

Ground Combat Systems Contract Analysis (FY2016-2020)

Department of Defense Spending Patterns, Vendor Concentration, and Risk
Assessment

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1 Executive Summary

Our analysis of Department of Defense (DoD) spending patterns on major ground combat systems (GCS) from FY2016 to FY2020 reveals significant market concentration, geographic dependencies, and systems in late lifecycle phases. Based on comprehensive contract data for the Abrams tank, Bradley fighting vehicle, and Stryker combat vehicle programs, we identified:

1. **High vendor concentration** - The top three vendors account for 85.9% of Abrams, 93.6% of Bradley, and 91.8% of Stryker program spending, creating significant single-source supplier risks [1].
2. **Geographic concentration** - Michigan accounts for 71.4% of total program spending, with Sterling Heights alone receiving nearly \$6.3 billion, posing substantial geographic risk [2].
3. **Late lifecycle status** - All three systems are in the sustainment and modernization phase with high modification rates (>96%), requiring different contracting approaches from new systems acquisition [3].

This report outlines recommendations for improved vendor diversification, geographic risk mitigation, and future acquisition planning as DoD evaluates potential contracting inefficiencies and opportunities for future investments.

2 Introduction and Methodology

The Deputy Program Executive Officer for Ground Combat Systems requested an analysis of DoD's contract data for the Abrams tank, Bradley fighting vehicle, and Stryker armored personnel carrier between FY2016-FY2020. This analysis aimed to illuminate actual spending patterns, identify prominent vendors and contracting offices, outline key technologies acquired, and evaluate risks associated with program management.

Our methodology included:

- Data cleaning and normalization of vendor names to address identification challenges
- Classification of contracts by program based on contract titles
- Analysis of spending patterns, vendor concentration, and geographic distribution
- Assessment of program lifecycle status and associated risks

The defense industrial base currently consists of over 200,000 companies according to recent assessments by the U.S. Government Accountability Office (GAO) [1]. Mitigating risks such as reliance on foreign and single-source suppliers is essential for the DoD to avoid supply disruptions and ensure the industrial base can meet current and future national security needs.

3 Spending Analysis

3.1 Program-Level Spending Trends

DoD spent a total of \$9.15 billion on the three ground combat vehicle programs during the five-year period analyzed. The Abrams program received the majority of funding (69.1%), followed by Stryker (21.3%), and Bradley (9.6%).

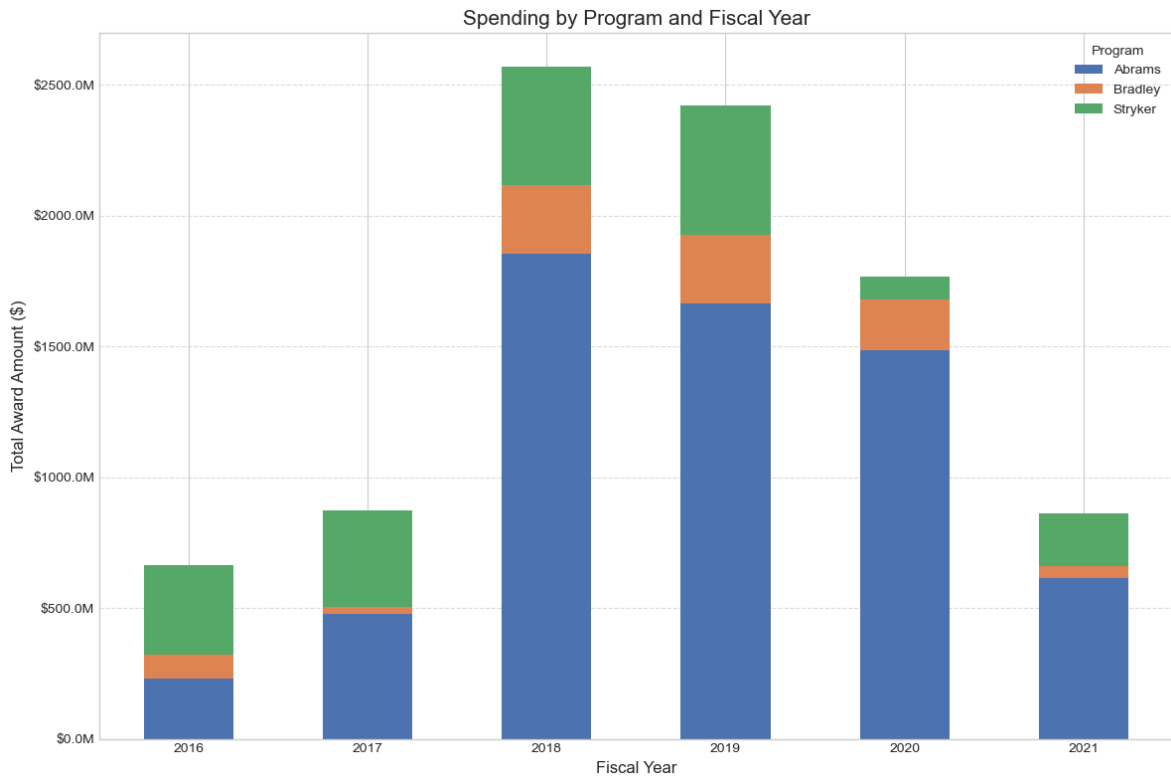


Figure 1: Spending by Program and Fiscal Year (FY2016-2021)

As shown in Figure 1, spending on all three programs peaked between FY2018-2019, with significant declines observed in FY2020-2021, indicating potential shifts in funding priorities or completion of major upgrades. The Abrams program experienced the most dramatic fluctuations, with spending increasing dramatically from \$477.59M in FY2017 to \$1,852.58M in FY2018, followed by a gradual decline to \$613.51M by FY2021.

Share of Total Spending by Program (FY2016-2021)

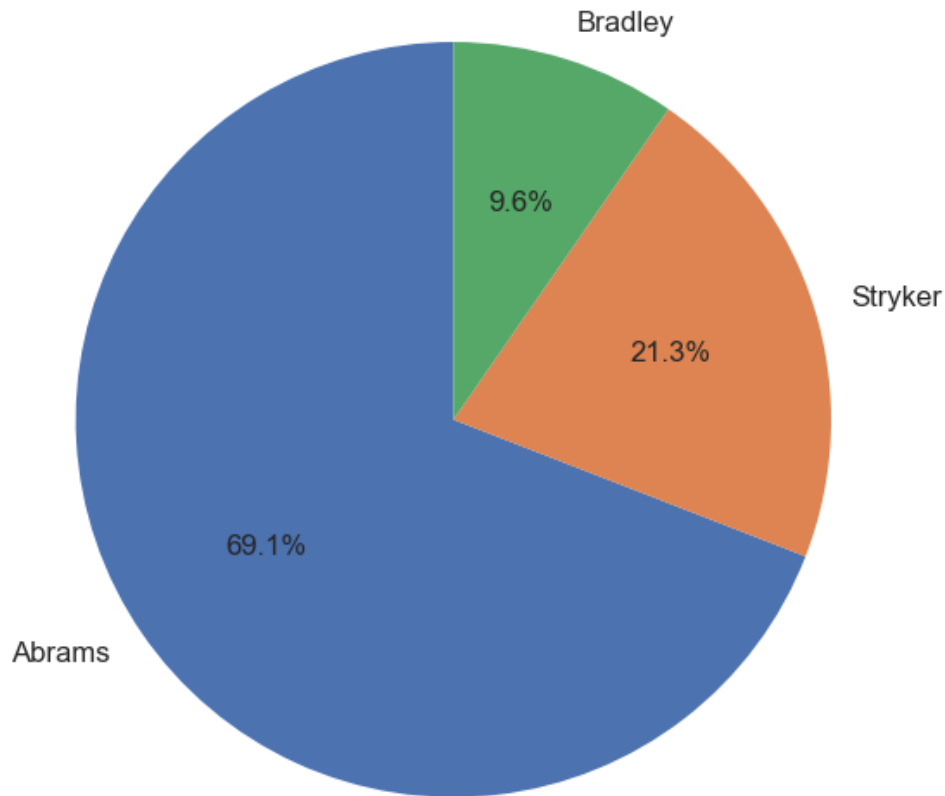


Figure 2: Share of Total Spending by Program (FY2016-2021)

The number of contracts declined over time for all programs, but most significantly for Stryker vehicles, suggesting consolidation of contracts into fewer, larger agreements (Figure 3).

