



U.S. Department of Commerce
Bureau of Industry and Security
Office of Technology Evaluation



U.S. Air Force C-17 Aircraft Supply Chain Impact Assessment

Final Results
November 2018

Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Who We Are:

- **Bureau of Industry and Security (BIS)**

Mission: Advance U.S. national security, foreign policy, and economic objectives by ensuring an effective export control and treaty compliance system and promoting continued U.S. strategic technology leadership

- Develops export control policies
- Issues export licenses
- Prosecutes violators to heighten national security
- Develops and implements programs that ensure a technologically superior defense industrial base

- **Office of Technology Evaluation (OTE)**

Mission: OTE is the focal point within BIS for assessing the capabilities of the U.S. industrial base to support the national defense and the effectiveness of export controls



OTE Industry Surveys & Assessments Background:

- Under Section 705 of the Defense Production Act of 1950 and Executive Order 13603, ability to survey and assess:
 - Economic health and competitiveness
 - Defense capabilities and readiness

- Data is exempt from Freedom of Information Act (FOIA) requests

- Enable industry and government agencies to:
 - Share data and collaborate in order to ensure a healthy and competitive industrial base
 - Monitor trends, benchmark industry performance, and raise awareness of diminishing manufacturing and technological capabilities



OTE/OEA C-17 Project Overview

- Partnership with the U.S. Department of Defense, Office of Economic Adjustment (OEA), and in coordination with the City of Long Beach, to conduct a comprehensive survey and assessment of the C-17 aircraft supply chain industrial base
- Three Phase Project:
 - Phase I: C-17 Excess Tooling and Equipment Transfer Completed - 2015
 - Phase II: Survey Development and Industry Deployment
 - Phase III: Survey Compliance and Final Results



Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



What is the C-17 Globemaster III Aircraft?

C-17 Aircraft Program

- The first C-17 production model was delivered to Joint Base Charleston, S.C. on June 14, 1993
- The USAF capped its C-17 fleet at 223 aircraft; its final delivery was on 12 September 2013



- **Notable C-17 Missions**

- Operation Allied Force
- Operation Iraqi Freedom
- Operation Enduring Freedom
- 2010 Earthquake Humanitarian Relief
- 2011 Pakistan Flood Relief

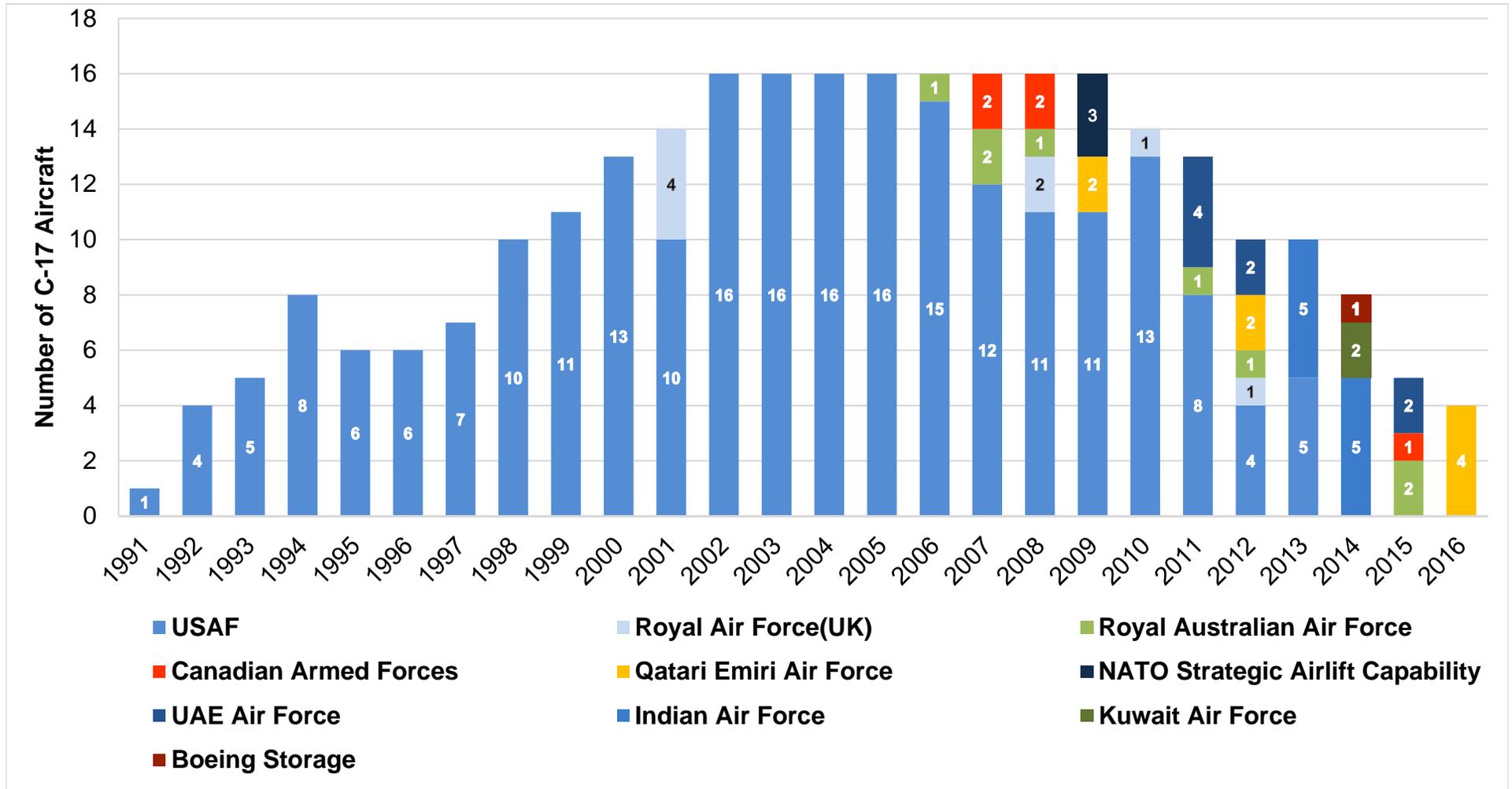
Achievements of the C-17 Program

- The C-17 Globemaster III is the most flexible cargo aircraft to enter the airlift force
- The C-17 flew half of the strategic airlift missions in the Kosovo and Operation Allied Force
- The C-17 was awarded U.S. aviation's most prestigious award, the Collier Trophy, in 1994





C-17 Aircraft Production by Year



Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Phase II: Survey Development and Deployment

- **Survey Development and Outreach**

- Develop survey data collection topics such as production, employment, financials, R&D, and competitive outlook
- Conduct initial site visits to better understand the impact of the loss of C-17 aircraft sales on the industrial supply chain
- Design, develop, and circulate the draft survey template for feedback from select organizations

- **Survey Approval**

- Formally field test final version of C-17 aircraft supply chain survey
- Obtain Office of Management and Budget (OMB) C-17 aircraft survey approval

- **Survey Deployment**

- Format and code approved survey template
- Distribute survey to all identified C-17 aircraft suppliers
- Conduct respondent compliance to ensure quality and timely data analysis



Methodology - C-17 Aircraft Assessment

- Organization size was established based on sales from C-17 related products manufactured in the U.S.
 - Small: Under \$10M in annual sales
 - Medium: \$10M-\$50M in annual sales
 - Large: Over \$50M in annual sales
- BIS received responses from over 420 organizations, representing 544 facilities. Organizations were categorized by business type:
 - Distributor
 - Engineering Firm
 - Holding Company
 - Laboratory
 - Manufacturer
 - Non-Profit
 - Research & Development Firm
 - Service Provider
 - Testing Facility



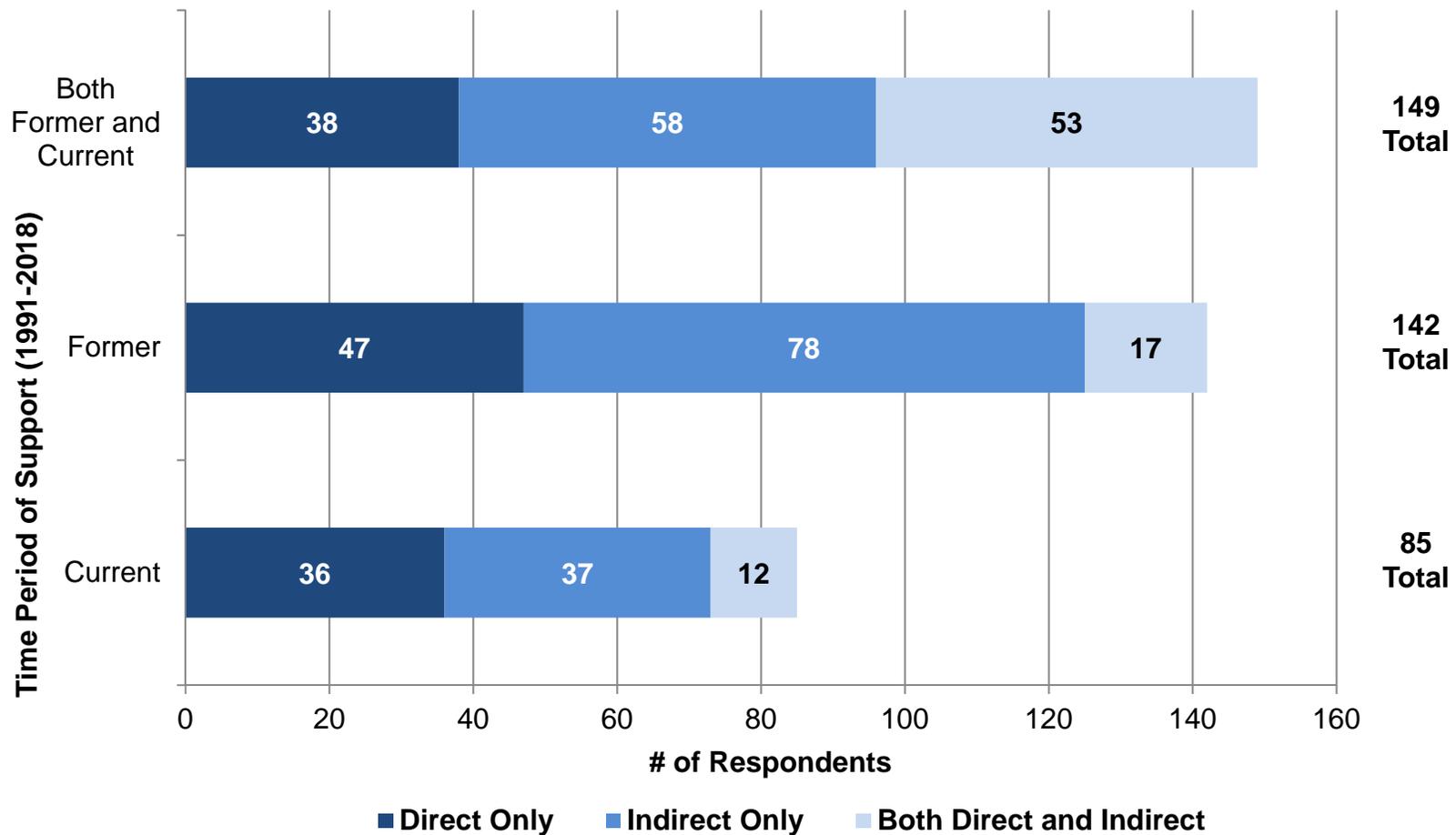
Methodology - C-17 Aircraft Assessment

- Scope of survey and assessment was limited to organizations with U.S. operations that supported the C-17 program
 - OTE used a list of suppliers provided by the prime contractor and combined it with an internal list, which was accumulated through previous Defense Industrial Base studies and other suppliers identified by C-17 supplier organizations
- Survey exemption requests were handled individually and The Boeing Company was consulted on some cases
 - If Boeing and the USAF was not a customer since 2012 and the respondent's products/services were generic, an exemption would be provided
 - Respondents that had Boeing and/or the USAF as a customer since 2012 but were unaware of specific C-17 support were NOT provided an exemption generally



