including engineers, operations workers, and supervisors, at both the prime and supplier level.

Recommendations:

29. The executive branch and Congress must review whether the process of setting prevailing wage rates and labor categories is ensuring DIB wages remain competitive. Across multiple U.S. DIB sectors, companies have noted that minimum wage increases and service sector starting wages are approaching industrial base starting wages.

30. The Military Services must examine whether they are encouraging both collegiate degrees and skilled trade as important and viable career paths for departing service members. Historically, a significant portion of the U.S. DIB skilled trades talent pipeline came from enlisted personnel. However, there are concerns that the Services are not currently encouraging skilled trade career paths. The 2021 House Armed Services Committee (HASC) Defense Critical Supply Chain Task Force report highlighted "the challenges related to social perceptions of industrial and manufacturing work."[23] In addition, the 2023 NDIS notes that "DoD will continue to support programs that showcase opportunities in manufacturing and technology fields with local high schools, colleges, and universities, as we work to change the present stigma associated with being an industrial worker."[24]

31. Companies building military aircraft programs have noted the Department of the Air Force should consider a similar program to that of the Department of the Navy, which has spent the last several years working on local, state, and federal partnerships to re-develop skilled trade talent pipelines.

22 WTW. "2022 Global Benefits Attitudes Survey, United States." November 11, 2022.

23 House Committee on Armed Services. "Defense Critical Supply Chain Task Force Report." *U.S. House of Representatives*. July 21, 2021. Page 11.

24 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.business-defense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 29.

Pillar 4: Restoring Industrial Readiness Powerhouses

In 2021, DoD re-asserted it would take significant time and government financial resources to reorient the defense industry to effectively handle peer conflict, requiring: "[difficult] but necessary investment choices, including expanding funding for capital investment in facilities and training and maintaining the workforce. **Without serious and targeted investment – billions instead of millions – America's DIB is simply unsustainable,** (emphasis added) let alone capable of supporting our deployed forces and legacy equipment while solving complex warfighting challenges posed by advanced technologies in the 21st century, from AI and cyber to hypersonics and autonomous air and sea systems."[120]

The 2022 NDS emphasizes deterrence by resilience and defines resilience as "the ability to withstand, fight through, and recover quickly through disruption."[121] **To be resilient, and to be responsive to policymakers, the U.S. government needs to continue to incentivize the U.S. DIB to expand its production capacity and to sustain its focus on rebuilding the U.S. DIB workforce.**

In *Vital Signs 2023*, NDIA noted the powerhouses of industrial readiness – stable and predictable budgets, an experienced and specialized workforce; diversified and modern infrastructure; manufacturing innovation; and sufficient, including idle, capacity have all atrophied under the combined transition to a services-based economy with a premium on just-in-time commercial supply chains. The report also noted that for the last 30 years, on a bipartisan basis, the U.S. government failed to resource the U.S. industrial footprint required to prevail in near-peer conflict.

The 2023 NDIS emphasized the importance of incentivizing industry to improve resilience by investing in extra capacity and recommended legislation to plan for spare production capacity and to provide oversight.[122] Any follow-on executive or legislative branch efforts should consider the fact that currently neither the federal government nor the investor community incentivizes the U.S. DIB to have significant surge capacity. Neither wants to pay for economic inefficiencies, including idle facilities,[123] idle capacity,[124] and high indirect rates for labor.[125]

In terms of facilities costs, there is a bias toward economic efficiency. Ordinarily, defense contractors must try to mitigate the costs of idle facilities and idle capacity before passing those costs on to the government via indirect rates. Generally speaking, costs of idle facilities are unallowable, and costs of idle capacity are allowable under certain conditions.[126] During the 2020-2021 global Coronavirus 19 (COVID-19) pandemic, the federal government made allowances under federal regulations for companies having idle capacity, but companies are reporting they expect renewed emphasis on government enforcement of this regulation. Therefore, **the federal government would have to make policy and regulatory changes before companies could carry significant excess capacity.**

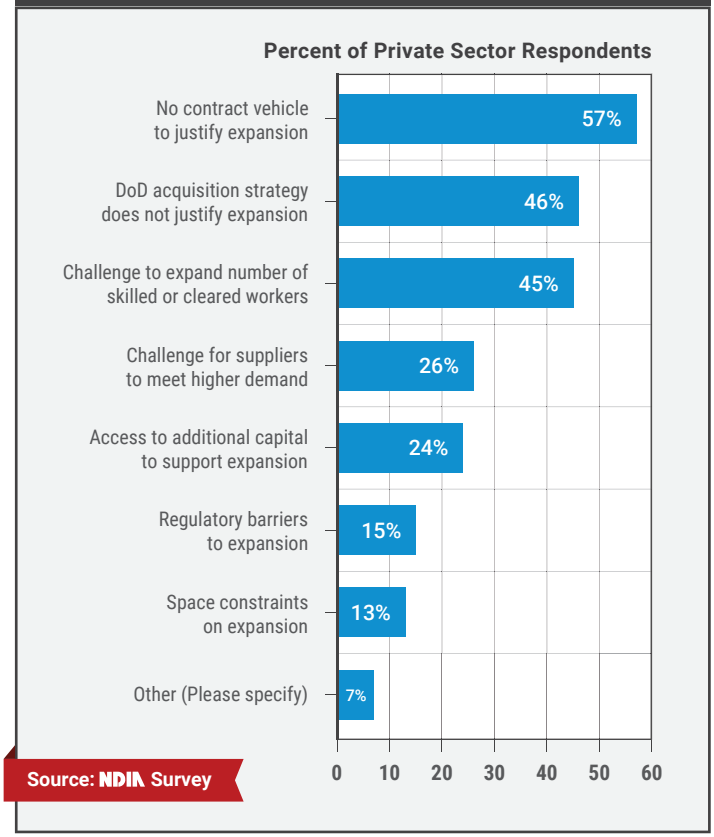
In addition, the federal government would need to revisit policies and regulations around indirect rates for labor. As a general example, as the work a company does on a program or contract winds down and the company anticipates another program or contract may begin, on its own, the company will want to keep employees it will need for the next contract, such as engineers and skilled trade workers. However, during this gap period, the federal government will not want the company to carry too many employees if it results in the company charging the government indirectly for that labor.

In addition, in each of these cases – idle facilities, idle capacity, and indirect rates for labor – companies know investors are also looking for economic inefficiencies. Investors focus on the return on a company's net assets and do not want the company carrying anything diluting economic efficiency in the metrics they use to ensure the company is financially healthy.

Over the course of the past year, NDIA received feedback from companies across the U.S. DIB regarding the disincentives and barriers preventing companies from expanding production capacity. One of the top issues mentioned was maintaining a workforce that could keep pace with scaling production. Private sector respondents reported that while 54% assessed their companies had a sufficient number of skilled workers for current production rates, 37% did not.

Question 45:

Capacity Expansion Barriers



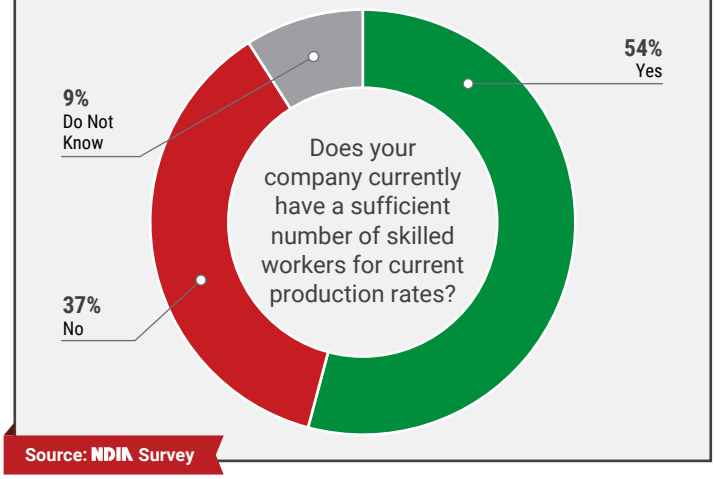
In addition, 48% of private sector respondents reported their companies currently have sufficient cleared workers for current production rates, but 38% reported they did not (see Q42, Q43, and Q44 Charts). **The *Vital Signs 2024 Survey* also asked private sector respondents if DoD needed to rapidly increase production for their company's service or product, would the company's suppliers be able to support increased production? While 41% responded favorably, 60% responded either negatively or said they did not know** (see Q44 Chart).

The current incentive structures for the federal government, U.S. DIB, and investors mirror the results from the *Vital Signs 2024 Survey*, which asked private sector respondents several questions to identify the top issues impacting industry's ability to expand production. The top three issues identified are (see Q45 Chart):

- No contract vehicle to justify expansion (57%)
- DoD acquisition strategy does not justify expansion (46%)
- Challenge to expand number of skilled or cleared workers (45%)

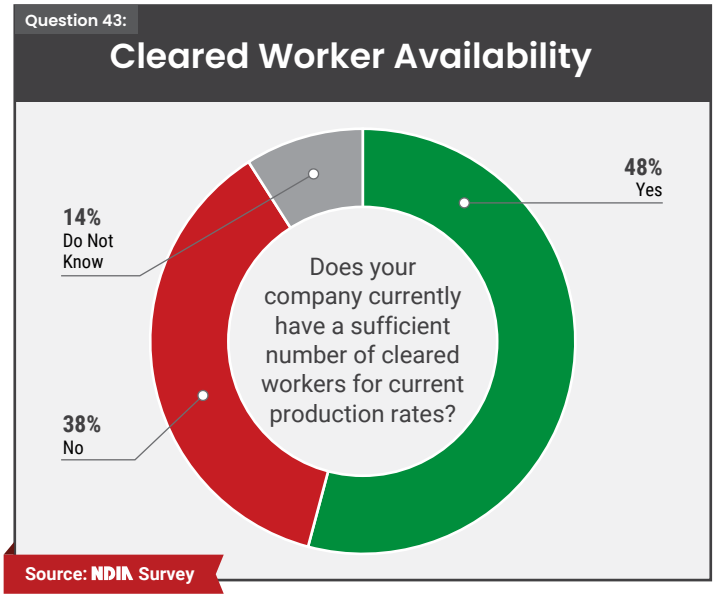
Question 42:

Skilled Worker Availability



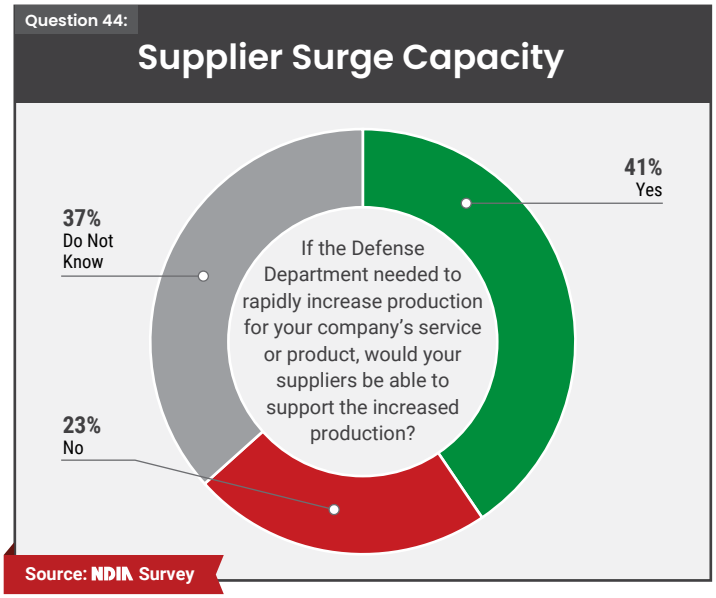
Question 43:

Cleared Worker Availability

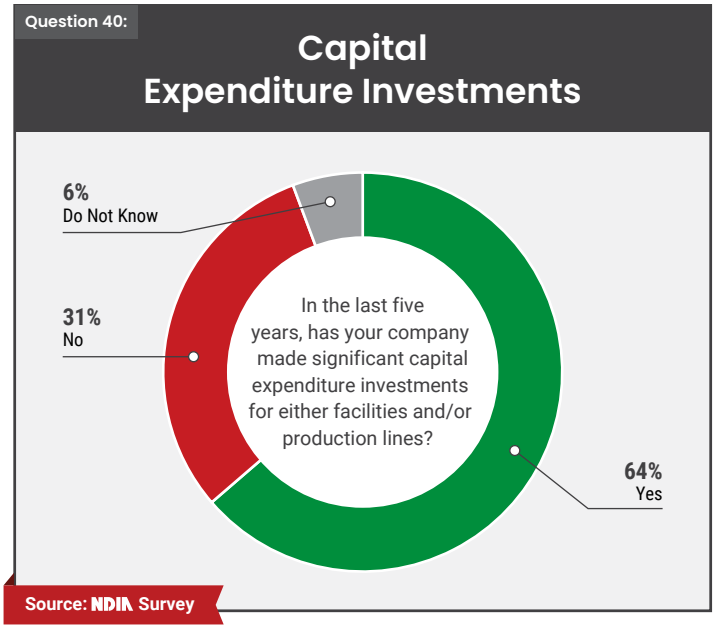


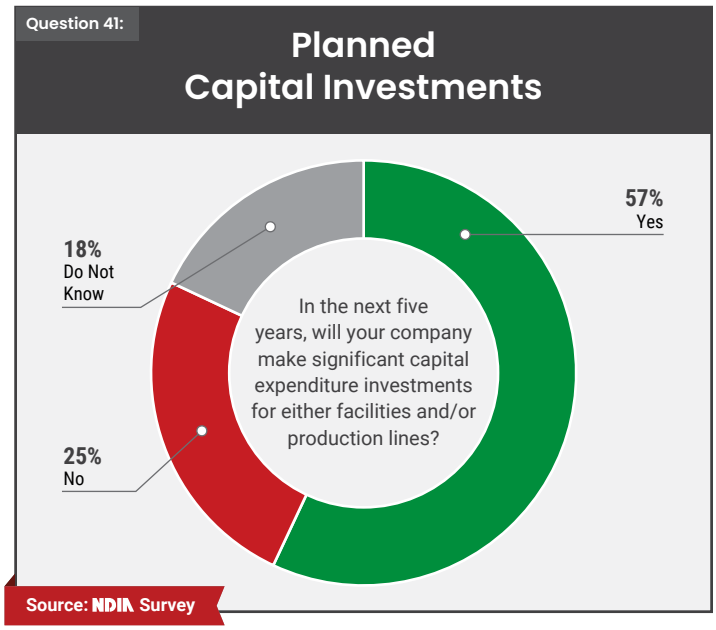
Question 44:

Supplier Surge Capacity



*Due to rounding, the sum of the figures may not equal 100%





*Due to rounding, the sum of the figures may not equal 100%

This report previously addressed the challenge of not having a contract vehicle to justify expansion. In this section, the current U.S. policy priority to ramp-up production of certain categories of munitions provides useful insights into private sector feedback regarding how DoD's current acquisition strategies do not justify expansion. For historical context, munitions have often been the bill payers for higher priorities in the DoD budgeting process. While the Military Services and Combatant Commanders reference requirements-based processes, the munitions requirements in the annual budget process are often softened from "what is required" to "what we can afford."

The Ukraine and Israel contingencies renewed emphasis on MYP authorities and the associated advanced procurement and economic quantity order funding in the FY2024 budget requests. Both the annual PBR and the Future Years Defense Program (FYDP)[127] helps companies and investors make important decisions regarding investments in modernizing facilities, infrastructure, and equipment, as well as expanding production lines. These investments also help industry retain and recruit skilled workers. In addition, it helps prime contractors support their suppliers and supply chains with forecasts for long lead items such as electronics, metal parts and steel, energetics, and packing materials. U.S. industry has sought to constructively remind the government that ramping up production of munitions in many cases exacerbates the competition for component parts, such as electronics and circuit cards. The competition is both *between* munition categories and *with* the civilian economy, including competition with the automobile and mobile phone sectors. It will take the combined efforts of OSD, the Military Services, and Congress, however, to ensure multi-year authorities and advanced procurement and economic quantity order requests are viable from a business strategy perspective. In multiple government-industry forums throughout 2023, industry highlighted challenges in acquisition strategies, including multi-year contracts that did not in some cases have a minimum buy or in other cases had a sharp decrease in production in the immediate years after the accelerated ramp-up of production.

Yet, **despite these challenges, the U.S. DIB is assuming risk and making capital investments.** Of note, in the last five years, 64% of private sector respondents work for companies that made significant CapEx investments to either facilities and/or production lines. In addition, 57% of respondents indicated their companies intended to make significant CapEx investments to either facilities and/or production lines during the next five years (see Q40 and Q41 Charts).

Recommendations:

32. Contract vehicles are the main source of demand signal for industry. DoD and Congress must understand that while public announcements and enacted legislation are important signals to financial markets and industry, industry cannot routinely raise capital for new investments or expanded production absent contract vehicles.

33. DoD and the Military Services should carefully review current acquisition profiles through the lens of whether they provide viable business strategies, including the retention of skilled employees. For example, there are several pending MYP authorities for certain categories of munitions that face a steep acquisition cliff beyond the life of the multi-year. This impacts the business strategy decisions for production capacity, from capital investment to operating expenses and workforce management.

34. The 2023 NDIS noted Congress should explore allocating additional funding for contracts and pursue other incentives, such as tax incentives, regulatory relief, and long-term contracts, aimed specifically at building and maintaining spare production capacity. At the same time, DoD should incentivize industry through higher profit and free cash flow for the purposes of maintaining or adding workers and capacity. It should also ensure companies are not penalized for having idle facilities and idle capacity or for charging indirect rates for labor for employees the company intends to utilize for surge production.

Pillar 5: Resilient Supply Chains

The combination of geopolitical factors and the lessons learned from the 2020 global pandemic has increased public policy interest in the availability and responsiveness of industrial supply chains across all sectors. The administration is focused on improving the resiliency of U.S. supply chains[128] through better data on the structure of supply chains, investments in redundancy, greater ability to substitute between inputs, and improved communication across the supply chain.[129]

In the *Vital Signs 2024 Survey,* both federal government respondents (51%) and private sector respondents (47%) cited supply challenges as the third most pressing issue facing the U.S. DIB.

As part of these efforts, Executive Order (E.O.) 14017, America's Supply Chains, was signed in February 2021.[130] The E.O. required U.S. agencies, including DoD, to review specific supply chain risks associated with critical mineral and rare earth materials, in addition to defense-critical supply chains within the U.S. DIB.[131] DoD reports that since E.O. 14017 was issued, the Department has obligated more than $893 million using the Defense Production Act (DPA) for investments in five critical sectors (kinetic capabilities, microelectronics, energy storage and batteries, strategic and critical materials, and castings and forgings).[132]

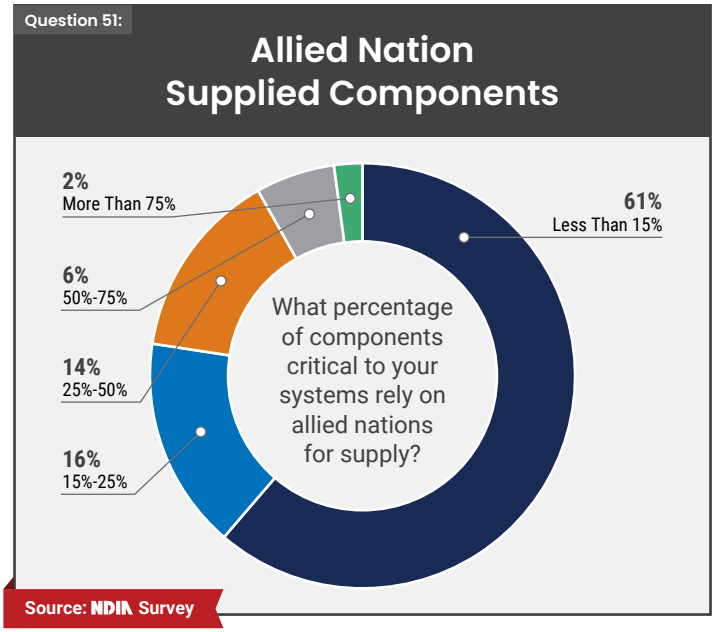
Congress also continues to focus on identifying and reducing vulnerabilities in strategic supply chains. The FY2024 NDAA Section 1414, *Critical Mineral Independence,* requires a strategy to develop supply chains that do not depend on mining or processing of critical minerals in or by countries such as the PRC and Russia.[133] The FY2024 NDAA also included other supply chain provisions covering energetic materials, military pharmaceuticals and military devices, semiconductors, unmanned aircraft, and cybersecurity risk management tools.[134] Finally, the legislation included a provision authorizing the OUSD(A&S) to establish and carry out a pilot program to analyze, map, and monitor supply chains for up to five covered weapons platforms to analyze them for supply chain vulnerabilities.[135]

Collectively, the executive branch and legislative branch work reflects a growing, bipartisan policy interest by both the previous and current administrations to reduce vulnerability in strategic supply chains. It is a recalibration of a policy

framework that prioritized efficiency and lower costs as benefits to tax payers. The framework now seeks to incorporate policy priorities of limiting the PRC's access to cutting-edge technology, especially technology that can be diverted to military applications, and to build alternative supply chains in sectors where the PRC currently dominates.

This recalibration is having a seismic impact on the entire economy, but it has an even deeper impact on the U.S. DIB because of its smaller purchasing power compared to the rest of the U.S. economy. **There are a couple of areas where the public policy objectives are not aligning with outcomes as envisioned.** First, while the U.S. government is focused on friend-shoring[136] and U.S. industry is pursuing "China plus one" strategies,[137] the countries to where production and export are moving maintain complex relationships with both the U.S. and the PRC. For example, **data tracking the sale of PRC electronic exports to Indonesia, Malaysia, Thailand, the Philippines, and Vietnam rose to $49 billion, an increase of 80% compared to five years ago**.[138] In addition, the PRC has increased its share of exports to the Association of Southeast Asian Nations (ASEAN) in 69 of the 97 product categories the regional organization tracks.[139] Similarly, according to the International Monetary Fund (IMF), PRC foreign direct investment in Southeast Asia is increasing, while U.S. foreign direct investment is decreasing.[140] This economic investment and the associated employment is vitally important for these countries, and it would be imprudent to forget deeper Chinese economic integration with these countries could come at the expense of U.S. policy goals.