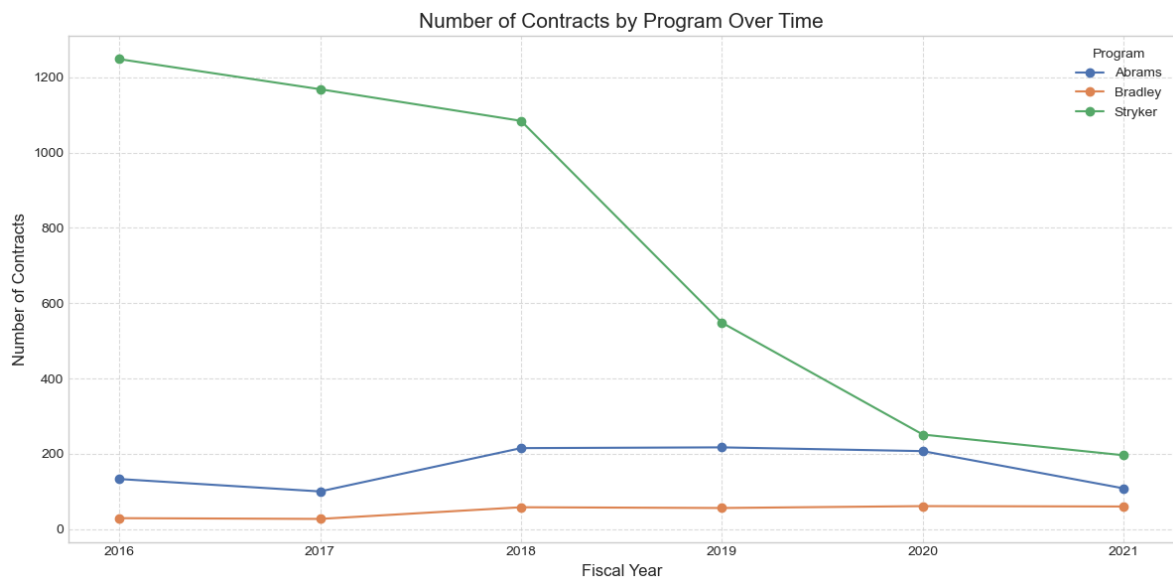


Figure 3: Number of Contracts by Program Over Time

3.2 Contract Size Analysis

Average contract sizes varied significantly across programs, with Abrams contracts averaging \$6.46 million, Bradley contracts averaging \$3.03 million, and Stryker contracts averaging just \$432,891. The difference in average contract size reflects the different acquisition approaches and lifecycle stages of each program.

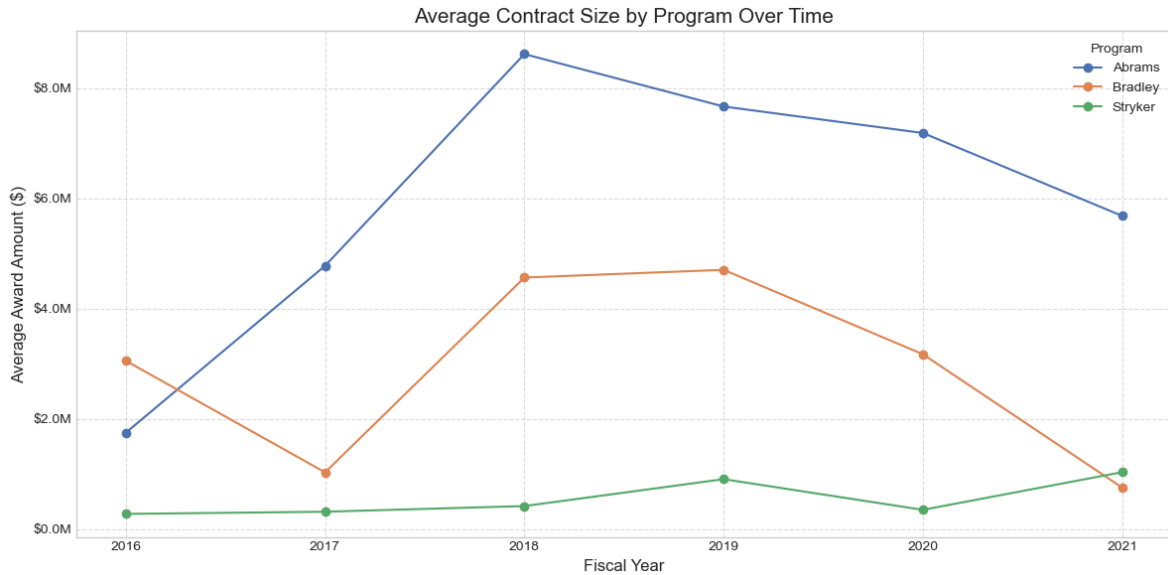


Figure 4: Average Contract Size by Program Over Time

4 Vendor Analysis

4.1 Vendor Concentration

Our analysis revealed extremely high market concentration within each program. The top vendor by spending for both Abrams and Stryker programs is General Dynamics Land Systems, accounting for 77.3% and 83.8% of program spending respectively. For the Bradley program, BAE Systems Land Armaments dominates with 69.4% of program spending.

This level of concentration aligns with broader trends in the defense sector. A February 2022 study by the Department of Defense found that after decades of consolidation, the number of defense prime contractors had shrunk from 51 to fewer than 10, with many segments of the market controlled by companies with monopoly or near-monopoly positions [4].