Type of Supply Chain Support

Self-Identified Support of C-17 Program by Type and Time Period (1991-2018)



QRP, A1

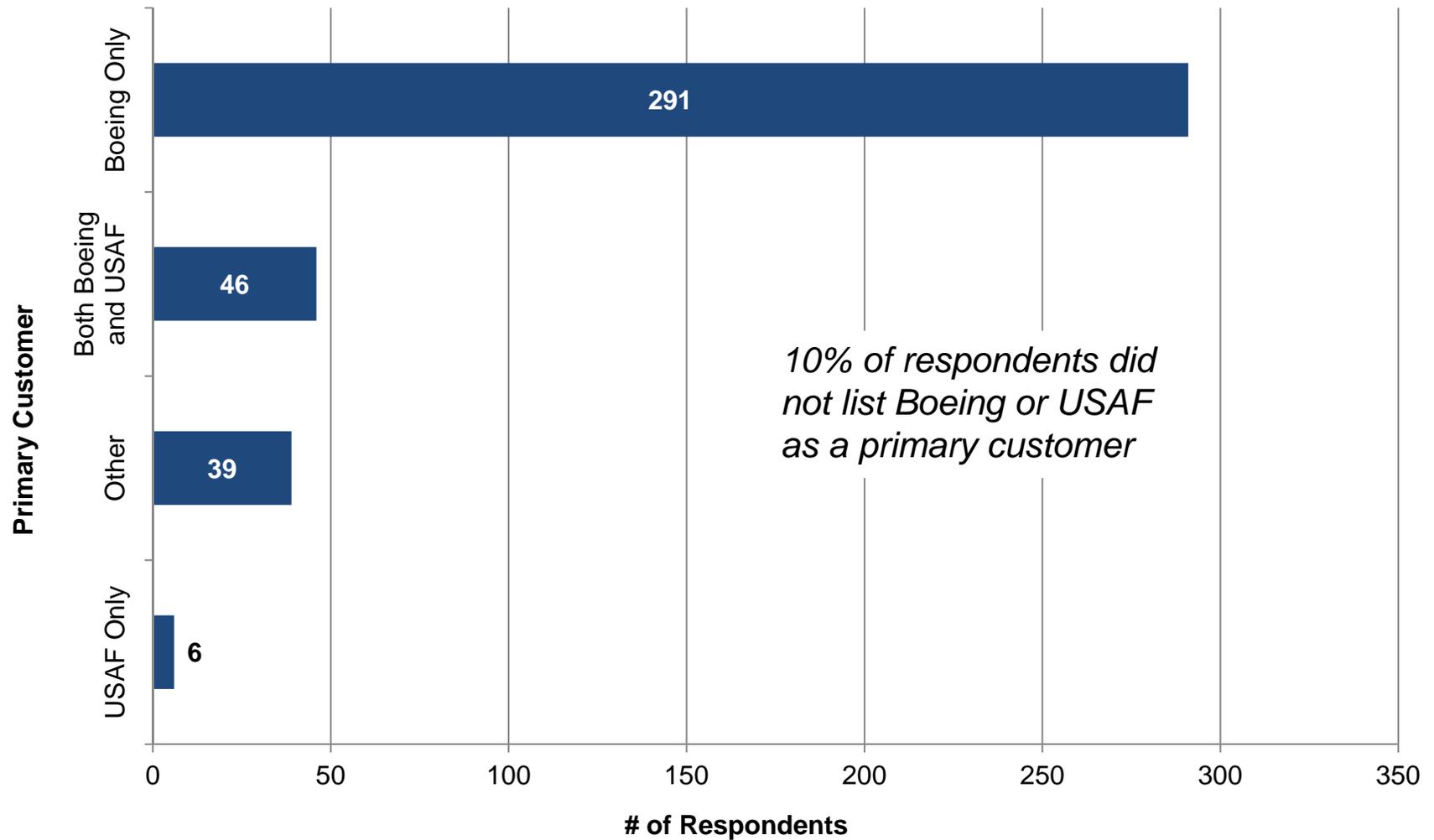
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

376 Respondents



Primary Customer: USAF or Boeing

Primary Customers for Known Support of C-17 Program



QRP, A1

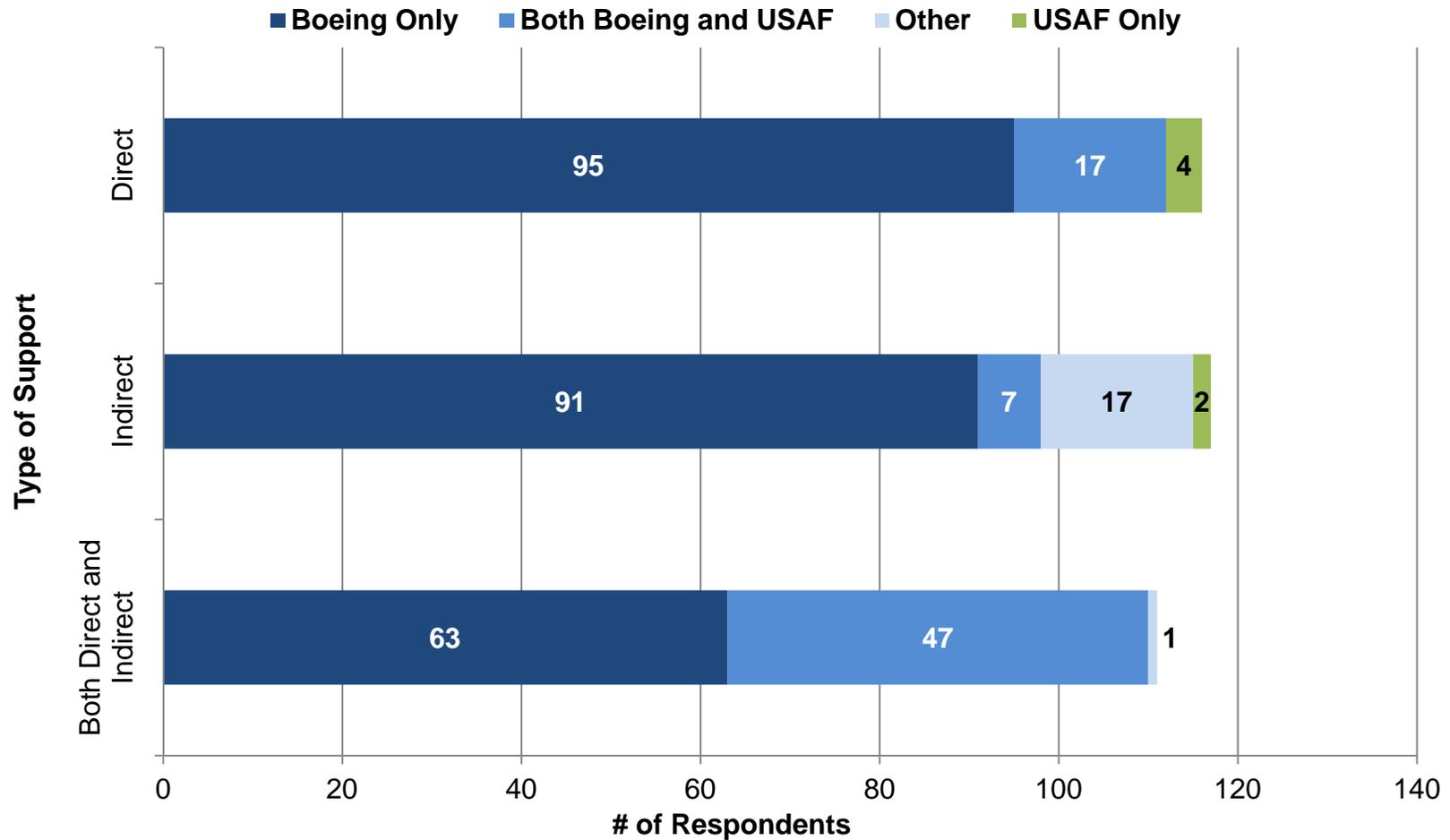
382 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Respondent Profile