Second, **while production in these countries may be increasing due to U.S. policies, much of this production relies substantially on intermediate inputs from China.** This trend has been facilitated by the Regional Comprehensive Economic Partnership, a trade deal signed in November 2020 between many Southeast Asian countries and China, to create a single market for many of these intermediate goods exports.[141] Research published by the IMF identified this trend even in advanced-manufacturing sectors.[142] This has, according to the IMF Deputy Managing Director, led to "suggestive evidence" illustrating how the direct



*Due to rounding, the sum of the figures may not equal 100%

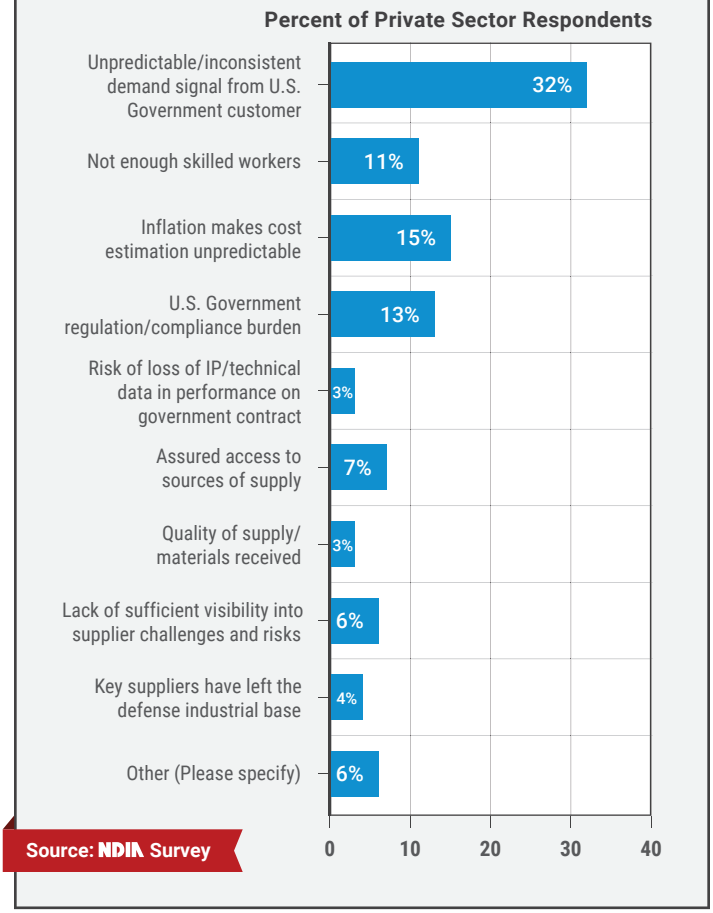
ties between China and the U.S. of the past are being replaced with indirect links.[143] For example, last year the U.S. imported more from Mexico than China for the first time in at least 15 years, and the U.S. trade deficit with Vietnam was almost triple the level of 2017.[144] However, a significant percentage of the value of those increased imports from Vietnam and Mexico actually consisted of inputs originally sourced in China.[145]

The federal government's classified sources and assessments, to which the private sector has limited access, drives the executive and legislative branches' focus and urgency with respect to reducing vulnerabilities in critical supply chains. Due to the public policy focus around friend-shoring and onshoring of supply chains, the *Vital Signs 2024 Survey* explored this issue. The majority of private sector respondents (77%) reported that 25% or less of critical components of their systems relied on allied nations for supply, and only 2% had more than 75% (see Q51 Chart). These numbers require a deeper level of analysis, but they are included to contribute to the public policy discussions regarding the importance of prioritizing on-shoring and friend-shoring and the necessity of factoring in realistic estimates regarding time and money in any shifts in strategic supply chains.

At the same time, the *Vital Signs 2024 Survey* shows private sector respondents' current biggest concerns regarding supply chain challenges are due to U.S. domestic

Question 50:

Supply Chain Challenges



*Due to rounding, the sum of the figures may not equal 100%

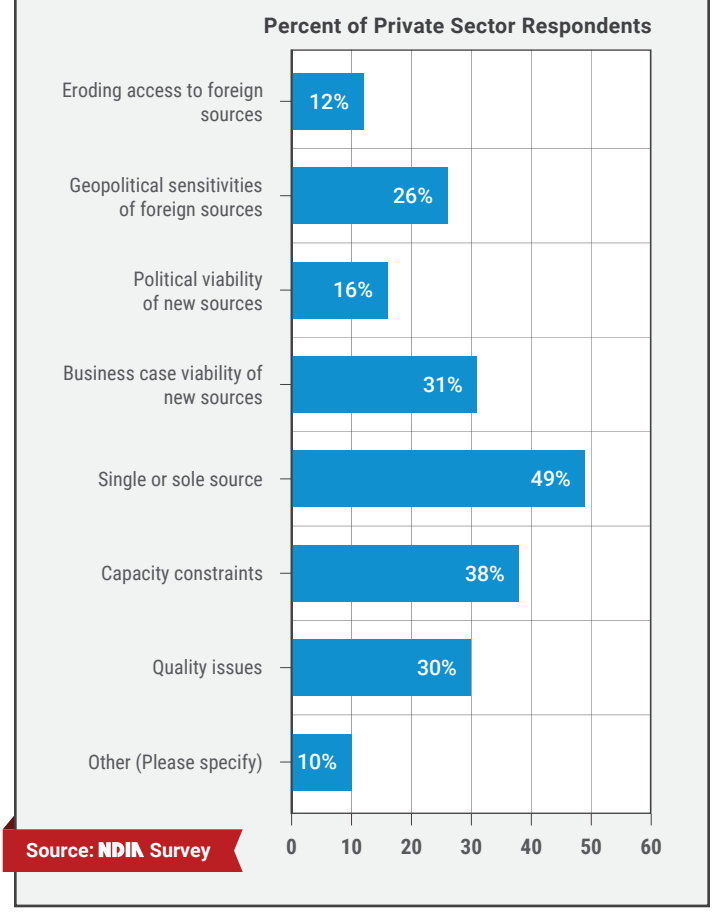
challenges. In response to the question "What are the biggest challenges to your supply chain?" the top four biggest challenges were (see Q50 Chart):

- Unpredictable/inconsistent demand signal from U.S. government customer (32%)
- Inflation levels make cost estimation unpredictable (15%)
- U.S. government regulation/compliance burden (13%)
- Not enough skilled workers (11%)

Private sector respondents were also asked to identify the most pressing supply chain vulnerabilities. The top concerns were single or sole source (49%), capacity constraints (38%), and the business viability of new sources (31%) (see Q47 Chart). The *Vital Signs 2024 Survey* also sought to identify where the loss of suppliers was having the biggest impact.

Question 47:

Pressing Supply Chain Vulnerabilities



Private sector respondents reported losing 26% of critical suppliers during the last three years and 23% of single or sole source domestic suppliers. Respondents reported losing roughly 12% of single or sole source international suppliers during the same period (see Q48 Chart).

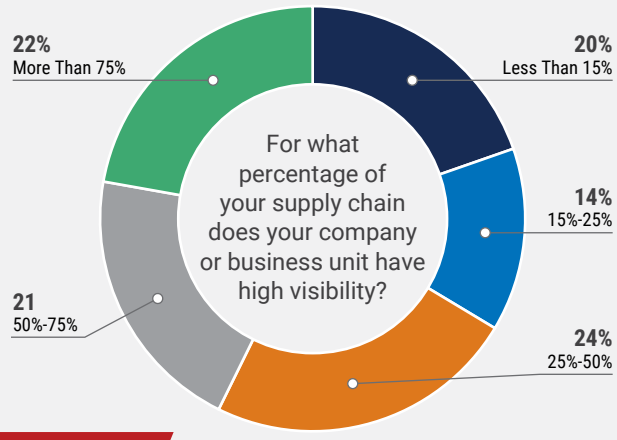
Private sector respondents identified the top two reasons companies lost suppliers was they either went out of business (48%) or the suppliers left the U.S. DIB (45%). It is important to keep sustained policy and funding focus on diversifying both domestic and international allied/partner supply chains to increase U.S. DIB resiliency.[146]

In its identified actions to achieve resilient supply chains, the 2023 NDIS noted the Department intends to leverage data analytics to improve supply chain visibility[147] to identify and minimize strategic supply chain risks and to manage disruptions proactively.[148] **The *Vital Signs 2024 Survey* asked private sector respondents to identify the percentage of their company's supply chain over which they**

do have high visibility. Of note, 34% reported 25% or less, and 22% reported more than 75% (see Q46 Chart). As DoD and Congress explore opportunities for increasing supply chain illumination through analytical tools, it will be important to have sound policy and regulatory frameworks in place to support industry during this transition period. This will provide positive support acting on any identified areas of risk, including over-reliance on sole and single source providers, obsolescence challenges, financial insecurity of critical contractors, and the overall integrity of the supply chain. At the same time, it will be important to proactively address potential unintended consequences such as discovering elements of the supply chain enmeshed in the indirect links discussed above.

Question 46:

Supply Chain Visibility

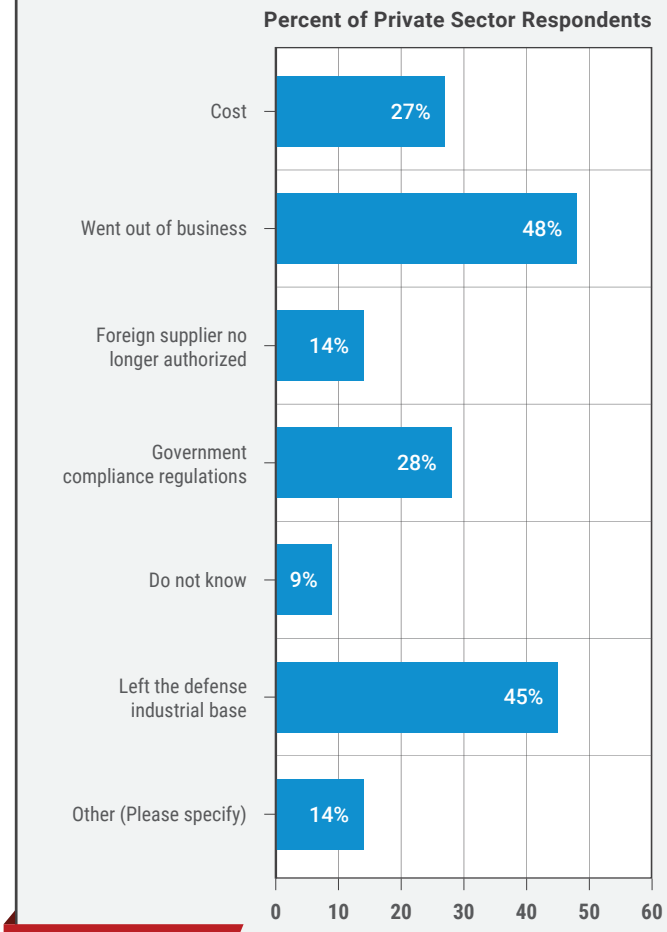


Source: NDIA Survey

*Due to rounding, the sum of the figures may not equal 100%

Question 49:

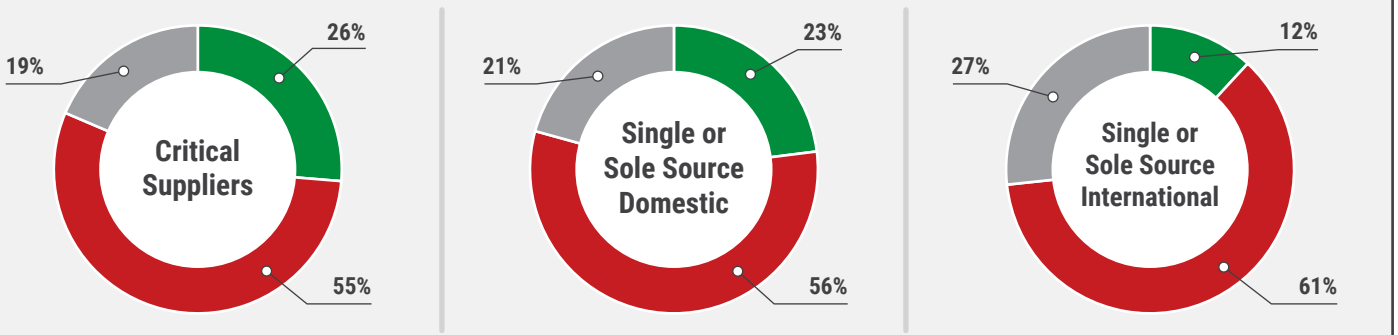
Reasons for Losing Suppliers



Source: NDIA Survey

Question 48:

Loss of Critical, Single, and Sole Source Suppliers



Source: NDIA Survey

*Due to rounding, the sum of the figures may not equal 100%

Recommendations

35. DoD and Congress must prioritize advanced procurement funding and long-term stability in the acquisition strategy profile, as suppliers in particular note their importance when managing supply chains.

36. The Military Services must be more open to consider resourcing second source suppliers in their budget requests for critical single source material, components, and equipment. Congress must support funding for second source suppliers in these areas.