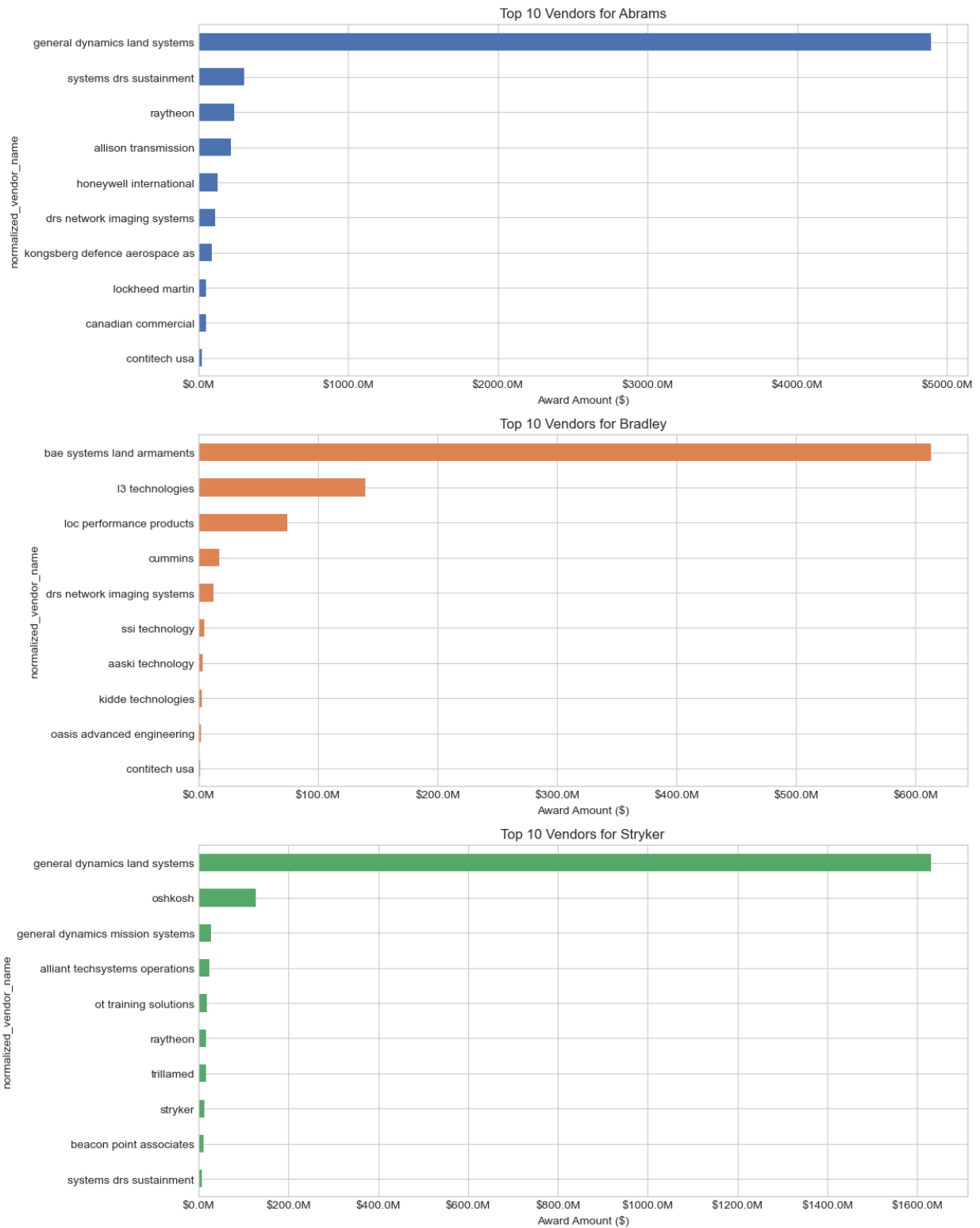


Figure 5: Top 10 Vendors for Abrams, Bradley, and Stryker Programs

Market concentration metrics indicate potential supply chain vulnerability:

Program	Total Vendors	Top 3 Vendor Share	HHI Index
Abrams	161	85.9%	0.6038
Bradley	41	93.6%	0.5143
Stryker	146	91.8%	0.7068

Table 1: Market Concentration Metrics by Program

These HHI (Herfindahl-Hirschman Index) values exceed 0.5, indicating near-monopolistic market conditions that create significant risks to program continuity in the event of disruptions affecting primary vendors. In commercial contexts, a Herfindahl-Hirschman Index above 0.25 is typically considered highly concentrated [5].

The market share distribution for each program is visualized below:

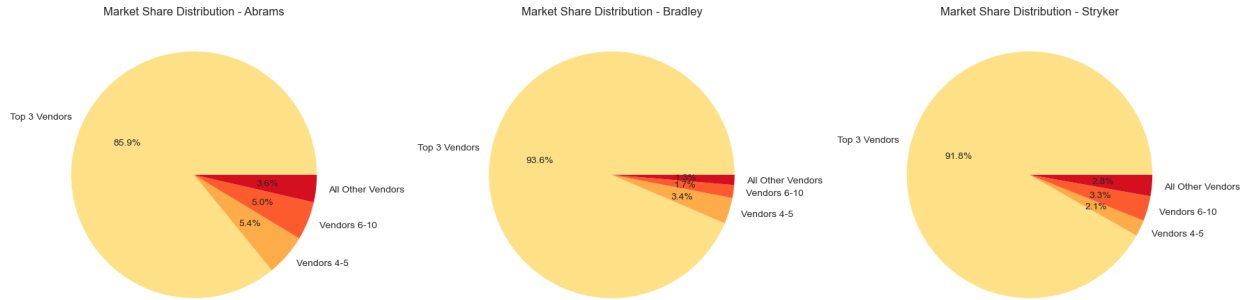


Figure 6: Market Share Distribution by Program

4.2 Cross-Program Vendors

We identified 34 vendors working across multiple programs, representing an opportunity for the DoD to consolidate contracts and potentially reduce costs. The most significant cross-program vendors include:

1. General Dynamics Land Systems - Primary vendor for both Abrams and Stryker programs
2. Systems DRS Sustainment - Significant contracts for Abrams and Stryker
3. Raytheon - Contracts across all three programs
4. Lockheed Martin - Primarily Abrams with smaller Stryker contracts

5 Geographic Analysis

5.1 State-Level Distribution

The geographic distribution of contract spending is highly concentrated, with Michigan receiving 71.4% of total program spending (\$6.54 billion). This concentration presents potential risks to program continuity in the event of regional disruptions.

Concentration risk related to geographic factors is a recognized issue in supply chain management, as disruptions in one region can impact the entire supply chain [2]. This risk is heightened

when suppliers are clustered in a single geographic area, as is the case with the ground combat systems programs analyzed.