Type of Support to USAF or Boeing



QRP, A2

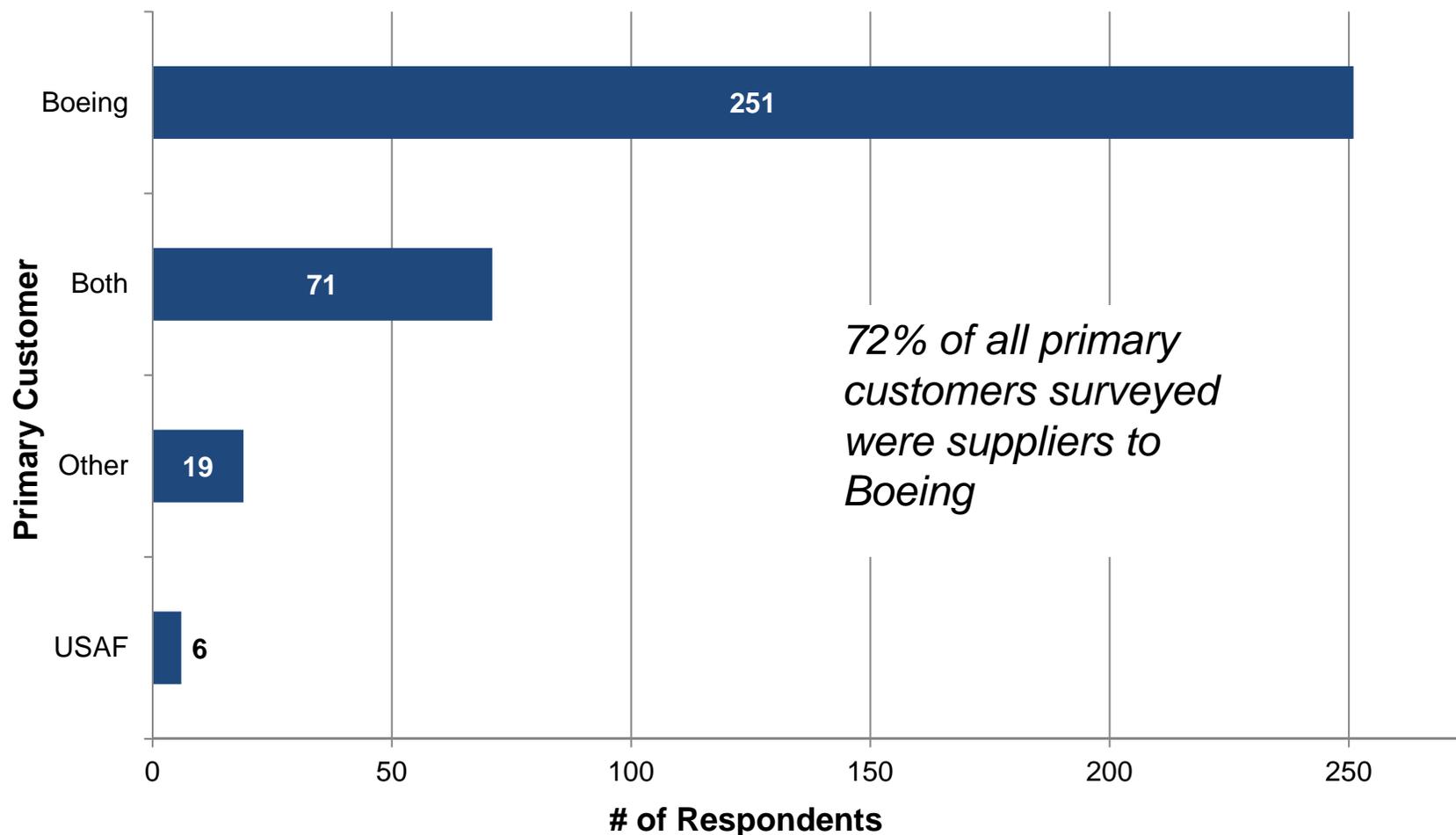
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

344 Respondents



Respondent Profile

Primary Customers of Suppliers to Boeing and USAF



QRP, A2

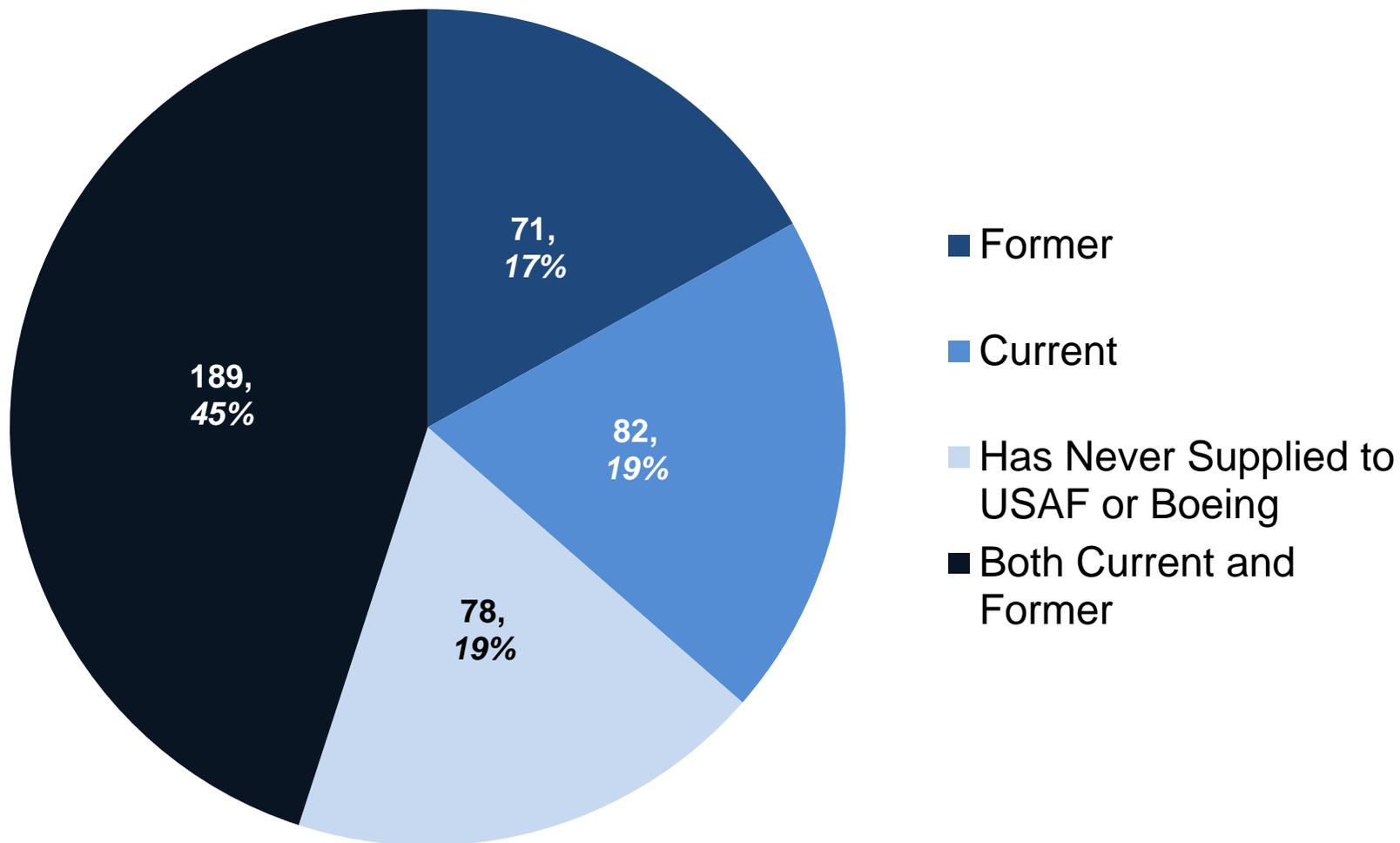
347 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Support of C-17 Program

Suppliers of USAF or Boeing with C-17 Support



QRP, A2

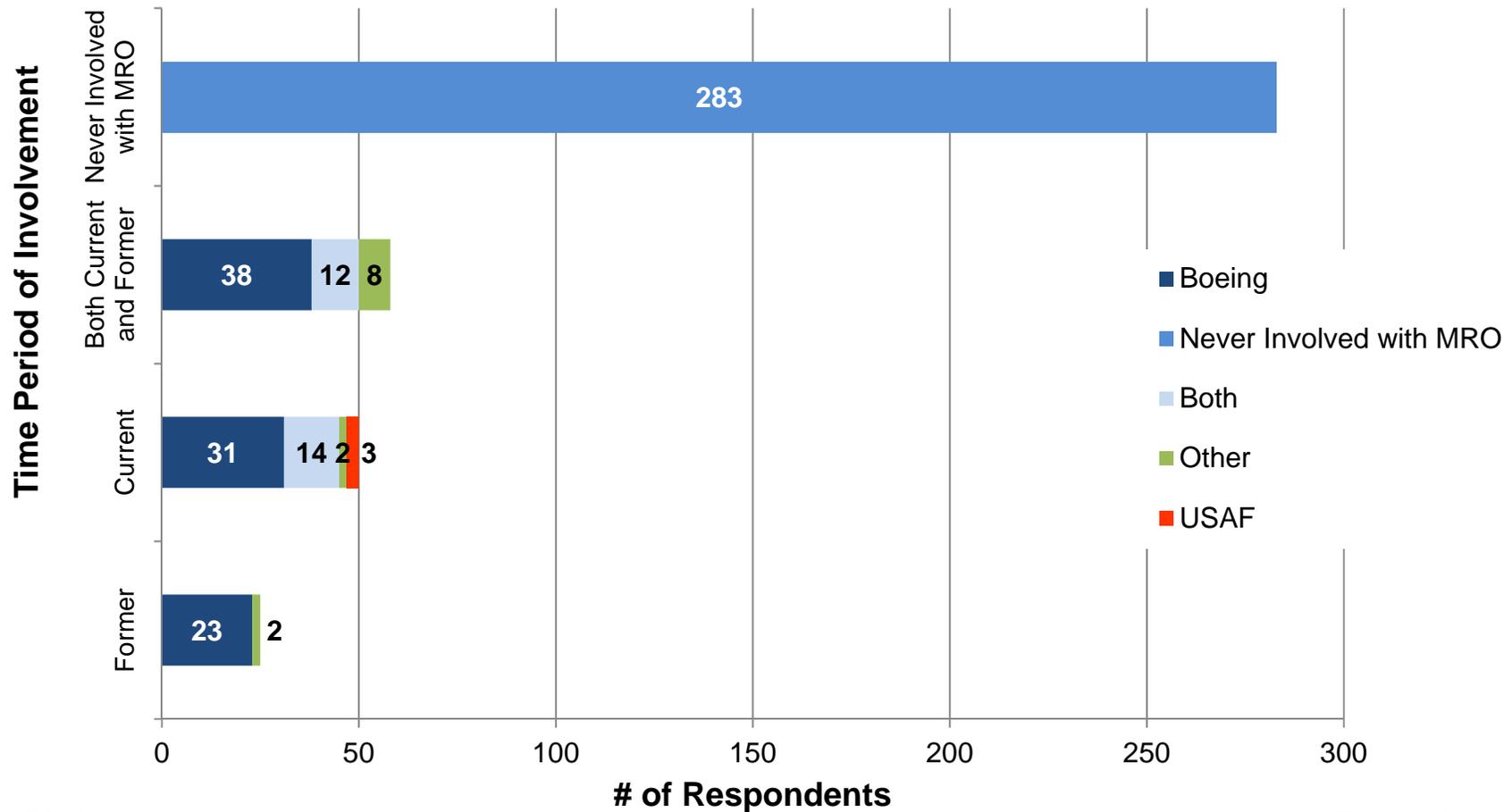
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Respondent Profile

Involvement with the Maintenance, Repair, and Overhaul of C-17 Program by Time Period and Primary Customer



QRP, A3

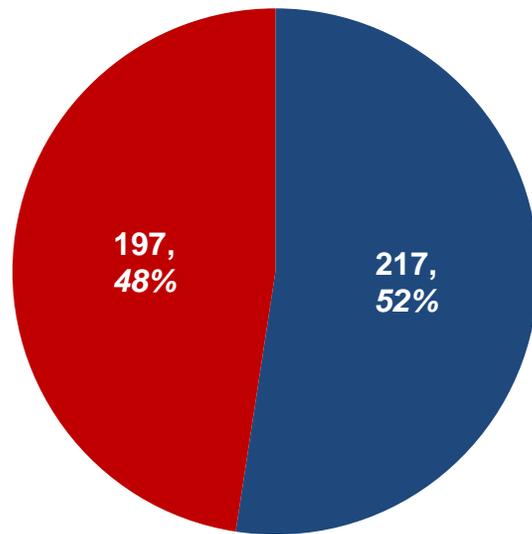
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

416 Respondents



Small Business Qualifications

Does Your Business Qualify as any of the Following Types?