37. DoD must develop policies and draft regulations to govern the use of third-party commercial data and analytical tools to map companies, individuals, and products in an organization's supply chain. This process will provide DoD and industry the opportunity to engage, assess, and propose solutions for any legal, regulatory, or contractual uses that may hinder the successful utilization of these analytical tools.

38. DoD and Congress must work with industry to proactively address how the Department will handle situations when supply chain analytics identify compliance problems. The NDIS acknowledges supply chains have become global, which causes prime contractors to struggle to maintain full visibility over their entire supply chains. However, in seeking to remedy the situation, given the fluidity and complexity of international supply chains, government and industry must both be realistic about the time required to fully identify truly independent and alternative supply chains and the resourcing required to operationalize those supply chains.

Addressing Inflation Challenges

In multiple government-industry forums throughout 2023 across different U.S. DIB sectors, the issue of historic inflation levels[25] was consistently cited as an ongoing concern, especially when government officials expressed concerns regarding the quality of deliveries and latency in meeting delivery schedules. Many companies highlighted both pre-pandemic and post-pandemic challenges with inflation. For pre-pandemic contracts, businesses are reporting significant labor and non-Economic Price Adjustment (EPA)[26] material cost increases above planned inflation escalation on long-term FFP delivery contracts. In many cases, companies reported they are struggling to retain both employees[27] and current suppliers, which lowers productivity and increases costs, and several have reported stretching delivery schedules to manage the financial viability of current contracts. These cost increases negatively impact contractors who have limited opportunities for contract modification and/or EPA clauses. In the case of pre-pandemic contracts, both government and industry report that most conversations about these challenges result in the government telling companies that their choice is to stick with the existing contract or have the government rebid the contract.

In the case of demand signal from DoD for potential new contracts, companies are providing feedback that providing and sticking to pricing for labor and materials has become extremely challenging. In a government-industry forum to discuss critical ammunition issues, one sector succinctly noted that pricing continues to be an issue due to "short validity periods." In the same meeting, the small

25 In *Vital Signs 2023,* NDIA noted U.S. defense companies were still facing economic headwinds coming out of the global pandemic. In 2022, the Federal Reserve aggressively used its economic management tools to reduce inflation rates, which reached their highest levels in 40 years. It raised interest rates seven times, causing concerns that its efforts to tame inflation may trigger an economic recession. In December 2022, the Federal Reserve increased interest rates to 4.5%, the highest in fifteen years. In the first two months of 2024, the Federal Reserve Chairman stated that a March rate cut was "probably not in the cards" but that three moves were still expected in 2024. The central bank chairman continues to assess there needs to be more evidence that inflation is under control before making a decision to cut interest rates. Sorkin, Andrew Ross. "Deal Book Newsletter." *New York Times.* February 5, 2024. https://www.nytimes.com/2024/02/05/business/dealbook/jobs-report-biden-trump-economy.html (accessed February 24, 2024).

26 FAR 16.203. "Fixed-price contracts with economic price adjustment."

27 The competition for labor, including wage and salary competition, is discussed elsewhere in this report.

business sector report stated that "in the current hyper-inflationary environment, providing and holding pricing for labor and materials has become extremely challenging." In addition, both prime contractors and suppliers who have dealt with inflation challenges on FFP MYP contracts awarded pre-pandemic and during the pandemic continue to report ongoing challenges of managing unplanned inflation escalation which are making suppliers risk adverse about committing to future long-term contracts.

Small business owners are also reporting the impact inflation has on lowest price technically acceptable (LPTA) cost type contracts. When responding to requests for proposals (RFPs), contractors are generally asked to forecast the direct costs to execute the contract and to include a projection of the company's indirect rates when bidding on long-term government contracts. Contracting officers cap indirect rates to ensure the government does not have cost overruns on long-term contracts. This is a straightforward way for contracting officers to limit cost increases when awarding LPTA cost contracts. For small businesses, computing indirect rates "presents a decision point as the contractor's historical indirect rates, used to allocate historical costs to contracts, may not be the most appropriate rates to use when bidding on the next contracting opportunity."[28] Small businesses have a variety of reasons for why historical indirect rates may not be appropriate, including changes in inflation levels and additional compliance costs due to new government regulations, such as CMMC 2.0. If the companies increase their indirect rates, including to account for new compliance costs, when bidding for new contracts, many contracting officers tend to respond unfavorably. Larger companies, with more complex operations, tend to have more options to appropriately spread indirect rates across multiple cost pools.[29] Therefore, in an environment of high inflation and increasing regulatory and compliance costs, the potential for small businesses to be uncompetitive under this type of contract with larger companies is high. The 2023 NDIS noted contracting with DoD requires small businesses to incur additional costs, such as maintaining appropriate cybersecurity measures.[30] This is one example of the barrier challenge 43% of small businesses cited in the *Vital Signs 2024 Survey* by competing with larger firms.

It is also important to note that positive changes to the consumer price index (CPI)[31] do not have a linear impact on the inflation challenges experienced in the U.S. DIB. Customization requirements throughout the entire supply chain often solely benefit the government customer and do not necessarily have a market in the commercial sector. Therefore, even as consumer commodity prices start achieving better economic equilibrium that equilibrium should not be automatically assumed to be occurring in the defense sector.

Recommendations:

39. DoD must facilitate a constructive environment in which companies are encouraged to raise inflation concerns with contracting officers and other DoD officials. In addition, DoD and Congress must provide additional financial investments, which are essential for favorable adjudications of requests for EPAs.

40. With the number of companies,[32] including small businesses,[33] exiting the defense sector, it would be prudent for DoD and Congress to carefully review whether current FAR regulations involving indirect rates is impeding public policy goals of recruiting and retaining small businesses and nontraditional companies into the U.S. DIB.

28 Eubanks, Jennifer. "GovCon 101: What Contractors Need To Know About Indirect Rates." *Forbes*. September 19, 2022. https://www.forbes.com/sites/forbesfinancecouncil/2022/09/19/govcon-101-what-contractors-need-to-know-about-indirect-rates/?sh=67563f95d357 (accessed February 22, 2024).

29 Defense Acquisition University. "Indirect Contractor Costs." https://www.dau.edu/acquipedia-article/indirect-contractor-costs (accessed February 23, 2024).

30 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.business-defense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 20.

31 Bureau of Labor Statistics. "Consumer Price Index." https://www.bls.gov/cpi/ (accessed February 22, 2024).

32 In the last five years, the DIB has lost 17,045 independent companies. Source: Govini.

33 DoD estimates that the number of small businesses participating in the DIB has declined by over forty percent (40%) in the past decade. U.S. Department of Defense. "Small Business Strategy." January 26, 2023. https://media.defense.gov/2023/Jan/26/2003150429/-1/-1/0/SMALL-BUSINESS-STRATEGY.PDF (accessed February 24, 2024). Page 5.

Conclusion

Americans are grappling with serious economic, social, and security challenges at home. These are urgent and serious issues, and they deserve urgent and serious responses. At the same time, the world is growing more dangerous, fractured, and volatile. **The current administration and 118th Congress inherited their defense options from previous generations of leaders, but they are also creating the options and risk their successors will inherit. In a crisis, one thing leaders cannot buy is more time.**

As discussed at the beginning of the report, time and consistency are immutable factors for both military readiness and defense industrial readiness. Rather than placing simultaneous pressure on the U.S. DIB to accelerate and to reduce speed, the *Vital Signs 2024* report emphasizes how government and private sector can work on a synergistic relationship to ensure time, money, and risk is appropriately managed. The report covers the most important issues that require real change, not incremental improvements, to ensure a healthy, diverse, and resilient U.S. DIB, one that provides the capabilities and capacity our warfighters require and deserve. **The clock is ticking.**

Appendix A:
Top Defense Industrial Base Companies

Top Public Defense Contractors With 20% or More of Their Revenue Sourced from DoD Contracts[1]

Contractor	
AeroVironment Inc	Lockheed Martin Corp
Boeing Co/The	Northrop Grumman Corp
Booz Allen Hamilton Holding Corp	OraSure Technologies Inc
CACI International Inc	Palantir Technologies Inc
General Dynamics Corp	Parsons Corp
Great Lakes Dredge & Dock Corp	RTX Corp
Huntington Ingalls Industries Inc	Science Applications International Corp
KBR Inc	V2X Inc
Kratos Defense & Security Solutions Inc	Viasat Inc
L3Harris Technologies Inc	VSE Corp
Leidos Holdings Inc	

1 Bloomberg Government. Historical Spending Database. https://www.bgov.com (accessed December 10, 2023).

Appendix B:
Recommendations by Section

A Synergistic Partnership

1. **Invest in the DIB Rebuild.** The biggest challenge for the 2023 National Defense Industrial Strategy (NDIS) is its silence on the specific additional resources required to implement the actions defined in the strategy. The Department of Defense (DoD) and Congress must make more substantial, sustained, and predictable financial investments to rebuild the U.S. Defense Industrial Base's (DIB) strategic endurance and resilience. As reasserted in the 2021 DoD report cited elsewhere in this report, the order of magnitude of financial investment is in the billions, not millions, of dollars.

2. **Engage Industry for NDIS Implementation.** The Office of the Under Secretary for Acquisition and Sustainment (OUSD(A&S)) should engage with industry before finalizing the expected unclassified Operational Annex and the classified Implementation Plan for the 2023 NDIS. The Department intends for these two documents to track progress metrics for rebuilding U.S. DIB resiliency and to inform resourcing decisions for additional financial investments in the U.S. DIB. Many NDIA companies report there has been limited opportunity to provide input to either document.

3. **Transform the PPBE Process.** While outside the scope of this report, the Planning, Programming, Budgeting, and Execution (PPBE) Reform Commission recently completed its work. DoD and Congress are encouraged to tackle the Commission's recommendations to transform the inflexible programming, budgeting, and appropriations process. The full report can be read at https://ppbereform.senate.gov/finalreport.

4. **Improve Cost or Pricing Data Requirements.** One of the most particularly cumbersome regulations for NDIA member companies of all sizes is the requirement for certified cost or pricing data. The burden of cost or pricing requirements could be ameliorated either by raising the Truthful Cost or Pricing Data Act (formerly known as the Truth in Negotiations Act (TINA)) threshold or by granting contracting officers additional authorities to tailor these requirements to specific procurements, including allowing contracting officers to rely on historical data of recent prices paid in determining costs of a subcontract, a purchase order, or a modification of either.

5. **Select Appropriate Contract Types.** The appropriate contract type should be selected after reviewing the complexity and maturity of requirements and the level of financial and technical risk in the program. NDIA companies of all sizes note the Department and Military Services are preferencing firm-fixed price (FFP) contracts, even when it is not the most appropriate contract vehicle. In the Fiscal Year (FY) 2022 National Defense Authorization Act (NDAA) (P.L. 117-81), Congress repealed the statutory preference for FFP contracts. OUSD(A&S) should conduct a review of all policies, guidance, instructions, and training curricula to ensure they reflect the current policy provided by the Adaptive Acquisition Framework (DoD Instruction 5000.85), and the Military Services should also review whether they are following current policy.

6. **Reform the Requirements Process.** Experienced DoD acquisition executives note significant work has been undertaken to reform acquisition and PPBE processes. However, the third leg – the requirements process – has not been reformed. This is an important area for additional work.

Pillar 1: Prioritizing Sufficient and Stable Budget

7. **Pass On-time Defense Appropriations.** The government's fiscal challenges are serious, but they are not driven by defense spending. NDIA member companies of all sizes are negatively impacted by 15 years of unstable funding for DoD. Congress needs to renew its commitment to return to regular order and pass on-time annual defense appropriations bills.

8. **Address Inflation in CRs.** When DoD must operate under a Continuing Resolution (CR), Congress should include provisions to address inflation impacts on personnel pay and military programs and to allow for new starts and procurement quantity changes to avoid creating further program delays.

9. **Pass National Security Supplemental Funding.** Congress should immediately pass the pending national security supplemental funding request to support ongoing U.S. policy objectives for Ukraine and Israel, to strengthen Taiwan's defense capabilities, and to provide billions in additional support to the U.S. DIB.