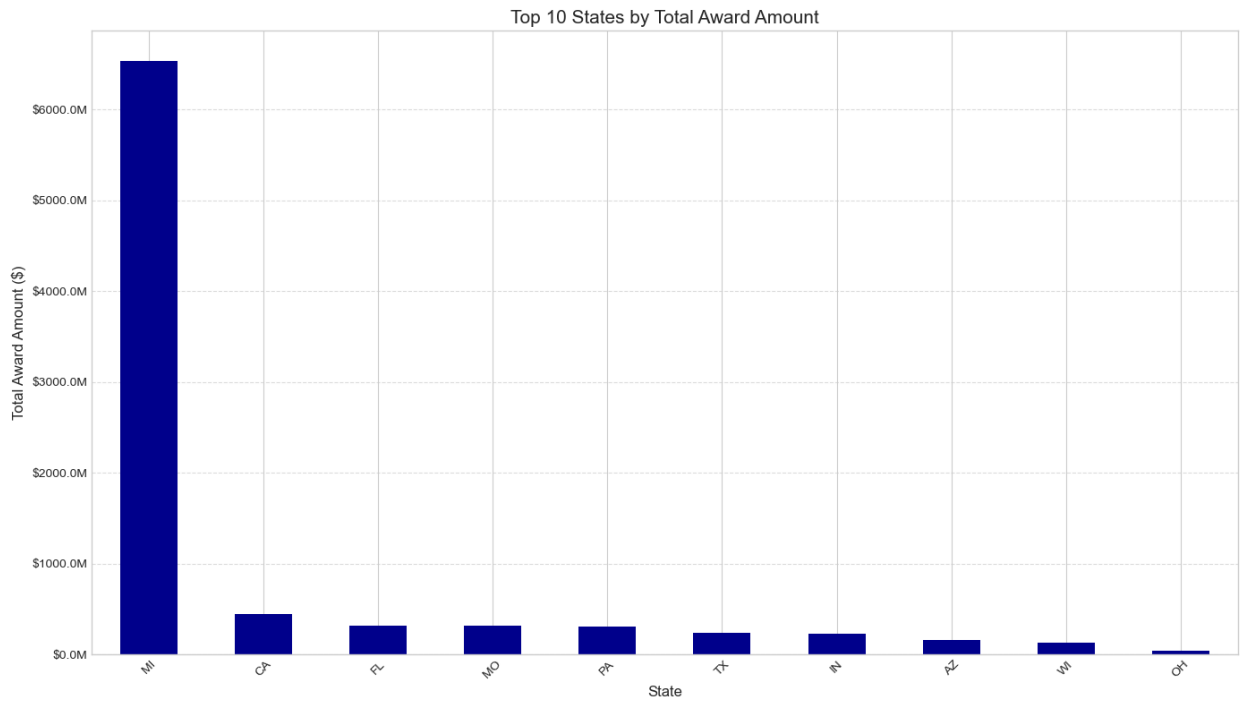


Figure 7: Top 10 States by Total Award Amount

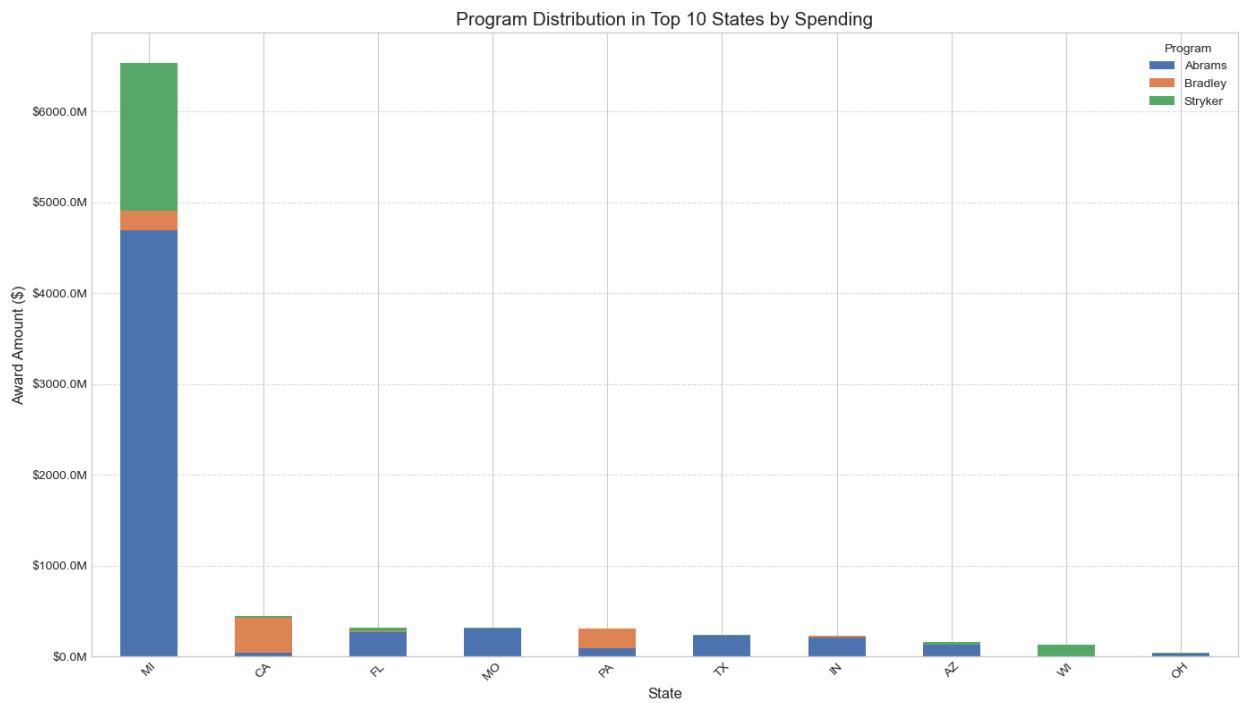


Figure 8: Program Distribution in Top 10 States by Spending

5.2 City-Level Distribution

At the city level, the concentration is even more pronounced, with Sterling Heights, Michigan receiving \$6.29 billion, accounting for 68.7% of total program spending.

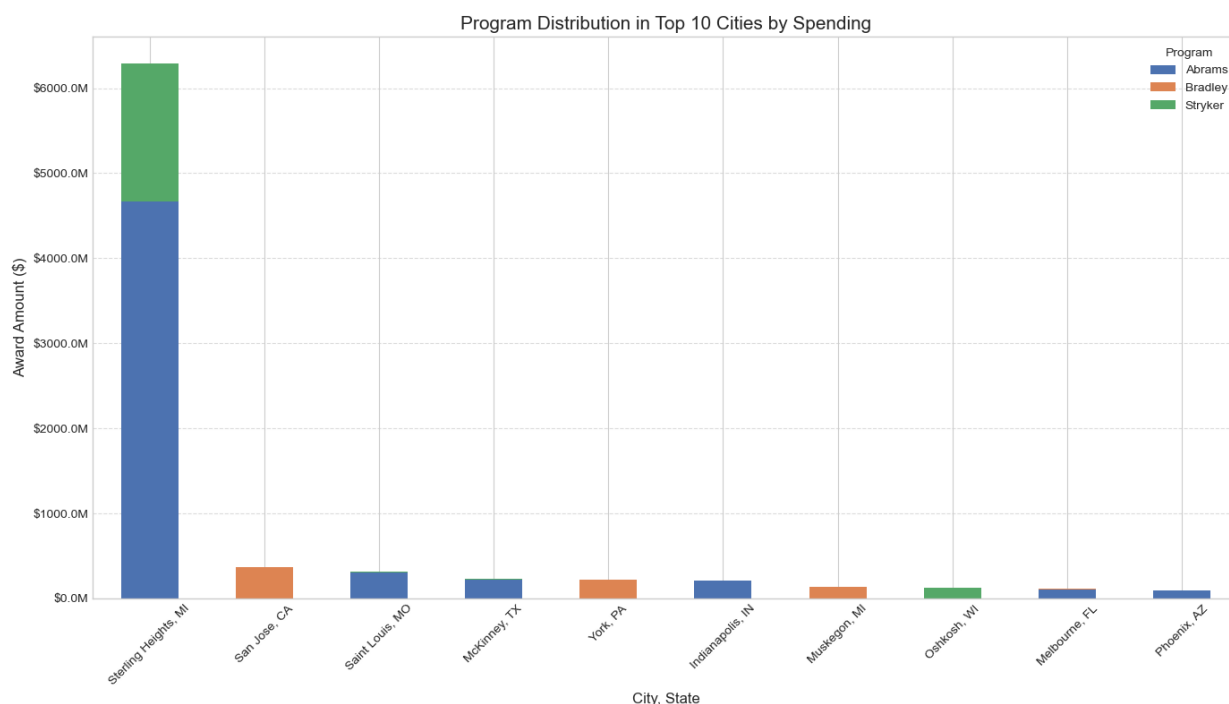


Figure 9: Program Distribution in Top 10 Cities by Spending

This extreme geographic concentration coincides with the location of General Dynamics Land Systems' main production facilities. While this co-location offers logistical advantages, it creates significant geographic risk should that region experience disruptions from natural disasters, labor issues, or other localized challenges. Supply chain experts recommend diversifying suppliers across different geographic regions to build resilience against such disruptions [2].