■ Yes ■ No



Types of Business	
Small Business	194
8 (a) Firm	4
HUBZone	17
Minority-owned	26
Woman-owned	48
Veteran-owned/service-disabled veterans	15

Several respondents qualified for more than one of the drop downs

194 out of 420 respondents identified as a small business

Q1a, C

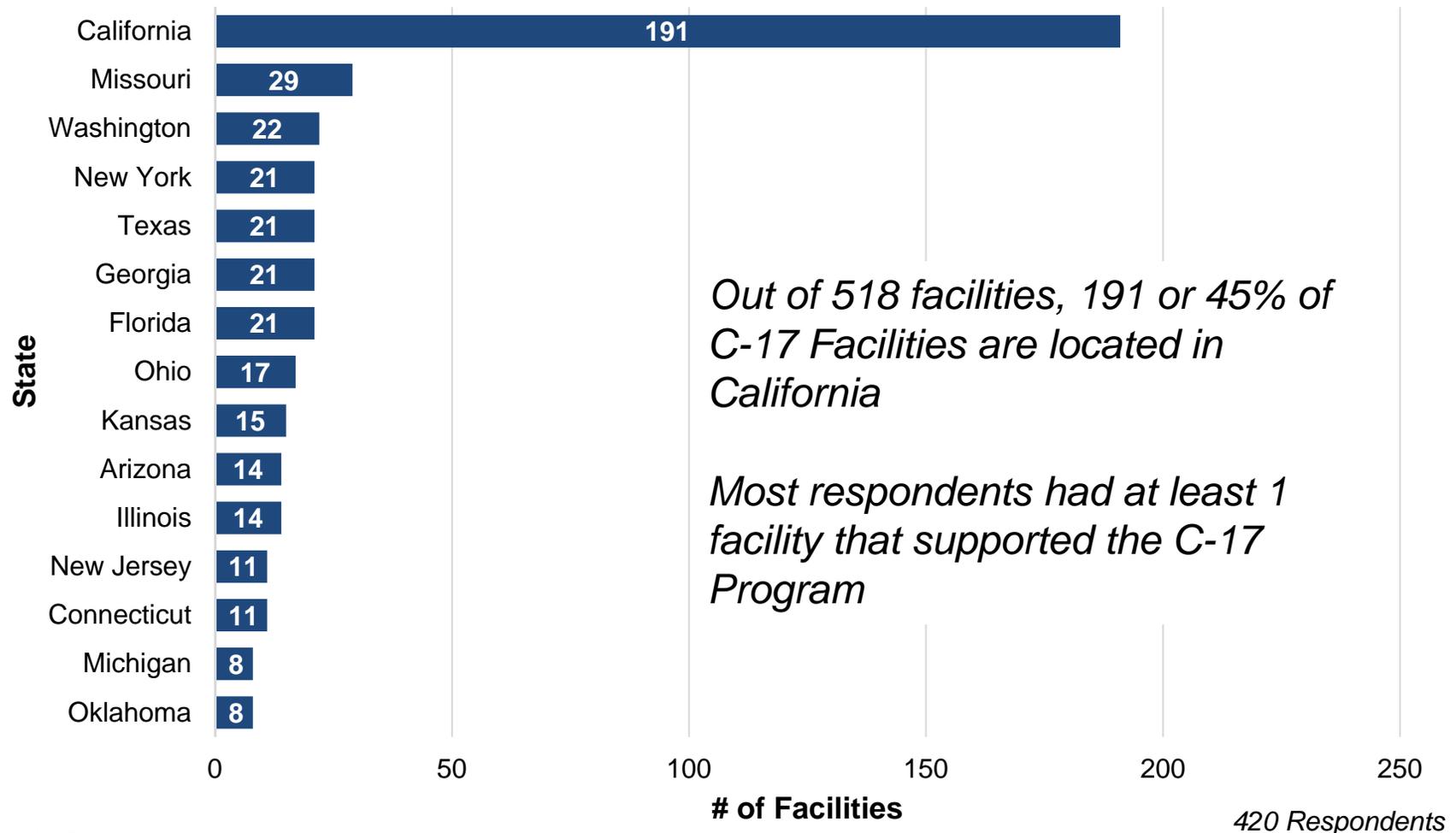
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

414 Respondents



C-17 Facility Support

Number of Facilities That Have Supported C-17 Program By State

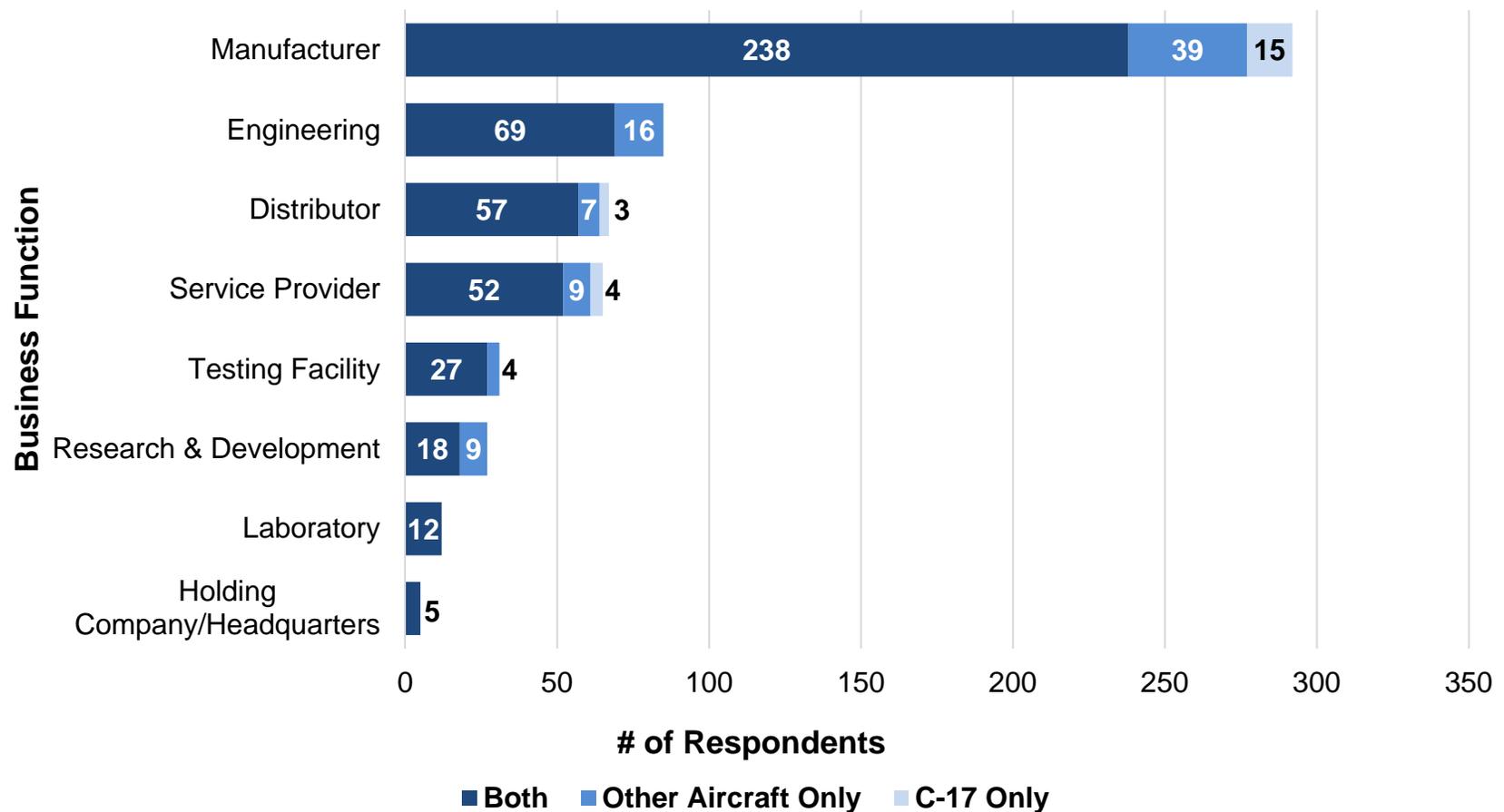


Q1b, B

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Business Functions With C-17 Support Number of C-17 Respondents By Type of Business Function