10. **Adjust Fiscal Responsibility Act Caps.** The FY2025 President's Budget Request (PBR) was released in March 2024. It is already clear that the mandatory Fiscal Responsibility Act (FRA) caps forced procurement and Research, Development, Test, and Evaluation (RDT&E) budget decisions that do not align with planned acquisition strategies and military requirements. The Administration and Congress need to work together to make necessary adjustments to the FRA caps to ensure the U.S. military is properly resourced.

Pillar 2: Advancing DoD Digital Modernization and Transformation

Intellectual Property and Data Rights Issues

11. **Balance Intellectual Property Approach.** Congress and the DoD should continue to work with industry, academia, and research institutions as the executive branch implements recent statutory changes, considers refinements to the system, and explores new innovative intellectual property (IP) techniques that support digitally based weapon systems. This will help ensure the DoD has access to the IP necessary to complete its mission without stifling innovation or the ability of companies, especially innovative small businesses and startups, to partner with the Department. As an immediate next step, the newly created pilot programs in the FY2024 NDAA for innovative IP strategies (Section 808) and anything as-a-service (Section 809) can be harnessed towards this joint effort.

Cybersecurity

12. **Establish Clear and Consistent CUI Guidance.** DoD must engage in a formalized process with industry and across the government to establish clear and consistent Controlled Unclassified Information (CUI) identification and marking guidance. The risk management goals of the Cybersecurity Maturity Model Certification (CMMC) 2.0 are fully dependent upon the ability of government and industry to effectively manage and safeguard defense-sensitive CUI. Effective management, however, is only possible with clear, accurate identification of what information requires protection and consistent government marking of CUI prior to the transmission of such CUI or clear instruction to the contractor when their performance under a contract will create defense-sensitive CUI.

13. **Clarify NIST SP 800-171 Transition.** DoD should partner with industry to develop and implement a plan to help U.S. DIB companies transition between NIST SP 800-171 Revision 2 and Revision 3. This is essential to help companies meet contractual obligations under the Defense Federal Acquisition Regulatory Supplement (DFARS).

14. **Refine CMMC 2.0.** DoD must engage with industry to provide further refinement around the scope and application of the proposed CMMC 2.0 requirements. This will be essential to prevent overregulating current companies out of working with DoD and serving as prohibitive barriers for new entrants and nontraditional companies, the very companies DoD's strategic policy objectives aim to attract.

15. **Mitigate Cybersecurity Costs.** The 2023 NDIS highlights the need to mitigate cybersecurity costs of entry to help diversify the supplier base with small companies, sub-tier suppliers, and nontraditional companies and industries. As part of this effort, the Department should partner with industry to understand the actual costs of DoD's cybersecurity requirements so that new entrants can assess the costs of doing business with the Department.

Areas of Concern for Small Businesses

16. **Enhance DODAAC Accuracy.** DoD should enhance the accuracy of Department of Defense Activity Address Code (DODAAC) information in the Wide Area Workflow (WAWF) and Procurement Integrated Enterprise Environment (PIEE) systems.

17. **Clarify Contract Administrator Roles.** DoD should clarify the roles and responsibilities of contract administrators, particularly those in the acceptor role, and provide clear points of contact information.

18. **Increase WAWF/PIEE Training.** DoD should increase training initiatives for DoD personnel acting as acceptors within the WAWF and PIEE systems.

19. **Introduce WAWF Performance Metrics.** DoD should introduce performance metrics and incentives designed to expedite the WAWF acceptance process, which accounts for protracted delays.

Tax R&D Amortization

20. **Provide Relief to R&D Amortization Requirement.** Congress should provide immediate relief to the statutory Research and Development (R&D) amortization requirement.

SBIR and STTR Programs

21. **Permanently Reauthorize SBIR and STTR.** Congress should permanently reauthorize Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) when both programs come up for reauthorization in calendar year 2025.

Pillar 3: Foreign Military Sales Modernization and Technology Cooperation

Modernizing and Streamlining FMS

22. **Communicate FMS Reforms.** To date, there has been limited communication from either DoD or the State Department on the progress of implementing their Foreign Military Sales (FMS) reform efforts. Both DoD and State should prioritize completing their identified areas of FMS reform in the calendar year 2024.

23. **Prioritize Section 918.** DoD should prioritize implementing Section 918, *Technology Release and Foreign Disclosure Reform Initiative,* and the Department's senior leadership should ensure the implementation addresses congressional and industry priorities for an expedited and transparent review process.

Launching AUKUS Implementation

24. **Finalize ATAM.** The State Department should finalize the AUKUS Trade Authorization Mechanism (ATAM) regulations in late spring or early summer of 2024 to address industry concerns the regulations will not be completed before running into the historical protocol to not issue new regulations within six months of the end of any presidential administration.

25. **Complete Section 1343 Review.** Fundamentally, U.S. industry is concerned the implementation of Section 1343 could lead to a limited change to the current legal and regulatory environment. As a confidence-building measure for industry, it is important that the administration complete its certification review of Section 1343 of the FY2024 NDAA within the prescribed window in the legislation (spring of 2024).

26. **Fund Pillar II Contracts.** It has been 2 ½ years since AUKUS was announced. Industry needs to start seeing viable business opportunities, including a dedicated funding stream and contract vehicles, under Pillar II.

A New Approach for Dual-Use Export Controls

27. **Evaluate the Move to a Single Licensing Agency.** Both the executive branch and Congress should evaluate the merits of moving to a single licensing agency for dual-use items and munitions, a single control list, and a single agency for export control enforcement.

28. **Assess Export Control Impacts.** Both the executive branch and Congress should assess the long-term impacts of U.S. export controls to U.S. technology leadership, including the risks of "design out" and avoidance of U.S. content.

Workforce Challenges

29. **Ensure Competitive DIB Wages.** DoD and Congress must review whether the process of setting prevailing wage rates and labor categories is ensuring DIB wages remain competitive. Across multiple U.S. DIB sectors, companies have noted that minimum wage increases and service sector starting wages are approaching industrial base starting wages.

30. **Encourage Skilled Trade Career Paths.** The Military Services must examine whether they are encouraging both collegiate degrees and skilled trade as important and viable career paths for departing service members. Historically, a significant portion of the U.S. DIB skilled trades talent pipeline came from enlisted personnel. However, there are concerns that the Services are not currently encouraging skilled trade career paths. The 2021 House Armed Services Committee (HASC) Defense Critical Supply Chain Task Force report highlighted "the challenges related to social perceptions of industrial and manufacturing work."[23] In addition, the 2023 NDIS notes that "DoD will continue to support programs that showcase opportunities in manufacturing and technology fields with local high schools, colleges, and universities, as we work to change the present stigma associated with being an industrial worker."[24]

31. **Adopt Talent Pipeline Programs.** Companies building military aircraft programs have noted the Department of the Air Force should consider a similar program to that of the Department of the Navy, which has spent the last several years working on local, state, and federal partnerships to re-develop skilled trade talent pipelines.

Pillar 4: Restoring Industrial Readiness Powerhouses

32. **Understand Contract Vehicles as Demand Signals.** Contract vehicles are the main source of demand signal for industry. DoD and Congress must understand that while public announcements and enacted legislation are important signals to financial markets and industry, industry cannot routinely raise capital for new investments or expanded production absent contract vehicles.

33. **Review Acquisition Profiles.** DoD and the Military Services should carefully review current acquisition profiles through the lens of whether they provide viable business strategies, including the retention of skilled employees. For example, there are several pending multi-year procurement (MYP) authorities for certain categories of munitions that face a steep acquisition cliff beyond the life of the multi-year. This impacts the business strategy decisions for production capacity, from capital investment to operating expenses and workforce management.

34. **Incentivize Excess Capacity.** The 2023 NDIS noted Congress should explore allocating additional funding for contracts and pursue other incentives, such as tax incentives, regulatory relief, and long-term contracts, aimed specifically at building and maintaining spare production capacity. At the same time, DoD should incentivize industry through higher profit and free cash flow for the purposes of maintaining or adding workers and capacity. It should also ensure companies are not penalized for having idle facilities and idle capacity or for charging indirect rates for labor for employees the company intends to utilize for surge production.

Pillar 5: Resilient Supply Chains

35. **Prioritize Procurement Stability.** DoD and Congress must prioritize advanced procurement funding and long-term stability in the acquisition strategy profile, as suppliers in particular note their importance when managing supply chains.

36. **Fund Second Source Suppliers.** The Military Services be more open to consider resourcing second source suppliers in their budget requests for critical single source material, components, and equipment. Congress must support funding for second source suppliers in these areas.

37. **Use Third-Party Commercial Mapping Tools.** DoD must develop policies and draft regulations to govern the use of third-party commercial data and analytical tools to map companies, individuals, and products in an organization's supply chain. This process will provide DoD and industry the opportunity to engage, assess, and propose solutions for any legal, regulatory, or contractual uses that may hinder the successful utilization of these analytical tools.

38. **Collaboratively Address Supply Chain Visibility.** DoD and Congress must work with industry to proactively address how the Department will handle situations when supply chain analytics identify compliance problems. The NDIS acknowledges supply chains have become global, which causes prime contractors to struggle to maintain full visibility over their entire supply chains. However, in seeking to remedy the situation, given the fluidity and complexity of international supply chains, government and industry must both be realistic about the time required to fully identify truly independent and alternative supply chains and the resourcing required to operationalize those supply chains.

Addressing Inflation Challenges

39. **Facilitate Constructive Environments for Dialogue.** DoD must facilitate a constructive environment in which companies are encouraged to raise inflation concerns with contracting officers and other DoD officials. In addition, DoD and Congress must provide additional financial investments, which are essential for favorable adjudications of requests for Economic Price Adjustments (EPAs).

40. **Review Indirect Rate Regulation.** With the number of companies,[33] including small businesses,[34] exiting the defense sector, it would be prudent for DoD and Congress to carefully review whether current Federal Acquisition Regulation (FAR) regulations involving indirect rates is impeding public policy goals of recruiting and retaining small businesses and nontraditional companies into the U.S. DIB.

Appendix C:
Survey Questions

Pg	Chart Title	Survey Question(s)
12	**Government and Private Sector U.S. DIB Alignment Areas**	What do you think is the most pressing issue facing the Defense Industrial Base? (select all that apply)
13	**Government Challenges with Contracting**	What do you find most difficult about government processes when trying to work with industry? (select all that apply)
13	**Steps to Improve Working with DoD**	What are the best steps the government could take to improve the ability for industry to work with the Department of Defense? (select all that apply)
15	**Business Conditions**	One year from now, do you think the following business conditions will be better, worse, or about the same compared to this year?
21	**Opportunity Costs of Government Shutdowns**	Has your business experienced any of the following as a direct result of preparation for a potential government shutdown?
22	**Stop Work Order Impacts**	Have you issued a stop-work order under a continuing resolution?
22	**Stop Work Order Workforce Impacts**	Have you ever received a stop-work order under a continuing resolution or shutdown?
22	**Stop Work Order Workforce Lay-Offs**	Have employees in your company ever been laid off during a continuing resolution or shutdown?
25	**Intellectual Property Rights Concerns**	Does your company choose not to bid on certain DoD contracts out of fear that DoD requirements for intellectual property (IP) will put your company's rights at risk?