6 Contracting Patterns

6.1 Contracting Offices

The analysis identified 197 contracting offices involved in GCS programs, with the top office (0646 AQ TM CONTRACTING TEA - APO) responsible for \$7.09 billion (77.4%) of total spending. This concentration of contracting authority poses potential risks to program efficiency and oversight.

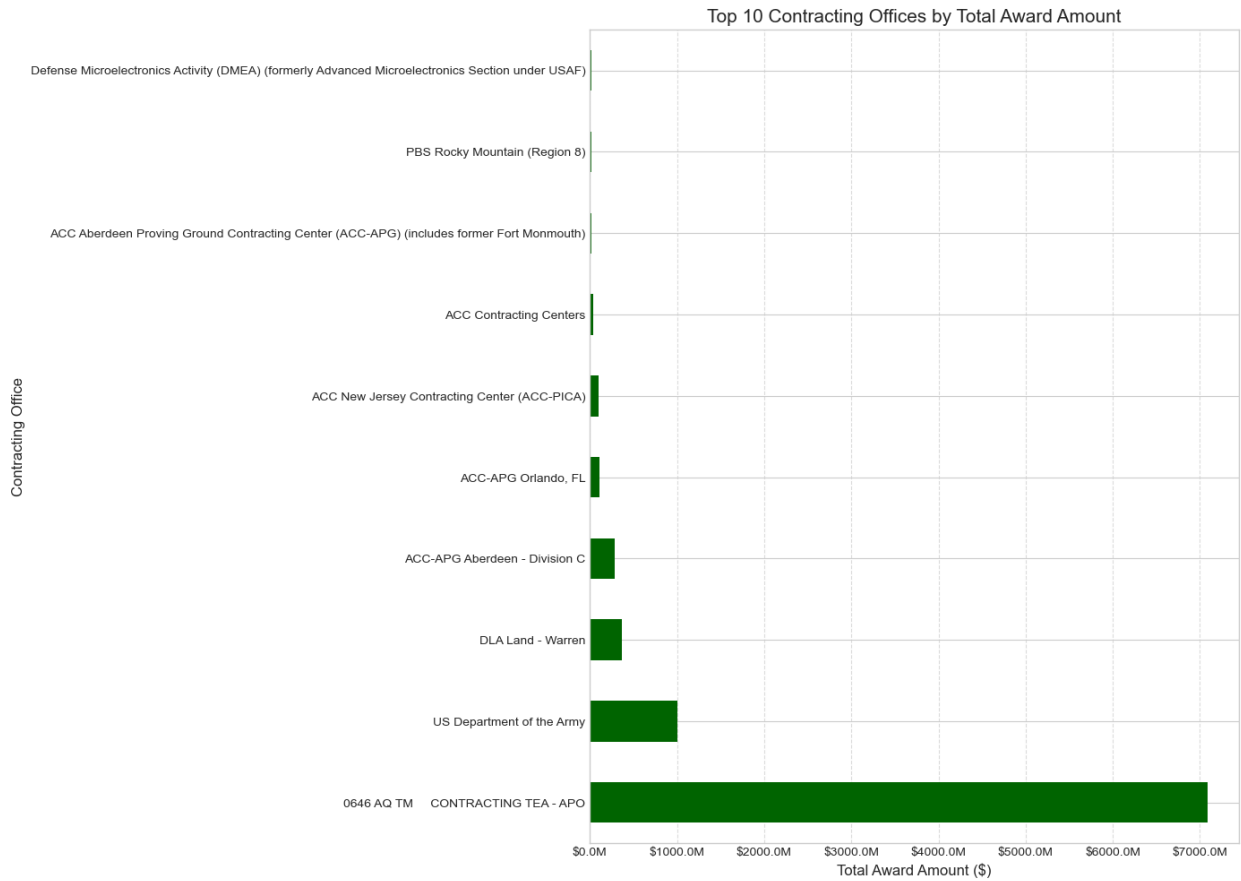


Figure 10: Top 10 Contracting Offices by Total Award Amount

6.2 Office Specialization

Contracting offices were categorized as specialized (managing one program) or generalist (managing multiple programs). We identified 165 specialized offices and 32 generalist offices, with generalist offices handling 95.8% of total spending.

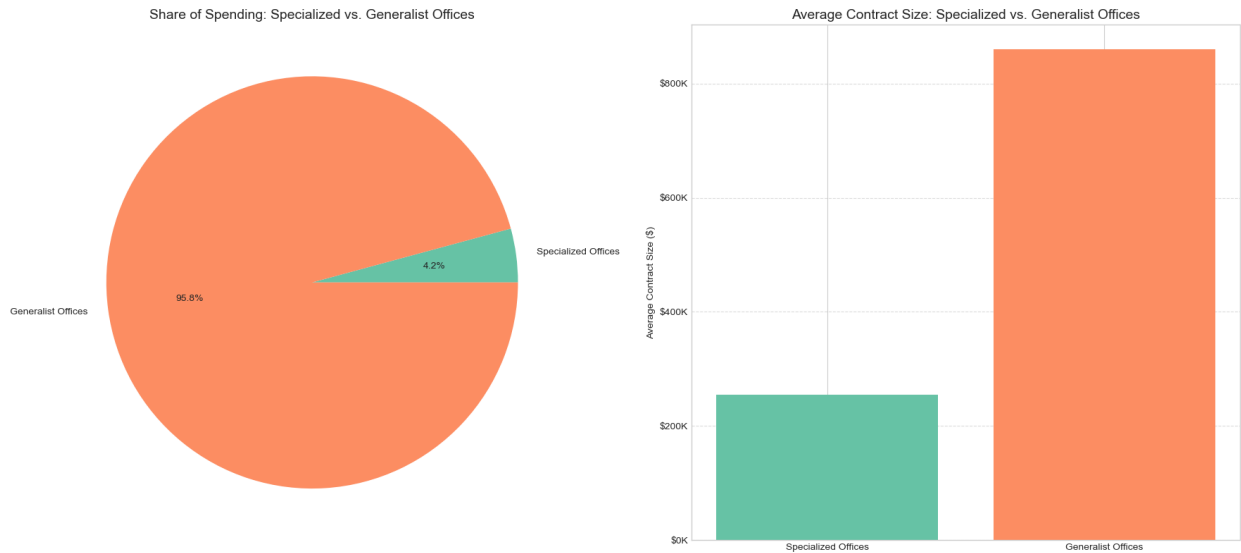


Figure 11: Share of Spending and Average Contract Size by Office Type

Interestingly, generalist offices demonstrated significantly higher average contract sizes (\$857,000) compared to specialized offices (\$251,000), suggesting potential economies of scale or different contracting approaches.

6.3 Contract Modifications

All three programs exhibited extraordinarily high contract modification rates, with 96.8% of Abrams contracts, 99.3% of Bradley contracts, and 98.0% of Stryker contracts requiring modifications after initial award.