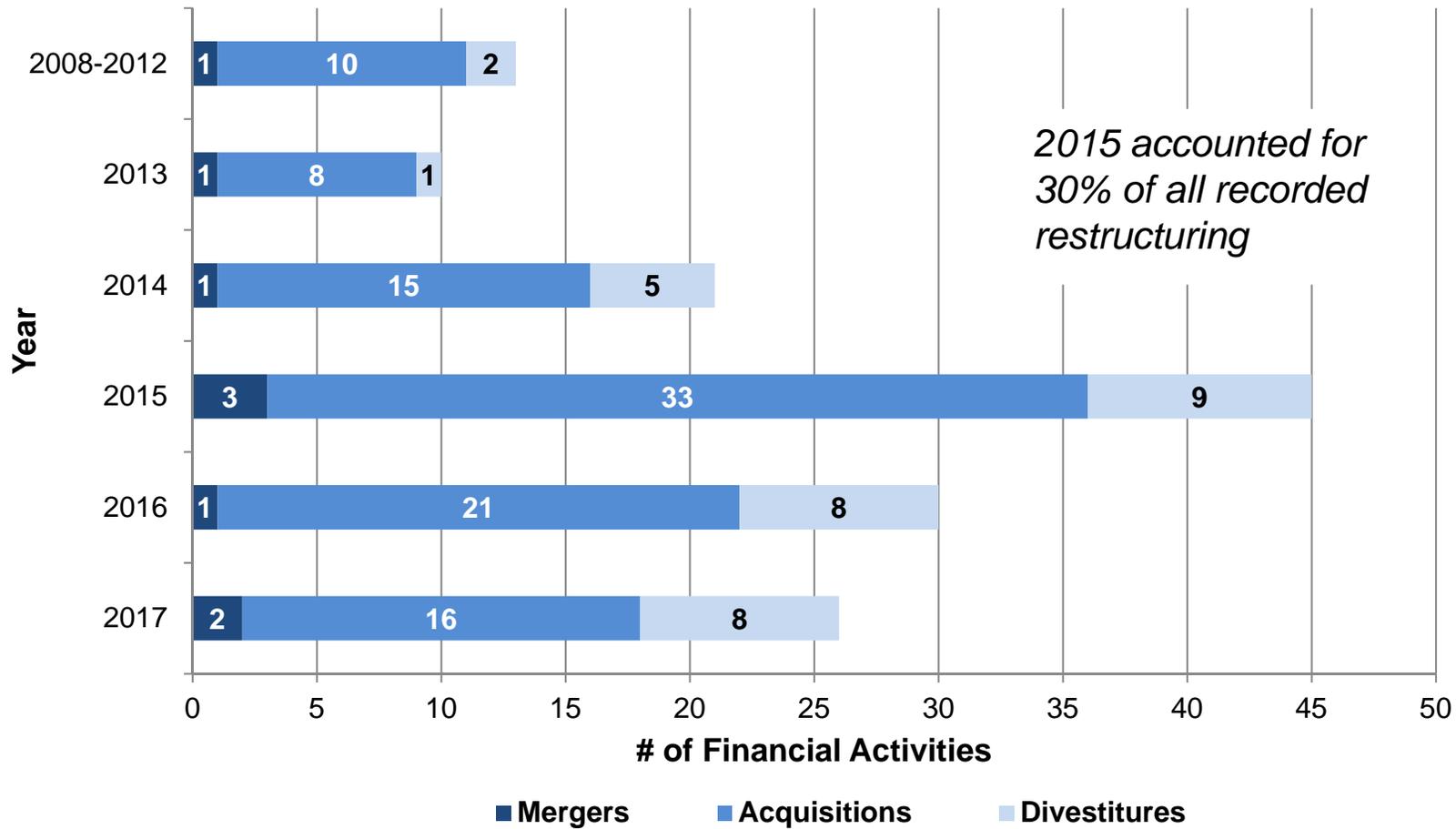
Q1c, B

420 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Types of Company Restructuring per Year Mergers, Acquisitions, and Divestitures from 2012-2017



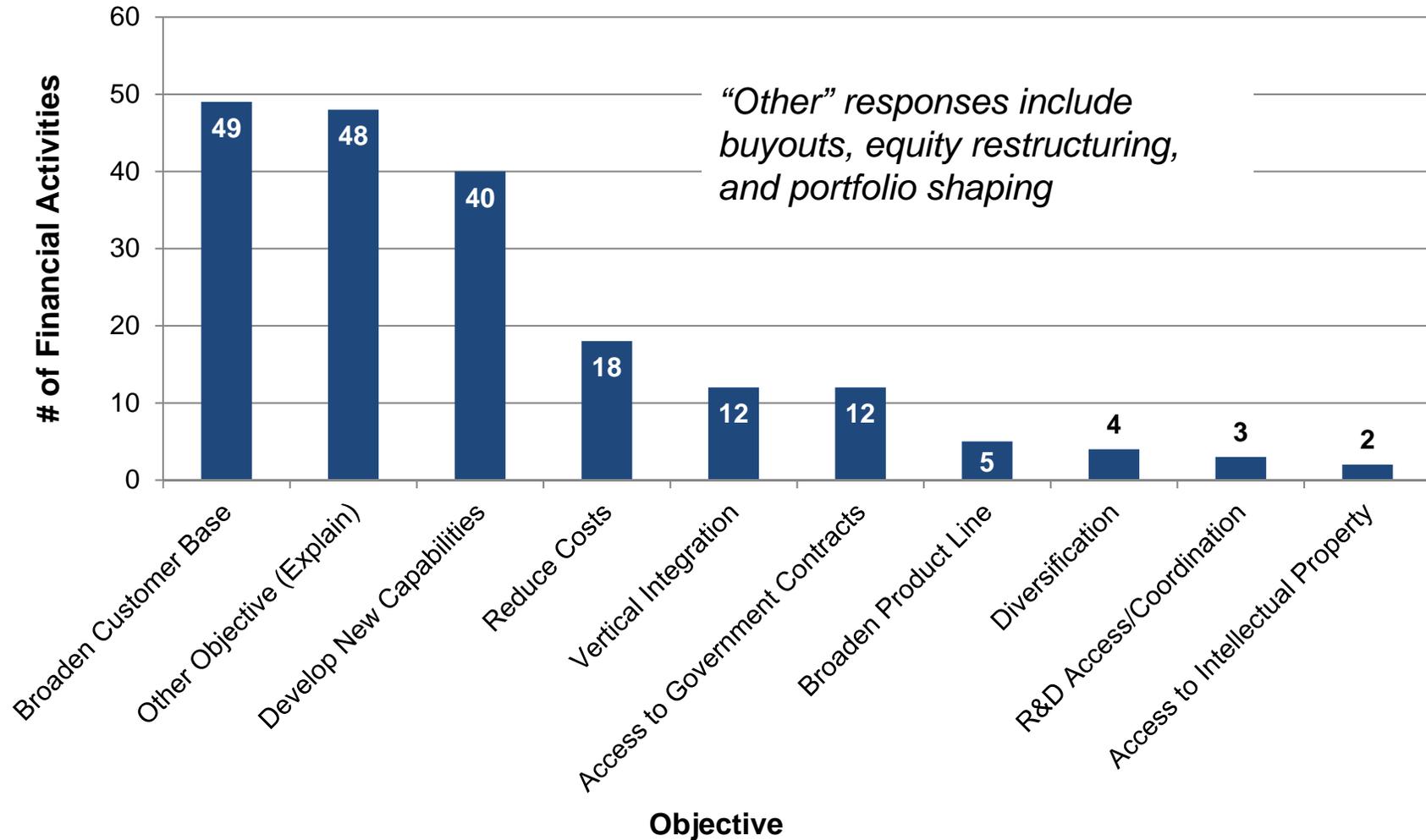
Q2, A & B

Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Acquisitions, Divestitures, and Mergers Primary Objectives



Q2, A

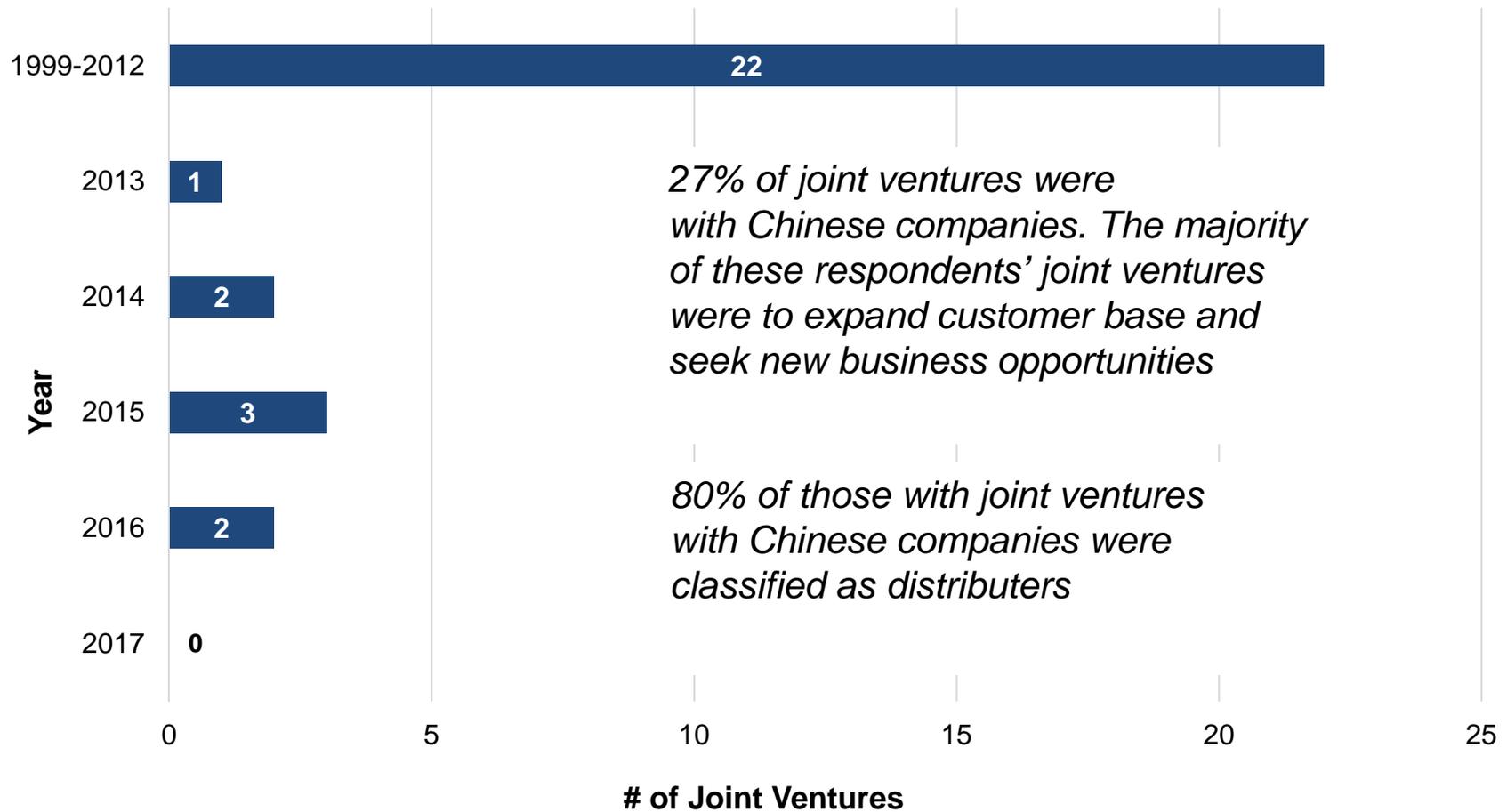
Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Joint Ventures Per Year