25	**Excluding Technologies to Protect Intellectual Property**	Are there instances that your company does not include certain technologies in bids due to concerns over IP protection?
28	**Small Business Contracting Challenges**	What are the most significant difficulties faced by small businesses in government contracting? (select all that apply)
31	**Importance of Direct Commercial Sales and Foreign Military Sales**	How important are direct commercial sales and/or foreign military sales to your company?
32	**International Opportunity Expectations**	In the next year, do you expect it to get easier or harder to sell your products and services to foreign customers?
32	**Barriers to International Sales**	What are the biggest barriers your company faces in selling your products and services to foreign customers? (select all that apply)
33	**Drivers of International Sales Barriers**	What primary factor influenced your answer above?
38	**Skilled Worker Availability**	How hard is it to find the following workers: Cleared workers, Skilled trade workers, STEM workers?
39	**Workforce Hiring Challenges**	What are the biggest barriers to filling vacancies in your company? (select all that apply)
39	**Pressing Workforce Challenges**	What are the most pressing issues your company faces regarding its workforce? (select all that apply)
42	**Capacity Expansion Barriers**	What are the biggest barriers to expanding capacity? (select all that apply)
42	**Skilled Worker Availability**	Does your company currently have a sufficient number of skilled workers for current production rates?
42	**Cleared Worker Availability**	Does your company currently have a sufficient number of cleared workers for current production rates?
42	**Supplier Surge Capacity**	If the Defense Department needed to rapidly increase production for your company's service or product, would your suppliers be able to support the increased production?
43	**Capital Expenditure Investments**	In the last five years, has your company made significant capital expenditure investments for either facilities and/or production lines?
43	**Planned Capital Investments**	In the next five years, will your company make significant capital expenditure investments for either facilities and/or production lines?
45	**Allied Nation Supplied Components**	What percentage of components critical to your systems rely on allied nations for supply?
46	**Supply Chain Challenges**	What are the biggest challenges to your supply chain?

46	**Pressing Supply Chain Vulnerabilities**	Which supply chain vulnerabilities are most pressing for your company or business unit? (select all that apply)
47	**Supply Chain Visibility**	For what percentage of your supply chain does your company or business unit have high visibility?
47	**Reasons for Losing Suppliers**	Please specify the reason you lost suppliers. (select all that apply)
47	**Loss of Critical, Single, and Sole Source Suppliers**	In the last three years have you lost any of the following: critical suppliers, single or sole source domestic suppliers, or single or sole source international suppliers?

Appendix D:
Glossary

5G – Fifth Generation

AECA – Arms Export Control Act

AI – Artificial Intelligence

AIRC – Acquisition Innovation Research Center

ASEAN – Association of Southeast Asian Nations

ATAM – AUKUS Trade Authorization Mechanism

AUKUS – Australia-United Kingdom-United States Security Pact

BIS – U.S. Department of Commerce Bureau of Industry and Security

CapEx – Capital Expenditures

CBO – Congressional Budget Office

CCL – Commerce Control List

CCP – Chinese Communist Party

CMMC – Cybersecurity Maturity Model Certification

Commerce – U.S. Department of Commerce

COVID-19 – Coronavirus 19 Pandemic

CPI – Consumer Price Index

CR – Continuing Resolution

CUI – Controlled Unclassified Information

DCS – Direct Commercial Sales

DFARS – Defense Federal Acquisition Regulatory Supplement

DFAS – Defense Finance and Accounting System

DoD – U.S. Department of Defense

DODAAC – Department of Defense Activity Address Code

DPA – Defense Production Act

DTCTs – Defense Trade Cooperation Treaties

DTIC – Defense Technical Information Center

EAR – Export Administration Regulation

ECRA – Export Control Reform Act

EPA – Economic Price Adjustment

ESPs – External Service Providers

FAR – Federal Acquisition Regulation

FedRAMP – Federal Risk and Authorization Management Program

FFP – Firm-Fixed Price

FMS – Foreign Military Sales

FRA – Fiscal Responsibility Act

FutureG – Future Generation

FY – Fiscal Year

FYDP – Future Years Defense Program

GAO – Government Accountability Office

GDP – Gross Domestic Product

GMLRS – Guided Multiple Launch Rocket Systems

HASC – House Armed Services Committee

IMF – International Monetary Fund

IP – Intellectual Property

IRAD – Independent Research and Development

ITAR – International Traffic in Arms Regulations

JASSM/ER – Joint Air-to-Surface Standoff Missile-Extended Range

LOA – Letter of Acceptance

LOR – Letter of Request

LPTA – Lowest Price Technically Acceptable

LRASM – Long-Range Anti-Ship Missiles

M&A – Mergers and Acquisitions

MOSA – Modular Open Systems Approaches

MSE – Missile Segment Enhancement

MSPs – Managed Service Providers

MSSPs – Managed Security Service Providers

MTCR – Missile Technology Control Regime

MYP – Multi-Year Procurement

NDAA – National Defense Authorization Act

NDIA – National Defense Industrial Association

NDIS – National Defense Industrial Strategy

NDS – National Defense Strategy

NSG – Nuclear Suppliers Group

NSM – Naval Strike Missile

O&M – Operations and Maintenance

OECD – Organization for Economic Cooperation and Development

OSD – Office of the Secretary of Defense

OUSD(A&S) – Office of the Under Secretary of Defense for Acquisition and Sustainment

PAC-3 – PATRIOT Advanced Capability - 3

PBR – President's Budget Request

PEC – President's Export Council

PECSEA – President's Export Council Subcommittee on Export Administration

PIEE – Procurement Integrated Enterprise Environment

PPBE – Planning, Programming, Budgeting, and Execution

PRC – People's Republic of China

R&D – Research and Development

RDT&E – Research, Development, Test, and Evaluation

RFPs – Request for Proposals

S&P – Standard and Poor's

SBIR – Small Business Innovation Research

SEC – Securities and Exchange Commission

SIB – Submarine Industrial Base

STTR – Small Business Technology Transfer

TINA – Truth in Negotiations Act

U.S. DIB – United States Defense Industrial Base

USSR – Union of Soviet Socialist Republics

WAWF – Wide Area Workflow

WMD – Weapons of Mass Destruction

Endnotes

1 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024).

2 This report uses the 2022 National Defense Strategy definition of resiliency, which is "the ability to withstand, fight through, and recover quickly from disruption." U.S. Department of Defense. "2022 National Defense Strategy." October 27, 2022. https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF (accessed February 22, 2024). Page 1.

3 The George C. Marshall Foundation. "Marshall and the Invasion of Poland." August 30, 2023. https://www.marshallfoundation.org/articles-and-features/marshall-invasion-poland/ (accessed February 9, 2024).

4 NDIA 2024 Vital Signs Survey. Question 1.

5 NDIA 2024 Vital Signs Survey. Question 3. Note: The numbers representing industry, university, research centers, or other non-governmental organizations do not add up to 829 because NDIA did not include the seven (7) respondents who submitted only a partially completed survey.

6 The Standard and Poor's 500 is a stock market index that tracks the stock performance of 500 of the largest companies listed on stock exchanges in the United States. It includes approximately 80% of the total market capitalization of U.S. public companies.

7 *Vital Signs 2024* defines companies in the S&P 500's Communication Services sector and the Information Technology Sector as S&P 500 technology companies.

8 Bloomberg Government. "Historical Spending Database." https://www.bgov.com (accessed December 10, 2023).

9 A full list of the companies used can be found in Appendix A.

10 Pew Research Center. "Important issues in the 2020 election." Pew Research. August 13, 2020. https://www.pewresearch.org/politics/2020/08/13/important-issues-in-the-2020-election/ (accessed February 24, 2024); Pew Research Center. "Public's Top Priority for 2022: Strengthening the Nation's Economy." *Pew Research.* February 16, 2022. https://www.pewresearch.org/politics/2022/02/16/publics-top-priority-for-2022-strengthening-the-nations-economy/ (accessed February 13, 2024).

11 The White House. "2022 National Security Strategy." October 12, 2022. https://www.whitehouse.gov/wp-content/uploads/2022/11/8-November-Combined-PDF-for-Upload.pdf (accessed February 8, 2024); U.S. Department of Defense. "2022 National Defense Strategy." October 27, 2022. https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF (accessed February 8, 2024).

12 McLeary, Paul. "Pentagon scours weapons stockpiles for Israel, even as Ukraine stresses industry." *Politico.* October 19, 2023. https://www.politico.com/news/2023/10/19/pentagon-weapons-stockpiles-israel-ukraine-00122495 (accessed February 9, 2024).

13 Copp, Tara. "The US is moving quickly to boost Israel's military. A look at what assistance it's providing." *Associated Press.* October 14, 2023. https://apnews.com/article/israel-hamas-military-navy-carrier-e648c53dc53a46e2e12950784ea5e8d2 (accessed February 22, 2024).

14 England, Andrew. "Biden's Vast Diplomatic Challenge in the Middle East." *Financial Times.* October 20, 2023. https://www.ft.com/content/ea65484f-81e9-4d26-ac6b-846a9b5d7685 (accessed February 10, 2024).

15 U.S. Department of Defense. "2022 National Defense Strategy." October 27, 2022. https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF (accessed February 8, 2024). Page 17.

16 Chair Jerome H. Powell, U.S. Federal Reserve. Speech entitled: "Inflation: Progress and Path Ahead." Economic Policy Symposium: Structural Shifts in the Global Economy. Jackson Hole, Wyoming. August 25, 2023. https://www.federalreserve.gov/newsevents/speech/powell20230825a.htm (accessed February 24, 2023).

17 The *2022 National Defense Strategy* defines integrated deterrence as "working seamlessly across warfighting domains, theaters, the spectrum of conflict, all instruments of national power, and [the U.S.] network of Alliances and partnerships. Tailored to specific circumstances, it applies a coordinated, multi-faceted approach to reducing competitors' perceptions of the net benefits of aggression relative to restraint." U.S. Department of Defense. "2022 National Defense Strategy." October 27, 2022. https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF (accessed February 22, 2024). Page 1.

18 International Monetary Fund. "World Economic Outlook Database." World Economic and Financial Surveys. October 5, 2023. https://www.imf.org/en/Publications/WEO/weo-database/2023/October (accessed January 3, 2024); Office of Management and Budget. "Table 1.2 Summary of Receipts, Outlays, and Surpluses or Deficits as Percentages of GDP: 1930–2028." Historical Tables. https://www.whitehouse.gov/omb/budget/historical-tables/ (accessed January 2, 2024); Purchasing Power Parity (PPP) is a common method in economics of comparing prices between countries. PPP compares the cost of goods in each currency to create a rate of exchange that is representative of the price of local goods. Using PPP create a more accurate comparison between U.S. and PRC defense spending by accounting for the lower cost of goods and labor in the PRC.

19 Campbell, Caitlin. "China's Military: The People's Liberation Army." *Congressional Research Service.* June 4, 2021. https://crsreports.congress.gov/product/pdf/R/R46808 (accessed February 8, 2024).

20 Martina, Michael, and David Brunnstrom. "CIA chief warns against underestimating Xi's ambitions toward Taiwan." *Reuters.* February 2, 2023. https://www.reuters.com/world/cia-chief-says-chinas-xi-little-sobered-by-ukraine-war-2023-02-02/ (accessed February 9, 2024).

21 Office of the Assistant Secretary of Defense for Industrial Base Policy. "Fiscal Year 2020 Industrial Capabilities Report." January 14, 2021. https://media.defense.gov/2021/Jan/14/2002565311/-1/-1/0/FY20-INDUSTRIAL-CAPABILITIES-REPORT.PDF (accessed February 7, 2024). Pages 11-12.

22 Stockholm International Peace Research Institute. "SIPRI Military Expenditure Database." https://www.sipri.org/databases/milex (accessed December 14, 2023).

23 U.S. Department of Defense. "2022 Military and Security Developments Involving the People's Republic of China." November 29, 2022. https://media.defense.gov/2022/Nov/29/2003122279/-1/-1/1/2022-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF (accessed February 8, 2024). Page 19.

24 In 2020, President Xi announced a renewed CCP interest in creating a dual circulation economy. This concept seeks to reduce the PRC's future dependency on export-driven growth and to instead have the PRC domestic consumer demand become the principal economic growth driver. The intention is to leverage the gravitational pull that a strong PRC domestic economy will have on the rest of the global economy; Kevin Rudd. "Xi Jinping's Pivot to the State: An address to the Asia Society, New York." *Asia Society Policy Institute.* September 8, 2021. https://asiasociety.org/policy-institute/xi-jinpings-pivot-state. (accessed March 27, 2024).