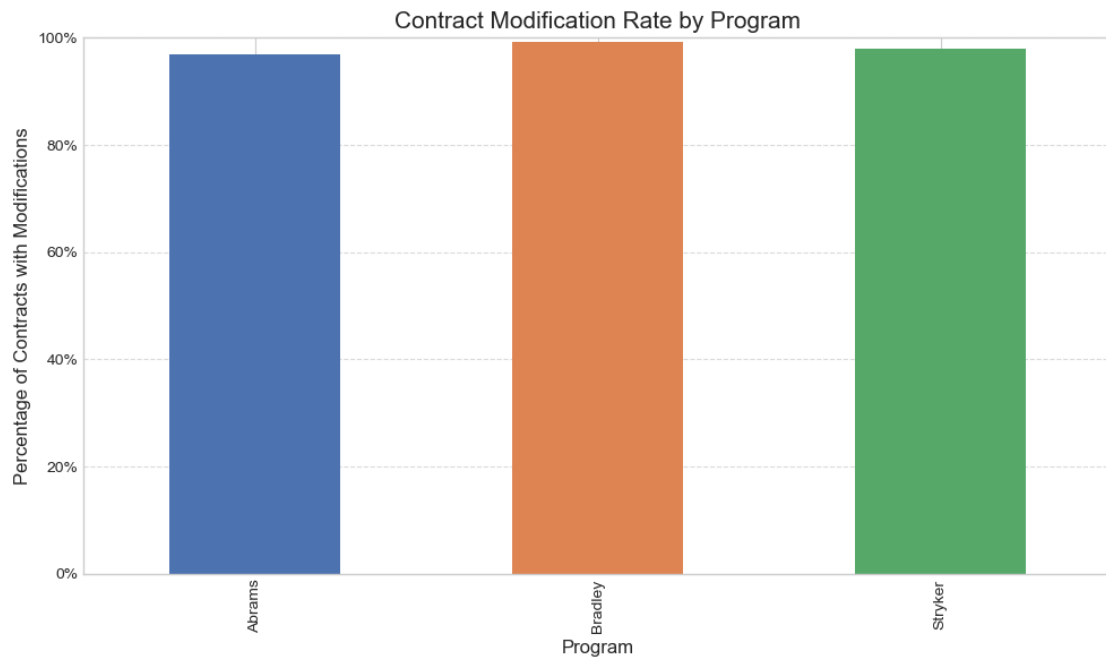


Figure 12: Contract Modification Rate by Program

This high modification rate suggests potential inefficiencies in the initial contracting process or

changing requirements during contract execution. It may also reflect the late lifecycle nature of these systems, where sustainment and modernization efforts often require contract adjustments as new needs emerge [3].

7 Technology and Product Analysis

7.1 Product Service Code Analysis

Analysis of Product Service Codes (PSC) revealed the types of products and services acquired for each program:

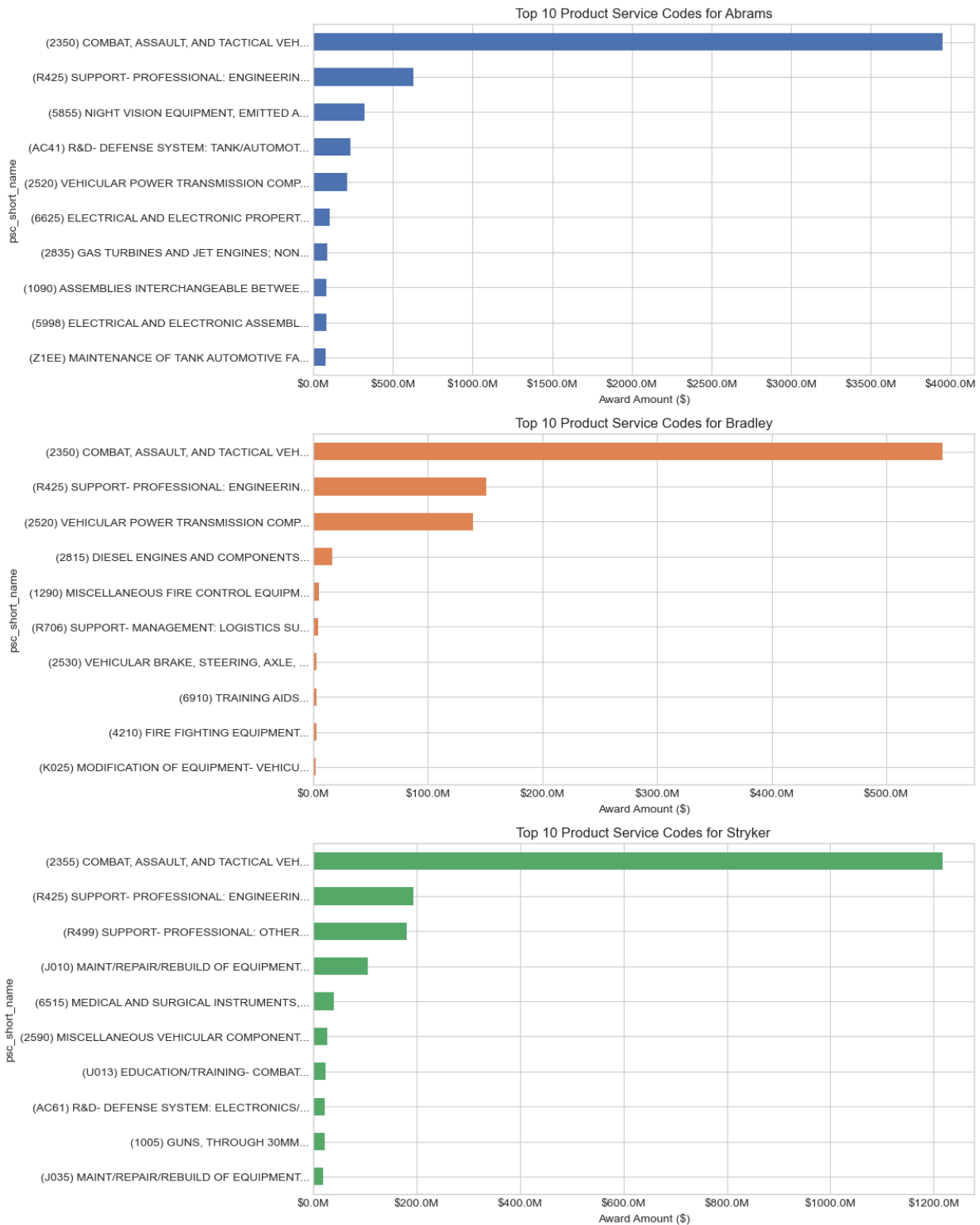


Figure 13: Top Product Service Codes by Program

For the Abrams program, the primary PSC categories were tracked combat vehicles (62.4%), professional engineering support (9.9%), and night vision equipment (5.1%). The Bradley program focused on tracked combat vehicles (62.2%), professional engineering support (17.1%), and vehicular power transmission components (15.8%). The Stryker program emphasized wheeled combat vehicles (62.6%), professional support (10.0%), and maintenance services (5.4%).

PSC diversity metrics indicated varied technology acquisition approaches:

Program	PSC Count	Top 5 PSC Share
Abrams	115	84.53%
Bradley	32	97.54%
Stryker	105	89.32%

Table 2: PSC Diversity Metrics by Program

The limited PSC diversity for Bradley suggests a narrower technology acquisition focus compared to the other programs.