Joint Venture Activities from 1999-2017



Q2, A

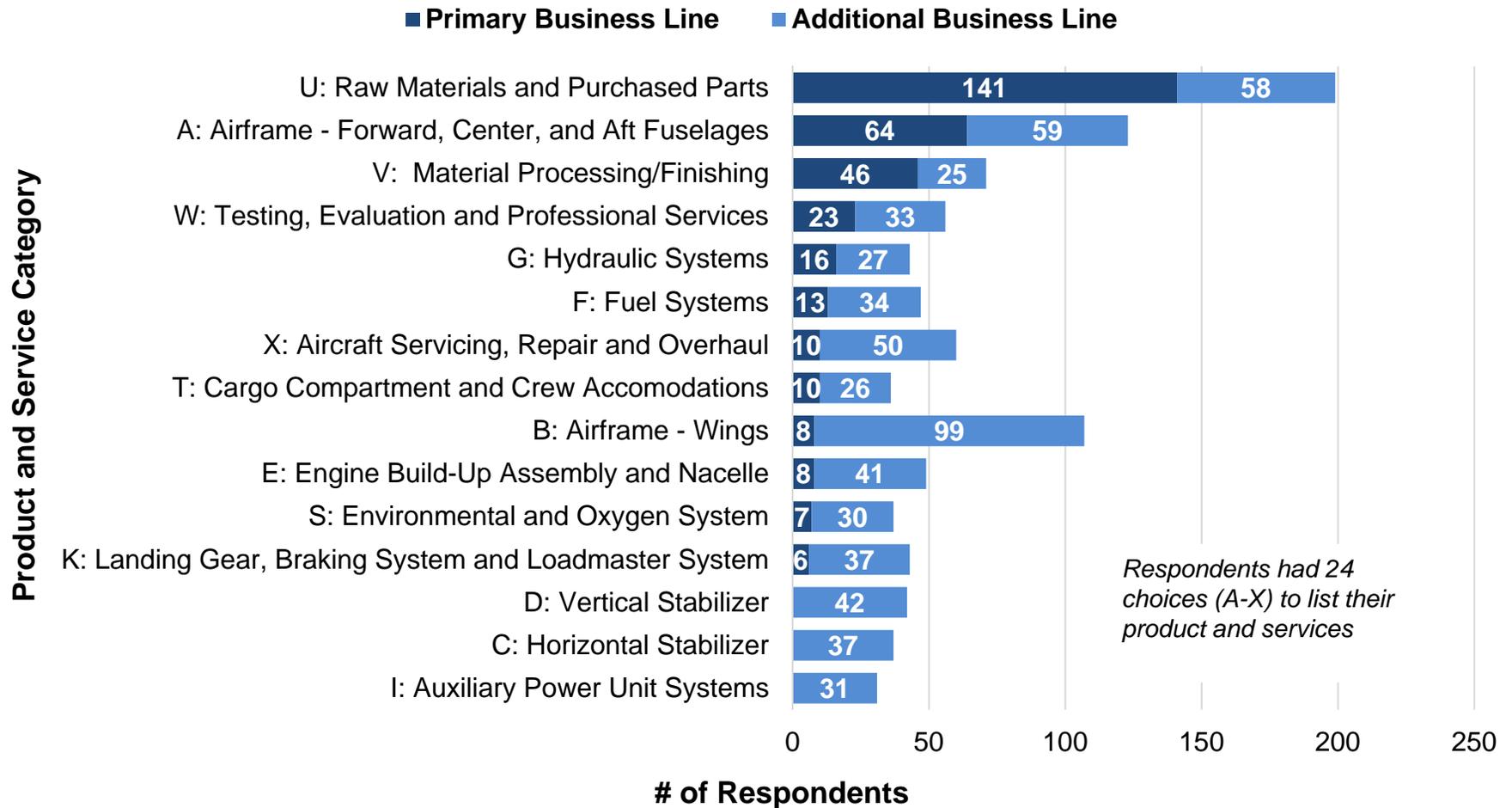
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Products and Services

Top Products and Services Provided



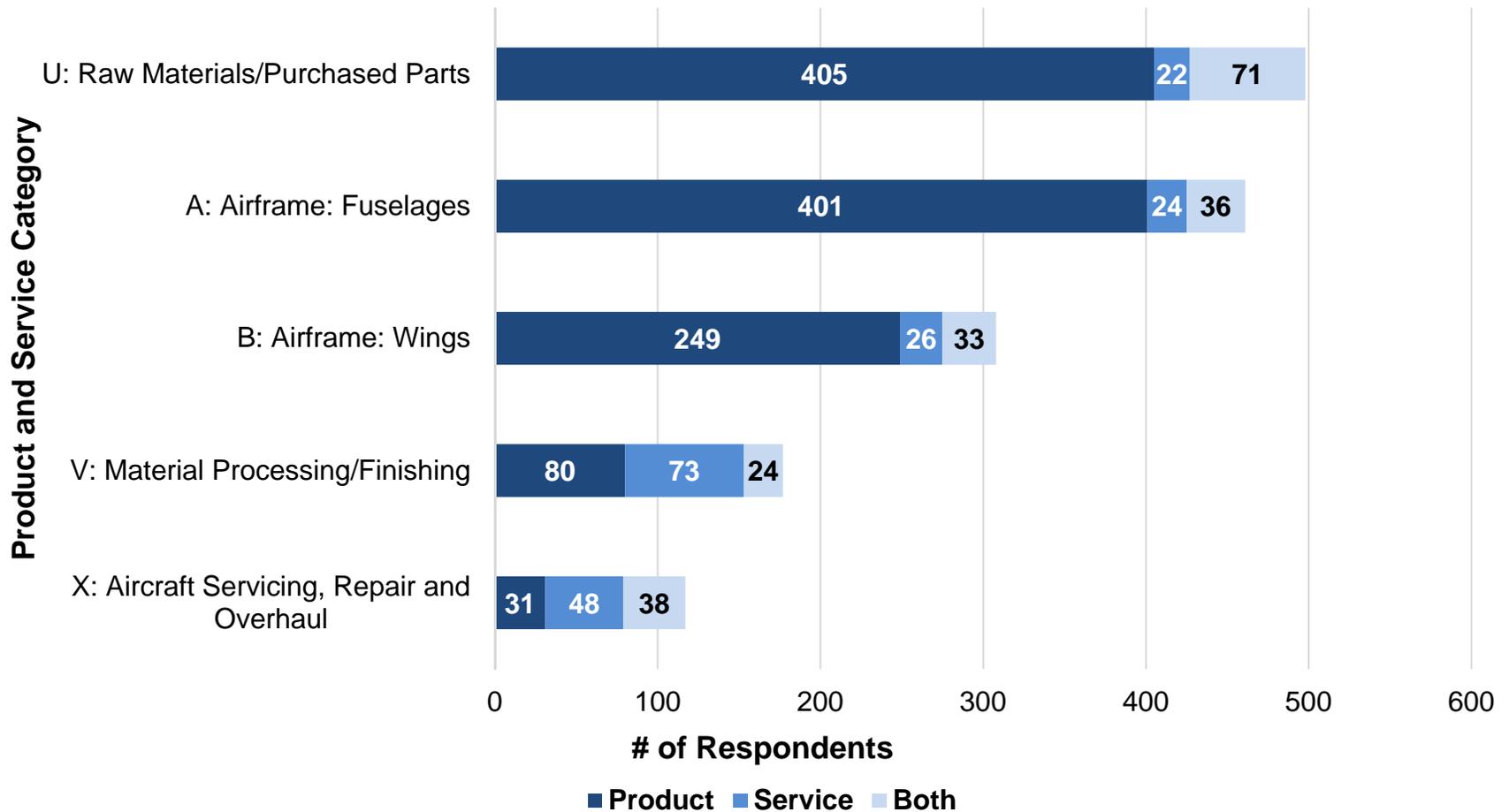
Q3, A

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Primary Business Lines Top 5 Out of 24 Business Lines



Q3, C-E

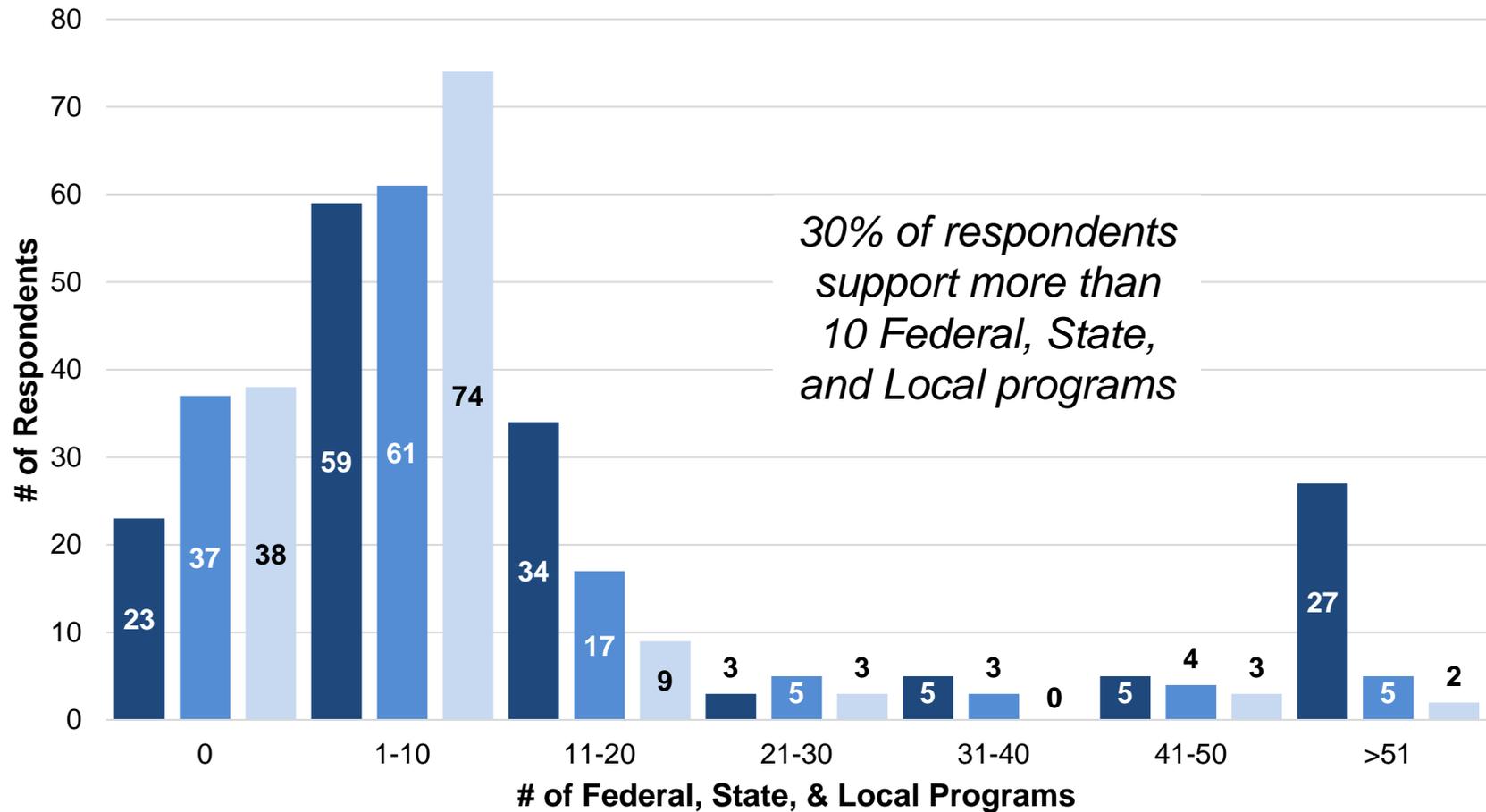
420 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Program Participation