25 Senate Committee on Armed Services. Statement of General Joseph F. Dunford, Jr. Department of Defense Budget Hearing. April 26, 2018; Senate Committee on Armed Services. Statement of General Mark A. Milley. Department of Defense Budget Hearing. March 28, 2023.

26 This past summer, the United Kingdom's Ministry of Defense released 2023's updated strategy. The strategy included constructive language regarding the synergistic partnership between government and industry. Specifically, it noted that a "common endeavor which places industry at the heart of the Defense Enterprise – recognizing our industrial base as an essential component of our national security – will help us maintain our strategic advantage."

27 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page i.

28 Callan, Byron. "Opinion: The Importance Of The U.S. Defense Industry's Other Partner." *Aviation Week*. August 25, 2023. https://aviationweek.com/defense-space/supply-chain/opinion-importance-us-defense-industrys-other-partner (accessed February 13, 2024).

29 In finance, multiples are used to make comparisons among companies and to find the best investment opportunities. Multiples can be used to show how much investors are willing to pay per dollar of earnings, as computed by the price-to-earnings ratio.

30 DoD has operated under a continuing resolution (CR) for part of the year for 14 of the last 15 years. For FY2024, the Department of Defense Appropriations Act was not signed into law until March 23, 2024.

31 R&D measures how much income a company re-invests into research and development. In the case of U.S. DIB companies, this only includes IRAD, which is publicly reported. It does not include government-funded R&D.

32 CapEx represents how much revenue is used to purchase equipment, facilities, etc.

33 Free Cash Flow is cash on hand.

34 Operating Margin is a ratio of income left after operating expenses to total revenue.

35 National Defense Industrial Association. "Vital Signs 2023." https://www.ndia.org/-/media/sites/ndia/policy/vital-signs/2023/ndia_vital-signs2023_final_v3.pdf (accessed February 23, 2024). Page 13.

36 U.S. Department of Defense. "Small Business Strategy." January 26, 2023. https://media.defense.gov/2023/Jan/26/2003150429/-1/-1/0/SMALL-BUSINESS-STRATEGY.PDF (accessed February 22, 2024). Page 5.

37 Peters, Heidi M. "Acquisition Reform in the FY2016-FY2018 National Defense Authorization Acts (NDAAs)." *Congressional Research Service*. R45068 – Version 9. Updated January 19, 2018. https://crsreports.congress.gov/product/details?prodcode=R45068 (accessed February 23, 2024).

38 Ibid.

39 Office of Management and Budget. "Table 3.2—Outlays by Function and Subfunction: 1962–2028." Historical Tables. https://www.whitehouse.gov/omb/budget/historical-tables/ (accessed January 2, 2024).

40 Office of the Under Secretary of Defense (Comptroller). "National Defense Budget Estimate for FY 2023." *Defense Budget Materials - FY2023*. July 2022. https://comptroller.defense.gov/Portals/45/Documents/defbudget/FY2023/FY23_Green_Book.pdf (accessed December 15, 2023).

41 Office of Management and Budget. "Table 8.4—Outlays by Budget Enforcement Act Category as Percentages of GDP: 1962–2028." Historical Tables. https://www.whitehouse.gov/omb/budget/historical-tables/ (accessed January 2, 2024). The White House budget projections show defense spending as a percentage of GDP declining as well.

42 Secretary of Defense Lloyd J. Austin III. Letter to the Senate Committee on Appropriations. December 12, 2023.

43 U.S. Senate. Committee on Armed Services Subcommittee on Readiness and Management Support. *Hearing on Department of Defense Audit*. November 20, 2019. Testimony of Deputy Secretary of Defense. https://www.armed-services.senate.gov/imo/media/doc/Norquist_11-20-19.pdf (accessed February 23, 2024). Page 12.

44 U.S. Government Accountability Office. "Defense Budget: DoD Has Adopted Practices to Manage Within the Constraints of Continuing Resolutions." GAO-21-541. https://www.gao.gov/products/gao-21-541 September 13, 2021. (accessed February 9, 2024). Page 9.

45 Secretary of Defense Lloyd J. Austin III. Letter to the Senate Committee on Appropriations. December 12, 2023.

46 Weisgerber, Marcus. "US Should Place Multiyear Munitions Orders to Protect Supply, Pentagon Arms Chief Says." *Defense One*. September 7, 2022. https://www.defenseone.com/policy/2022/09/us-should-place-multiyear-munitions-orders-protect-supply-pentagon-arms-chief-says/376845/ (accessed February 22, 2024); Skove, Sam. "Why It's Hard to Double GMLRS Production." *Defense One*. March 30, 2023. https://www.defenseone.com/business/2023/03/why-its-hard-double-gmlrs-production/384646/ (accessed February 22, 2024).

47 Secretary of Defense Lloyd J. Austin III. Letter to the Senate Committee on Appropriations. December 12, 2023.

48 Ibid.

49 P.L. 118-5. Section 102.

50 Secretary of Defense Lloyd J. Austin III. Letter to the Senate Committee on Appropriations. December 12, 2023.

51 Ibid.

52 P.L. 114-328. Section 809. P.L. 115-91. Section 802.

53 U.S. Department of Defense. "DoD Instruction 5010.44. Intellectual Property (IP) Acquisition and Licensing." October 16, 2019.

54 Ibid.; Secretary of the Army. "Army Directive 2018-26 (Enabling Modernization Through the Management of Intellectual Property)." December 7, 2018. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN14261_AD2018_26_Final.pdf (accessed February 23, 2024).

55 Defense Federal Acquisition Regulation Supplement: Small Business Innovation Research Data Rights (DFARS Case 2019-D043); Defense Federal Acquisition Regulation Supplement: Modular Open Systems Approaches (DFARS Case 2021-D005); and Defense Federal Acquisition Regulation Supplement: Rights in Technical Data (DFARS Case 2019-D044).

56 Government-Industry Advisory Panel on Technical Data Rights (Section 813 Panel). "2018 Report." November 13, 2018.

57 The Acquisition Innovation Research Center (AIRC) was established in September 2020 by DoD to infuse innovation and alternative disciplines from academia to better respond to rapidly changing threats and technological advances. Learn more at https://acqirc.org.

58 P.L. 116-92. Section 801.; P.L. 117-263.; P.L. 118-31. Sections 808 and 809.

59 DoD defines flexible acquisition as strictly relating to "DoD aiming to acquire an intelligent, balanced mix of platforms and systems, together with the benefits that accrue." DoD considers it "vital to establish that the term...does not directly call for broad-based acquisition reform." Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Indus-

trial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 34.

60 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 34.

61 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 37.

62 A MOSA is defined as a technical and business strategy for designing an affordable and adaptable system. "MOSA combines system engineering open architecture techniques with open licensing and related legal and business considerations to isolate proprietary technology and to prevent overleveraging of limited private investments from undermining return on government investment." Ibid. Learn more about MOSA at: Modular Open Systems Approach (MOSA) | www.dau.edu

63 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 34.

64 Abercrombie, Cara L. "Advance Policy Questions for Ms. Cara L. Abercrombie Nominee for Assistant Secretary of Defense for Acquisition." *Senate Armed Services Committee.* September 28, 2023. https://www.armed-services.senate.gov/imo/media/doc/cara_abercrombie_apqs.pdf (accessed February 12, 2024). Page 25.

65 Office of the Assistant Secretary of Defense (Acquisition). Intellectual Property Cadre. www.acq.osd.mil/asda/ae/ada/ip-cadre.html (accessed February 12, 2024).

66 Senate Armed Services Committee. "Confirmation Hearing for Ms. Cara L. Abercrombie. September 28, 2023." Video Transcript. https://www.armed-services.senate.gov/hearings/to-consider-the-nominations-of-honorable-derek-h-chollet-to-be-under-secretary-of-defense-for-policy-and-ms-cara-l-abercrombie-to-be-assistant-secretary-of-defense-for-acquisition (accessed February 12, 2024).

67 Abercrombie, Cara L. "Advance Policy Questions for Ms. Cara L. Abercrombie Nominee for Assistant Secretary of Defense for Acquisition." *Senate Armed Services Committee*. September 28, 2023. https://www.armed-services.senate.gov/imo/media/doc/cara_abercrombie_apqs.pdf (accessed February 12, 2024). Page 25.

68 Defense Federal Acquisition Regulation Supplement: Small Business Innovation Research Data Rights (DFARS Case 2019-D043); Defense Federal Acquisition Regulation Supplement: Modular Open Systems Approaches (DFARS Case 2021-D005); and Defense Federal Acquisition Regulation Supplement: Rights in Technical Data (DFARS Case 2019-D044).

69 One of the top legislative priorities for NDIA member companies was Section 868 in the Senate-passed FY2024 NDAA. This provision proposed to give DoD the authority, under certain circumstances and upon unilateral determination, to give a contractor's proprietary technical data to a third party without compensation. Section 868 was not adopted in the final FY2024 NDAA conference report, but Congress has signaled IP and data rights will remain a policy priority area in the FY2025 legislative cycle.

70 U.S. Department of Defense, "Small Business Strategy." January 26, 2023. https://media.defense.gov/2023/Jan/26/2003150429/-1/-1/0/SMALL-BUSINESS-STRATEGY.PDF (accessed February 22, 2024).

71 Defense Federal Acquisition Regulation Supplement: Network Penetration Reporting and Contracting for Cloud Services (DFARS Case 2013-D018). Published October 21, 2016.

72 Defense Federal Acquisition Regulation Supplement: Assessing Contractor Implementation of Cybersecurity Requirements (DFARS Case 2019-D041). Published September 29, 2020.

73 U.S. Department of Defense, Proposed Rule. Cybersecurity Maturity Model Certification (CMMC) Program. 88 FR 89087. December 26, 2023.

74 U.S. Department of Defense. Proposed Rule. CMMC Program. Published December 26, 2023.

75 NIST SP 800-172. "Enhanced Security Requirements for Protecting Controlled Unclassified Information: A Supplement to NIST Special Publication 800-171." Published February 2021.

76 U.S. Department of Defense. Proposed Rule. CMMC Program. 88 FR 89084. Published December 26, 2023.

77 Ibid.

78 NIST SP 800-171 Rev. 3 (Final Public Draft). "Protecting Controlled Unclassified Information in Nonfederal Systems and Organizations." Published November 9, 2023.

79 U.S. Department of Defense. Proposed Rule. CMMC Program. 88 FR 89084. Published December 26, 2023.

80 External service provider (ESP) means external people, technology, or facilities that an organization utilizes for provision and management of comprehensive IT and/or cybersecurity services on behalf of the organization. In the CMMC Program, CUI or Security Protection Data (e.g., log data, configuration data), must be processed, stored, or transmitted on the ESP assets to be considered an ESP. (CMMC-custom term), 88 FR 89121.

81 A managed service provider (MSP) is a third-party company that remotely manages a customer's information technology (IT) infrastructure and end-user systems. Companies hire MSPs to perform a defined set of day-to-day management services. These services may include network and infrastructure management, security, and monitoring.

82 A managed security service provider (MSSP) provides outsourced monitoring and management of security devices and systems. Common services include managed firewall, intrusion detection, virtual private network, vulnerability scanning, and anti-viral services.

83 The Federal Risk and Authorization Management Program (FedRAMP) was established in 2011 to provide a cost-effective, risk-based approach for the adoption and use of cloud services by the federal government. Learn more about FedRAMP at www.fedramp.gov

84 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 20.

85 Greenwalt, Dr. William, and Mr. Tom Corben. "Breaking the Barriers: Reforming U.S. Export Controls to Realise the Potential of AUKUS." *United States Studies Centre.* May 17, 2023. https://www.ussc.edu.au/breaking-the-barriers-reforming-us-export-controls-to-realise-the-potential-of-aukus (accessed February 22, 2024). Page 3.

86 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 21.

87 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 22.