8 Program Lifecycle Assessment

8.1 Lifecycle Status Determination

Our analysis identified all three programs as being in the ‘Late (Sustainment & Modernization)’ phase based on multiple indicators:

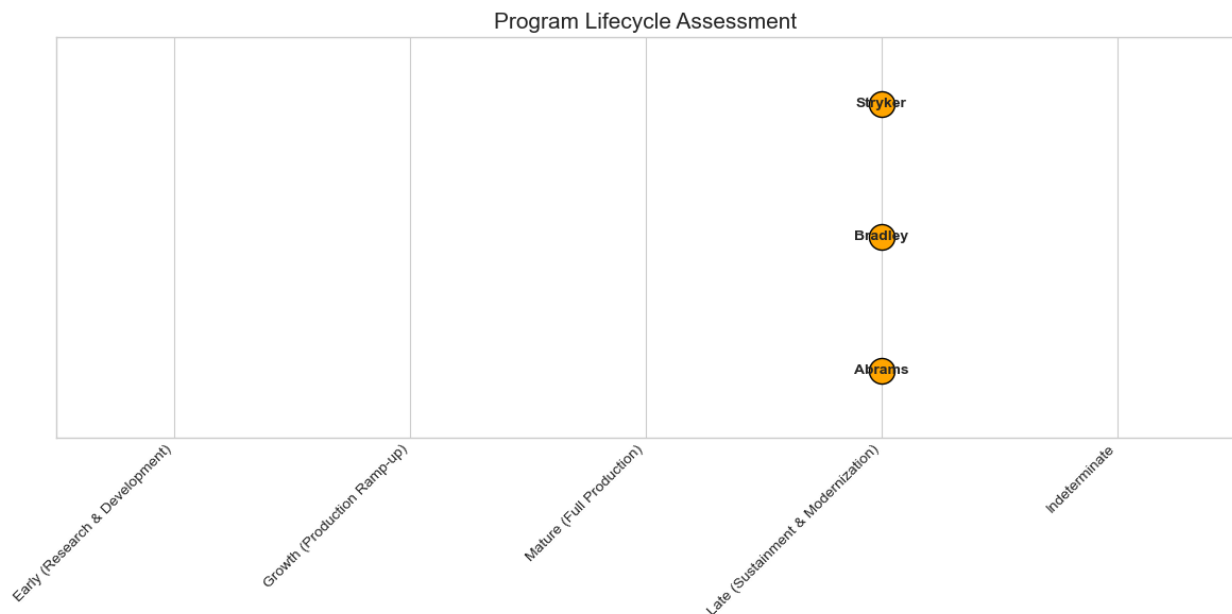


Figure 14: Program Lifecycle Assessment

Key lifecycle indicators included:

- **Spending trend:** Decreasing for all programs
- **Contract size trend:** Decreasing (Abrams, Bradley) or Stable (Stryker)
- **Primary PSC category:** Maintenance for all programs
- **Modification rate:** Extremely high (>96%) for all programs

This assessment aligns with DoD guidance on lifecycle management, which emphasizes the importance of adapting acquisition and sustainment strategies based on a system’s lifecycle phase [3] [6].

8.2 Future Acquisition Projections

Based on the lifecycle assessment, we project the following acquisition trends:

Program	Projected Trend	Spending Outlook	Acquisition Focus
Abrams	Declining production, increasing maintenance	Gradual decrease with maintenance floor	Spares, maintenance, and targeted modernization
Bradley	Declining production, increasing maintenance	Gradual decrease with maintenance floor	Spares, maintenance, and targeted modernization
Stryker	Declining production, increasing maintenance	Gradual decrease with maintenance floor	Spares, maintenance, and targeted modernization

Table 3: Future Acquisition Projections by Program

These programs, developed in the 1980s-2000s, are now in the sustainment and modernization phase of their lifecycle. This aligns with recent DoD initiatives to develop next-generation replacements, such as the XM30 Mechanized Infantry Combat Vehicle (MICV) program that aims to replace the Bradley [7].

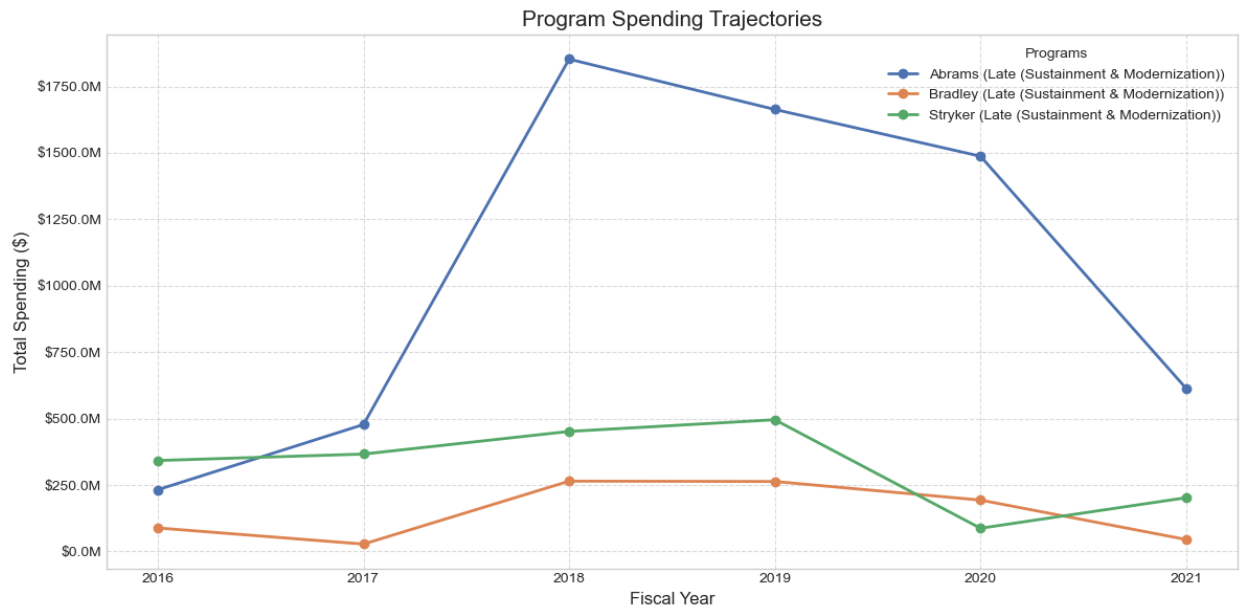


Figure 15: Program Spending Trajectories

9 Risk Analysis

9.1 Vendor Dependence Risk

All three programs exhibit extreme vendor concentration risk:

Program	Top Vendor	Top Vendor Share	Vendor Concentration Risk	Market Structure Risk
Abrams	General Dynamics Land Systems	77.3%	Very High	Very High (Near Monopoly)
Bradley	BAE Systems Land Armaments	69.4%	High	Very High (Near Monopoly)
Stryker	General Dynamics Land Systems	83.8%	Very High	Very High (Near Monopoly)

Table 4: Vendor Dependence Risk Assessment

This concentration creates significant risk of supply disruption should any primary vendor experience financial, operational, or capacity challenges. The GAO has highlighted the importance of diversifying supplier relationships to mitigate such risks in the defense industrial base [1].

9.2 Budget Consistency Risk

All programs demonstrate high budget volatility:

Program	Year-to-Year Volatility	Consistent Trend	Budget Risk
Stryker	50.79%	No	High
Abrams	94.61%	No	High
Bradley	205.12%	No	High

Table 5: Budget Consistency Risk Assessment

This budget inconsistency complicates long-term planning for both DoD and vendors, potentially leading to inefficiencies in resource allocation and creating challenges for maintaining industrial capacity.