Number of Federal, State, and Local Programs Supported Since 2012



■ Large Companies ■ Medium Companies ■ Small Companies

Q4, A

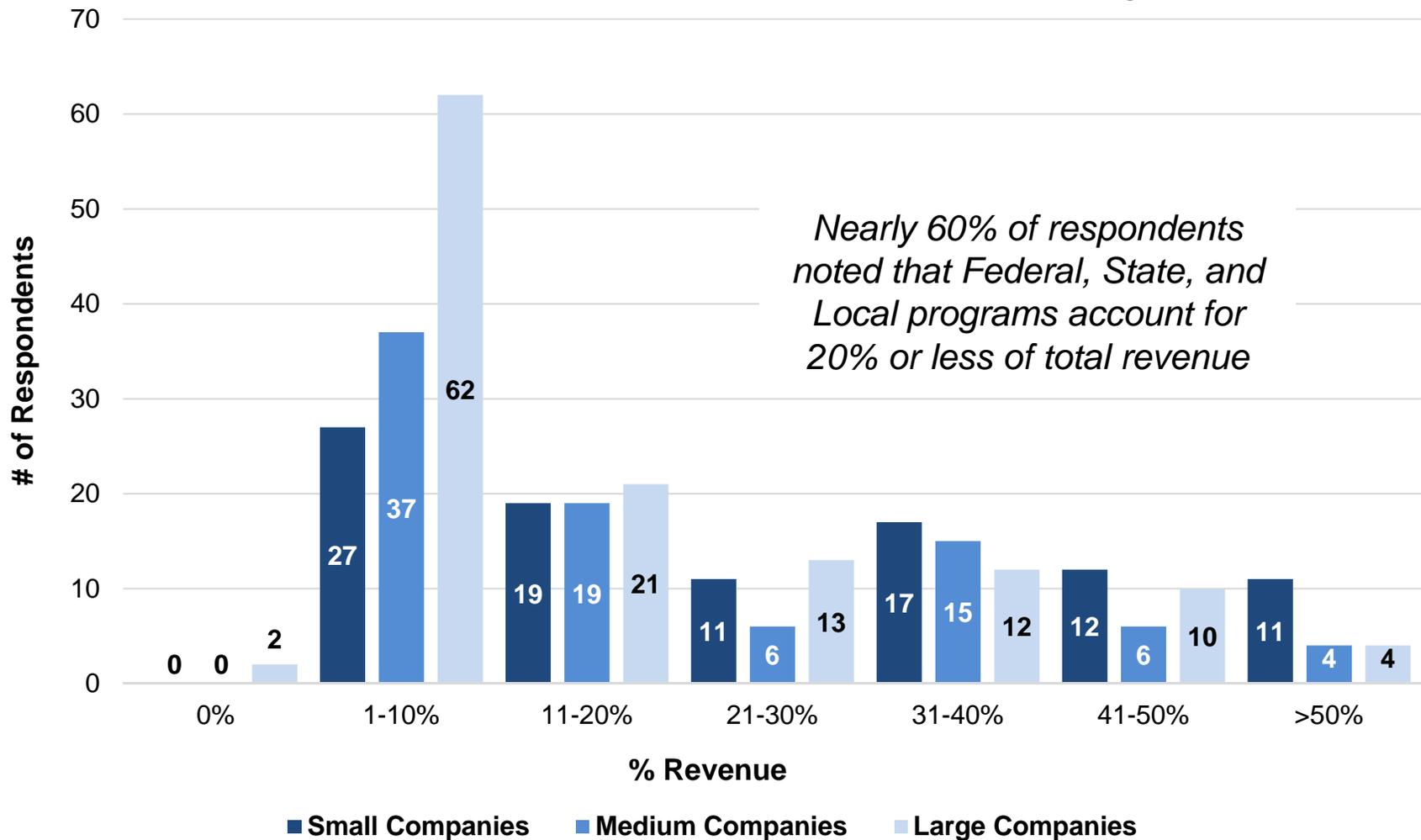
420 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Program Participation

Revenue Attributable to Federal, State, and Local Programs



Q4, B2

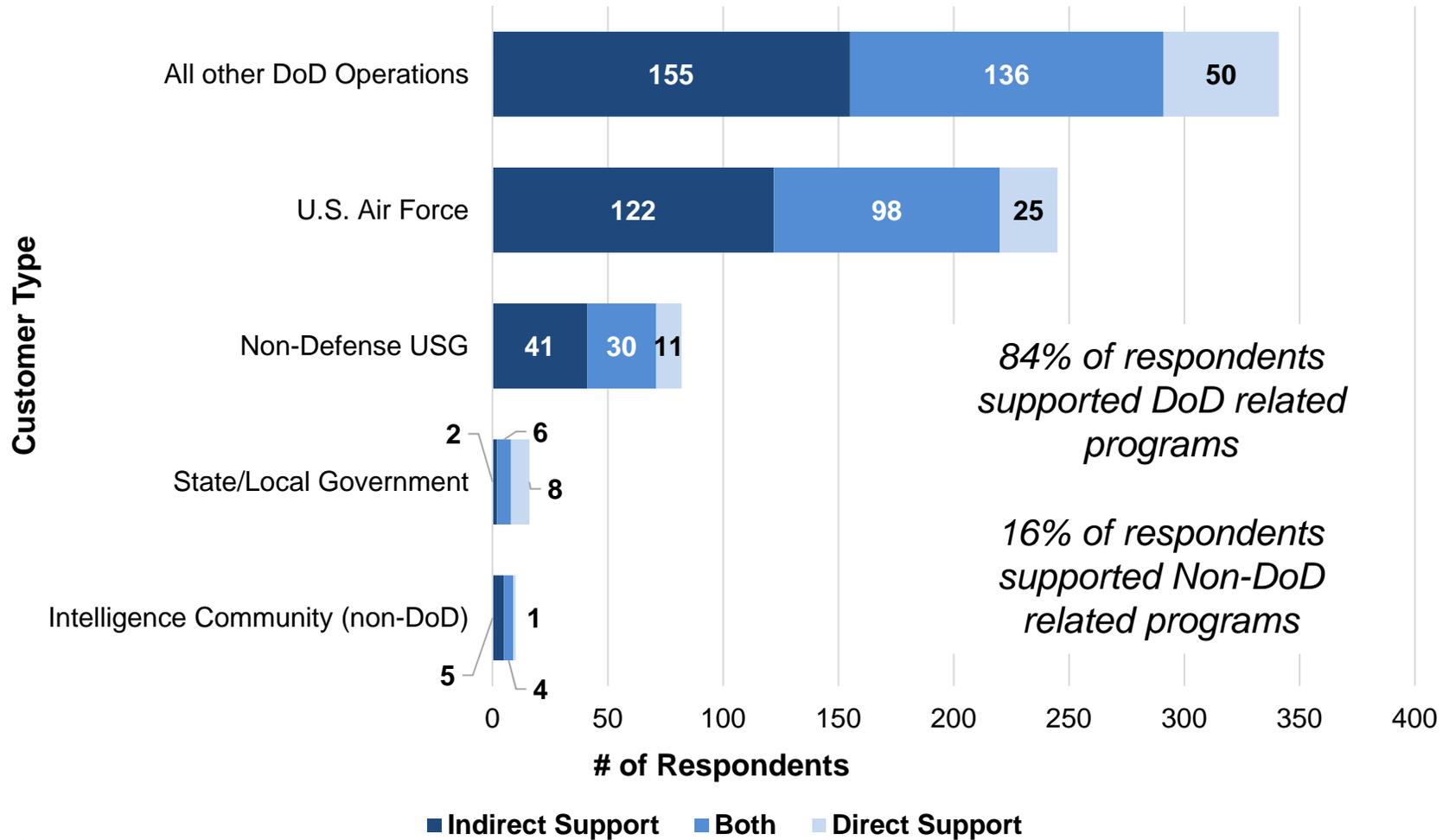
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Program Participation