88 Aerospace Industries Association, National Defense Industrial Association, and Professional Services Council. "FMS Modernization: U.S. Industry Feedback to the Department of Defense Foreign Military Sales (FMS) Tiger Team." November 29, 2022. https://www.ndia.org/-/media/sites/ndia/policy/documents/fms-files/fms-tiger-team-feedback-29nov22-final.pdf?download=1; Volume 2: https://www.ndia.org/-/media/sites/ndia/policy/documents/fms-files/volume-ii-defense-trade-modernization.pdf?download=1 (accessed February 22, 2024).

89 U.S. Department of Defense. "Department of Defense Unveils Comprehensive Recommendations to Strengthen Foreign Military Sales." June 13, 2023. https://www.defense.gov/News/Releases/Release/Article/3425963/department-of-defense-unveils-comprehensive-recommendations-to-strengthen-forei/ (accessed February 22, 2024).

90 This included: (1) developing a regional approach to arms transfers; (2) prioritizing cases for FMS based on NSS goals; (3) promoting proactive, forward-looking uses of the Special Defense Acquisition Fund (SDAF); (4) refining implementation of the Unmanned Aerial System (UAS) Export Policy; (5) improving Security Cooperation Officer (SCO) training; (6) working with Congress to improve consultation through the tiered review (TR) process; (7) modernizing the congressional notification process; (8) limiting special security arrangements (SSAs); (9) streamlining internal processes to avoid delivery delays and manage expectations where they occur; and (10) advancing the Conventional Arms Transfer (CAT) Policy Working Group initiatives. https://www.state.gov/fms-2023-retooling-foreign-military-sales-for-an-age-of-strategic-competition/

91 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 23.

92 Aerospace Industries Association, National Defense Industrial Association, and Professional Services Council. "FMS Modernization: U.S. Industry Feedback to the Department of Defense Foreign Military Sales (FMS) Tiger Team." November 29, 2022. https://www.ndia.org/-/media/sites/ndia/policy/documents/fms-files/fms-tiger-team-feedback-29nov22-final.pdf?download=1; Volume 2: https://www.ndia.org/-/media/sites/ndia/policy/documents/fms-files/volume-ii-defense-trade-modernization.pdf?download=1 (accessed February 22, 2024).

93 Ibid.

94 P.L. 118-31.

95 P.L. 118-31. Section 1204.

96 P.L. 118-31. Section 873.

97 Ibid.

98 P.L. 118-31. Section 918.

99 The White House. "AUKUS Leaders' Level Statement." April 5, 2022. https://www.whitehouse.gov/briefing-room/statements-releases/2022/04/05/aukus-leaders-level-statement/ (accessed February 9, 2024).

100 U.S. Department of Defense. "AUKUS Defense Ministers Meeting Joint Statement." December 1, 2023. https://www.defense.gov/News/Releases/Release/Article/3604511/aukus-defense-ministers-meeting-joint-statement/ (accessed February 8, 2024).

101 P.L. 118-31. Sections 1321-1354.

102 P.L. 118-31. Section 1343.

103 For further background reading: Kerr, Paul K. and Ilana Krill. "U.S. Arms Transfer Restrictions and AUKUS Cooperation." *Congressional Research Service.* Updated January 4, 2024. https://crsreports.congress.gov/product/pdf/IF/IF12483 (accessed February 23, 2024).

104 P.L. 94-329.

105 Lewis, Jessica. "House Committee on Foreign Affairs Hearing: Modernizing U.S. Arms Exports and a Stronger AUKUS A/S Jessica Lewis." *Remarks & Releases.* May 24, 2023. https://www.state.gov/house-committee-on-foreign-affairs-hearing-modernizing-u-s-arms-exports-and-a-stronger-aukus-a-s-jessica-lewis/ (accessed February 21, 2024).

106 Ibid.

107 Defense Trade Cooperation Treaties. Signed 2007. Ratified on September 29, 2010; The UK and Australia were added to the National Technology and Industrial Base in 2016 through the FY2017 NDAA. P.L. 114-328. Sec. 881.

108 Cheverton, Deborah, and John T. Watts. "AUKUS is Hamstrung by Outdated US Export Control Rules; Here's What Congress Can Do." *The New Atlanticist.* November 15, 2023. https://www.atlanticcouncil.org/blogs/new-atlanticist/aukus-is-hamstrung-by-outdated-us-export-control-rules-heres-what-congress-can-do/ (accessed February 22, 2024).

109 Sullivan, Jake. "Remarks by National Security Advisor Jake Sullivan at the Special Competitive Studies Project Global Emerging Technologies Summit." *The White House.* September 16, 2022. https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/09/16/remarks-by-national-security-advisor-jake-sullivan-at-the-special-competitive-studies-project-global-emerging-technologies-summit/ (accessed February 23, 2024).

110 Bureau of Industry and Security. "Multilateral Export Control Regimes." *Policy Guidance.* https://www.bis.doc.gov/index.php/policy-guidance/multilateral-export-control-regimes (accessed February 21, 2024).

111 ECRA replaced most of the expired Export Administration Act of 1979 and provided a permanent statutory basis for controlling the export of dual-use goods and certain military parts and components. The legislation was part of a wider effort to revise U.S. trade and investment policy, which also included the passage of the Foreign Investment Risk Review Modernization Act (FIRRMA). P.L. 115-232.

112 Bureau of Industry and Security. "Commerce Implements New Export Controls on Advanced Computing and Semiconductor Manufacturing Items to the People's Republic of China (PRC)." October 7, 2022. https://www.bis.doc.gov/index.php/documents/about-bis/newsroom/ press-releases/3158-2022-10-07-bis-press-release-advanced-computingand-semiconductor-manufacturing-controls-final/file (accessed February 23, 2024).

113 Palmer, Alex W. "'An Act of War': Inside America's Silicon Blockade Against China." *The New York Times Magazine.* July 12, 2023. https://www.nytimes.com/2023/07/12/magazine/semiconductor-chips-us-china.html (accessed February 21, 2024).

114 Reagan Foundation and Institute. "RNDF 2023 Welcomes the Honorable Gina M. Raimondo." October 25, 2023. https://www.reaganfoundation.org/reagan-institute/about/press-releases/rndf-2023-welcomes-the-honorable-gina-m-raimondo/ (accessed February 9, 2024).

115 Hitchens, Theresa. "'Game on': Raimondo calls for beefing up tech export controls to counter China." *Breaking Defense.* December 2, 2023. https://breakingdefense.com/2023/12/game-on-raimondo-calls-for-beefing-up-tech-export-controls-to-counter-china/ (accessed February 8, 2024).

116 Ibid.

117 Bureau of Industry and Security. "Notice of Reestablishment of the President's Export Council Subcommittee on Export Administration and Solicitation of Nominations for Membership." January 3, 2024. https://www.federalregister.gov/documents/2024/01/09/2024-00190/

notice-of-reestablishment-of-the-presidents-export-council-subcommittee-on-export-administration-and (accessed February 23, 2024).

118 Bureau of Industry and Security. "Annual Report of the Bureau of Industry and Security for Fiscal Year 2021." September 20, 2022. https://www.bis.doc.gov/index.php/documents/pdfs/3140-annual-report-of-the-bureau-of-industry-and-security-for-fiscal-year-2021 (accessed February 21, 2024).

119 The White House. "Fact Sheet: Implementation of Export Control Reform." March 08, 2013. https://obamawhitehouse.archives.gov/the-press-office/2013/03/08/fact-sheet-implementation-export-control-reform (accessed February 21, 2024).

120 Office of the Assistant Secretary of Defense for Industrial Base Policy. "Fiscal Year 2020 Industrial Capabilities Report." January 14, 2021. https://media.defense.gov/2021/Jan/14/2002565311/-1/-1/0/FY20-INDUSTRIAL-CAPABILITIES-REPORT.PDF (accessed February 7, 2024).

121 U.S. Department of Defense. "2022 National Defense Strategy." October 27, 2022. https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF (accessed February 8, 2024). Page 1.

122 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 16.

123 Idle facilities are defined in FAR 31.205-17 as completely unused facilities that are excess to the contractor's current needs. FAR 31.205-17. "Idle facilities and idle capacity costs."

124 Idle capacity means the unused capacity of partially used facilities. It is the difference between that which a facility could achieve under 100 percent operating time on a one-shift basis, less operating interruptions resulting from time lost for repairs, set-ups, unsatisfactory materials, and other normal delays, and the extent to which the facility was actually used to meet demands during the accounting period. A multiple-shift basis may be used in the calculation instead of a one-shift basis if it can be shown that this amount of usage could normally be expected for the type of facility involved. FAR 31.205-17. "Idle facilities and idle capacity costs."

125 FAR 42.7. "Indirect Cost Rates."

126 FAR 31.205-17. "Idle facilities and idle capacity costs."

127 McGarry, Brendan W., and Alexandra G. Neenan "Defense Primer: Future Years Defense Program (FYDP)." *Congressional Research Service.* Updated January 23, 2024. https://crsreports.congress.gov/product/pdf/IF/IF10831/14 (accessed February 22, 2024).

128 The Biden Administration defines a resilient supply chain as one that can easily adapt, rebound, or recover when faced with economic shocks that are either idiosyncratic – e.g., a local supplier plant shutdown – or system – e.g., the COVID-19 pandemic. The White House. "Issue Brief: Supply Chain Resilience." November 30, 2023. https://www.whitehouse.gov/cea/written-materials/2023/11/30/issue-brief-supply-chain-resilience/ (accessed February 23, 2024).

129 Council of Economic Advisors. "Economic Report of the President." April 2022. https://www.whitehouse.gov/wp-content/uploads/2022/04/ERP-2022.pdf (accessed February 23, 2024).

130 The White House. "Executive Order on America's Supply Chains." February 24, 2021. https://www.whitehouse.gov/briefing-room/presidential-actions/2021/02/24/executive-order-on-americas-supply-chains/ (accessed February 9, 2024).

131 Ibid.

132 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 3.

133 P.L. 118-31. Section 1414.

134 P.L. 118-31. Sections 241, 716, 1513, 1813 and 2809.

135 P.L. 118-31. Section 856.

136 The White House. "Building Resilient Supply Chains Revitalizing American Manufacturing and Fostering Broad-Based Growth." June 2021. https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf (accessed February 13, 2024).

137 The "China plus one" concept can be characterized as keeping some production in China while moving the rest of the production to countries more geostrategically friendly or neutral to the United States.

138 The Economist. "Rising tigers, hidden dragon: America and China are slashing trade links with one another. Aren't they?" August 8, 2023. https://www.economist.com/finance-and-economics/2023/08/08/how-america-is-failing-to-break-up-with-china (accessed February 14, 2024).

139 Ibid.

140 Ibid.

141 Ibid.

142 Ibid.

143 Rosen, Phil. "China and the US risk entering a 'new cold war' as trade and investment ties strain, IMF official says." *Business Insider.* December 11, 2023. China, US Risk 'New Cold War' As Trade and Investment Ties Strain: IMF (businessinsider.com) (accessed February 9, 2024).

144 Ip, Greg. "A China-U.S. Decoupling? You Ain't Seen Nothing Yet." *Wall Street Journal.* February 7, 2024. https://www.wsj.com/economy/trade/a-china-u-s-decoupling-you-aint-seen-nothing-yet-12c0828e (accessed February 23, 2024).

145 Ibid.

146 The White House. "Issue Brief: Supply Chain Resilience." November 30, 2023. https://www.whitehouse.gov/cea/written-materials/2023/11/30/issue-brief-supply-chain-resilience/ (accessed February 23, 2024).

147 The 2023 NDIS defines supply chain visibility as the ability to track parts, materials, and services from prime contractors back to sub-tier level suppliers and sources – effectively from the raw materials to the end-product. Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 21.

148 Office of the Assistant Secretary of Defense for Industrial Base Policy. "National Defense Industrial Strategy." January 11, 2024. https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf (accessed February 8, 2024). Page 16.

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