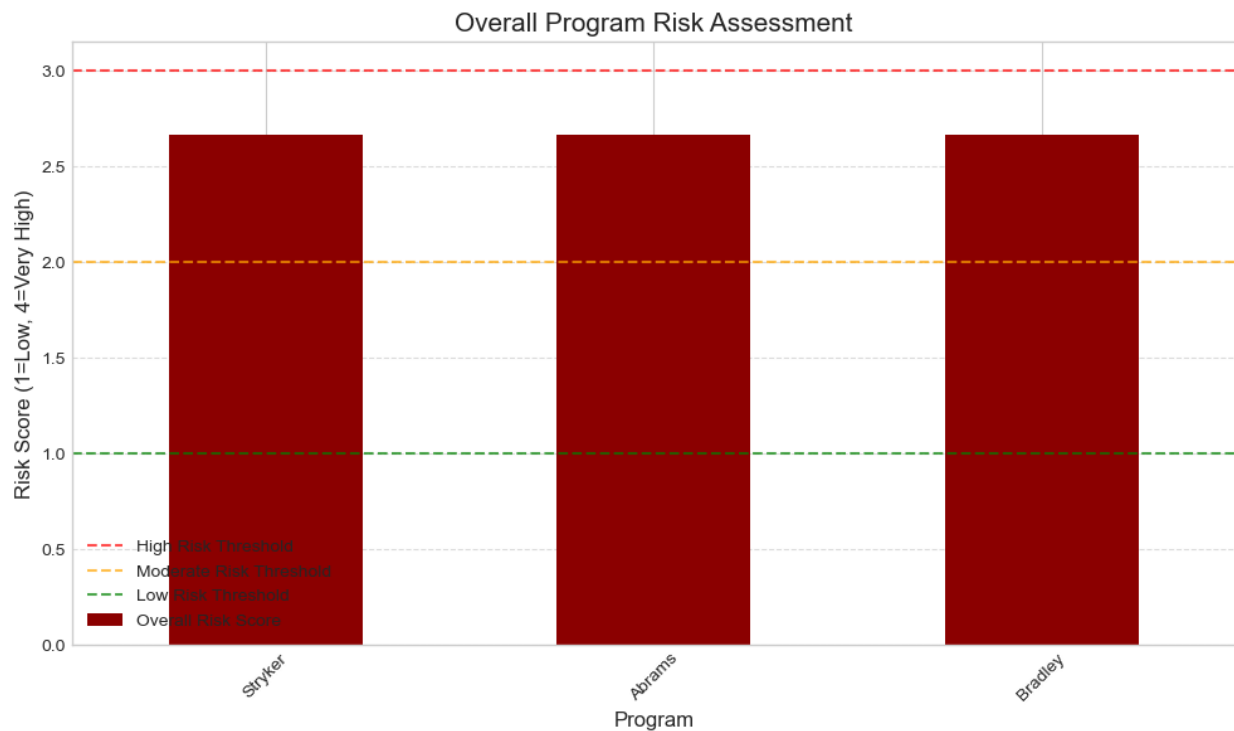


Figure 16: Overall Program Risk Assessment

9.3 Overall Risk Assessment

The combined risk assessment indicates high vulnerability across all programs:

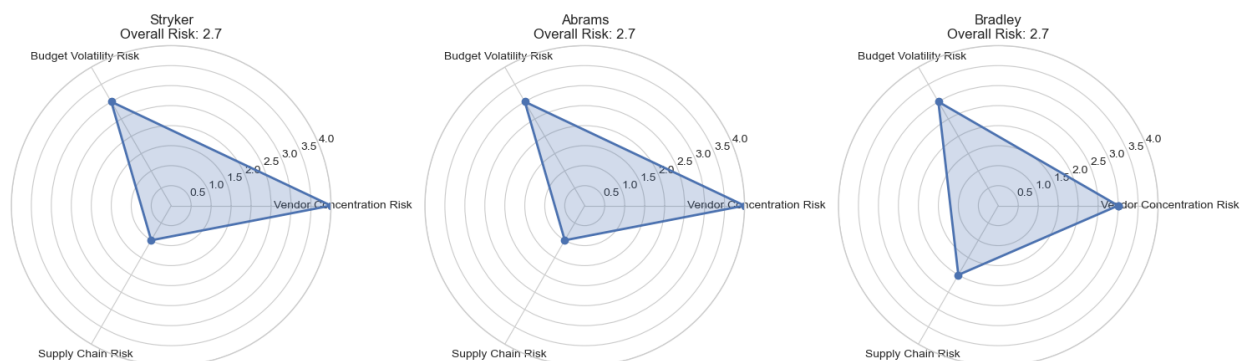


Figure 17: Risk Assessment Radar Chart by Program

The risk analysis shows all three programs facing similar risk profiles, with particularly high vendor concentration risk and budget volatility risk. The Bradley program demonstrates slightly lower supply chain risk due to more distributed geographic production.

10 Conclusions and Recommendations

10.1 Key Insights

1. **Extreme Market Concentration:** The near-monopolistic vendor concentration across all three programs creates significant vulnerability to supply disruption. With General Dynamics Land Systems controlling over 75% of Abrams and Stryker spending, and BAE Systems controlling nearly 70% of Bradley spending, alternative sources should be developed to mitigate single-source risk.
2. **Geographic Vulnerability:** The extraordinary concentration of spending in Michigan (71.4%) creates geographically-concentrated risk. DoD should consider incentivizing geographic diversification through contract requirements or other mechanisms.
3. **Late Lifecycle Phase:** All three systems are in the sustainment and modernization phase, with declining production and increasing maintenance spending. This indicates the need for DoD to balance sustainment of existing platforms with planning for next-generation replacements.

10.2 Recommendations for Future Investments

1. **Vendor Diversification Strategy:** Implement targeted contract awards to second and third-tier vendors to reduce extreme concentration risk [1]. Consider requirements for prime contractors to develop alternate sources for critical components, which aligns with recent GAO recommendations to mitigate supply chain vulnerabilities in the defense industrial base [8].
2. **Geographic Risk Mitigation:** Incentivize contractors to develop additional production and maintenance capabilities in different regions to reduce geographic vulnerability in Michigan. Recent supply chain resilience studies recommend diversifying suppliers across different geographic regions to better withstand regional disruptions [2] [9].
3. **Lifecycle-Appropriate Contracting:** Adapt contracting approaches to match the late lifecycle phase of these systems [3]:
 - Implement performance-based logistics contracts for maintenance and sustainment
 - Develop targeted modernization programs to extend service life
 - Begin shifting investment toward next-generation replacements
4. **Contract Modification Reduction:** The extremely high modification rates (>96%) suggest inadequate initial requirement definition. Implement more rigorous upfront requirements analysis to reduce costly modifications. The Defense Acquisition University notes that effective sustainment planning early in a system's lifecycle can lead to more efficient sustainment and modernization activities [6].
5. **Data-Driven Decision Making:** Improve vendor data standardization and contract categorization to enable more precise monitoring of industrial base health and program performance. Recent advances in supply chain visibility technology can help defense organizations identify and mitigate risks across multi-tier supply networks [10].

10.3 Implementation Strategy

To effectively implement these recommendations, we propose a phased approach:

Timeframe		Actions	Expected Outcomes
Short-term (1 year)	(1	Conduct supply chain vulnerability assessment; Identify alternative suppliers for critical components; Implement enhanced data collection	Improved visibility into supply chain risks; Initial risk mitigation plan
Medium-term (2-3 years)	(2-	Begin geographic diversification incentives; Transition to performance-based logistics contracts; Develop alternative sources for key components	Reduced single-source dependencies; Improved contract efficiency; Initial geographic diversification
Long-term (4-5 years)	(4-5	Fully implement vendor diversification strategy; Establish distributed maintenance capabilities; Coordinate transition to next-generation systems	Resilient supplier network; Significantly reduced geographic concentration; Smooth transition to future systems

Table 6: Implementation Strategy Timeline

By addressing these challenges systematically, DoD can improve the efficiency of its ground combat systems portfolio while preparing for the transition to next-generation platforms that will maintain battlefield superiority against emerging threats.

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