Top Federal, State, Local Customers Since 2012 by Support Type



Q4, B3

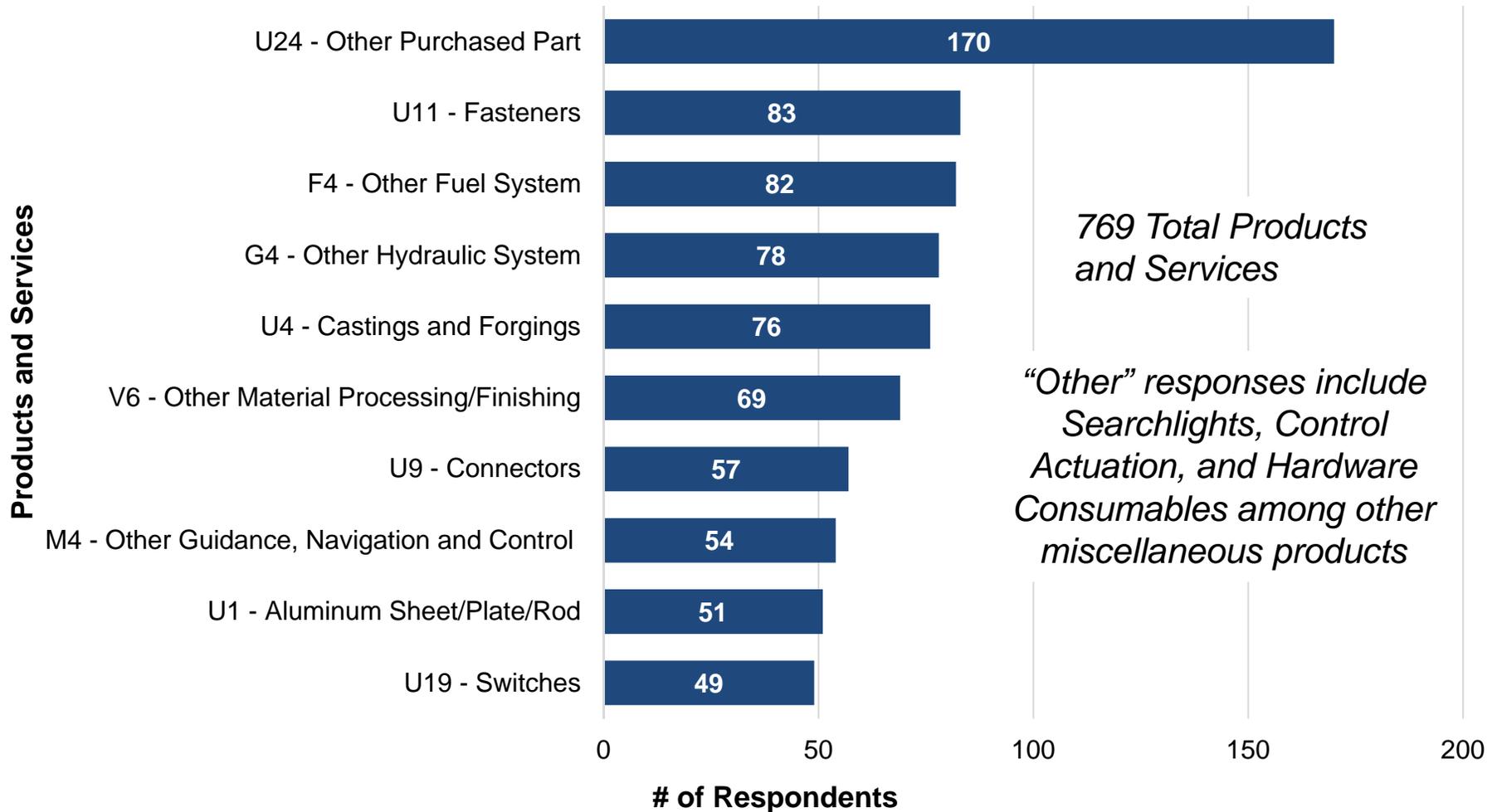
420 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



USG Programs Support

Top 10 Products/Services Supported through USG Work



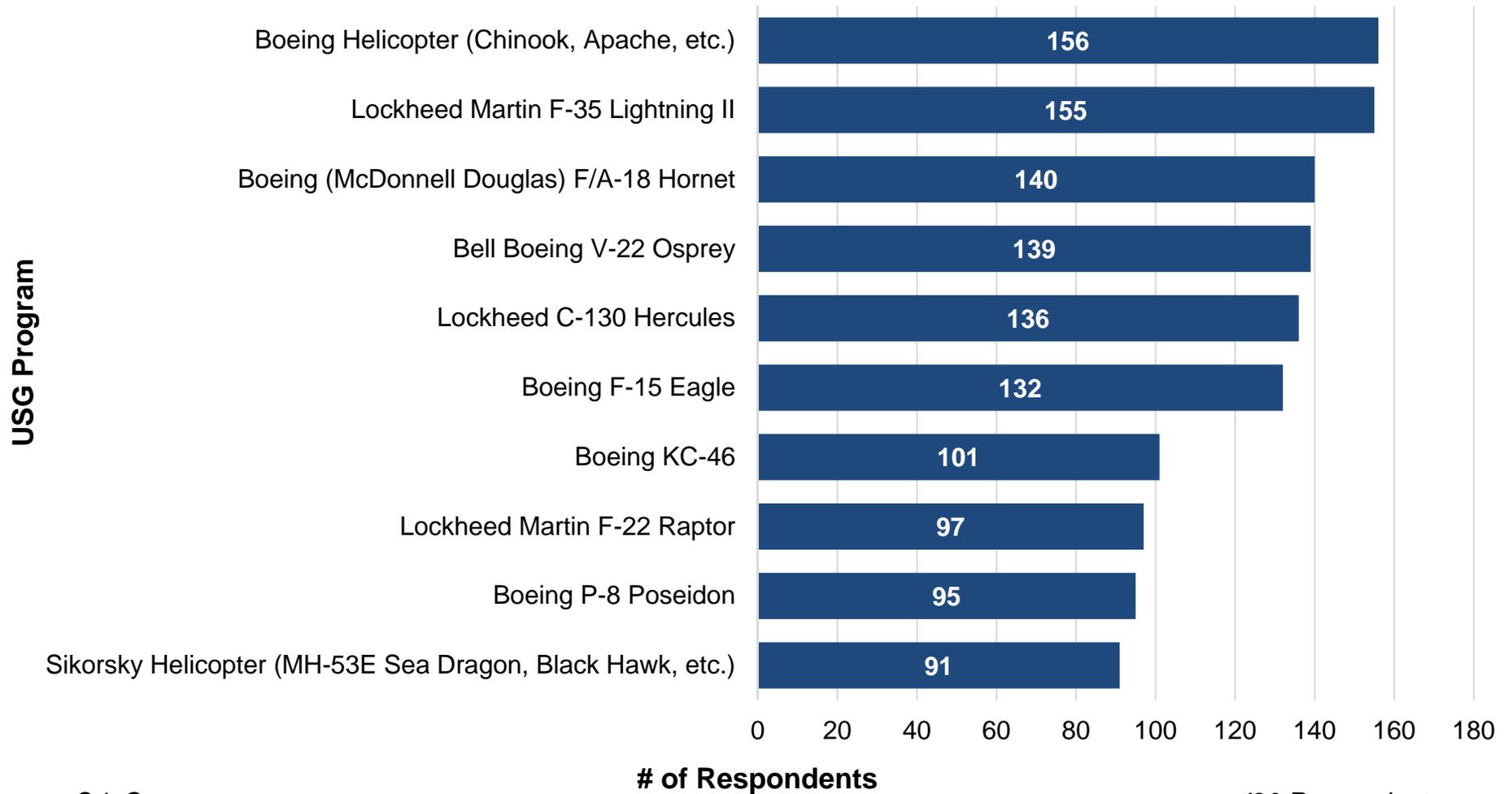
Q4, C

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



USG Program Support Top 10 DoD Programs Supported



Q4, C

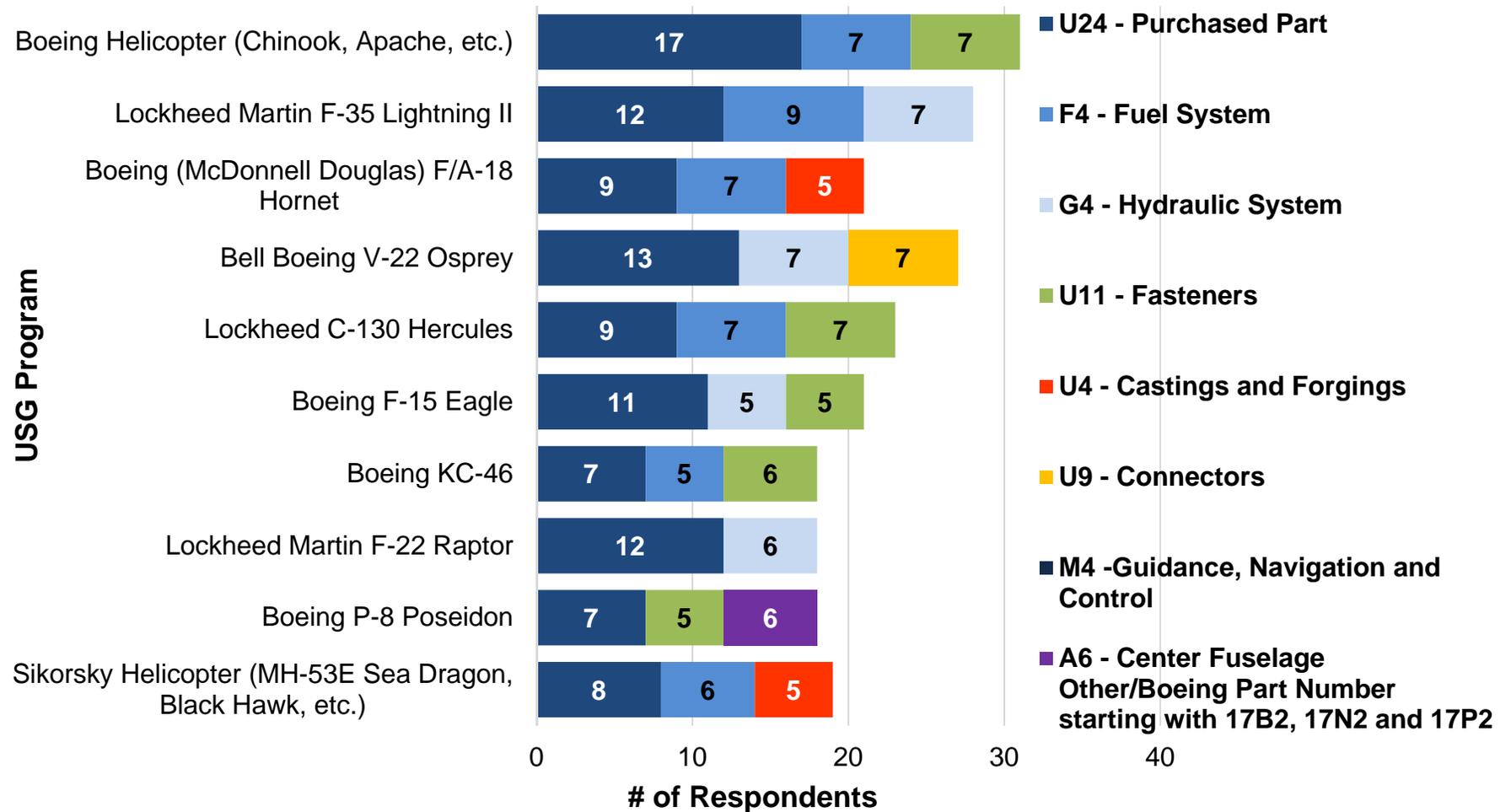
Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



USG Program Support

Top 3 Primary Products/Services Supported by DoD Program



Q4, C

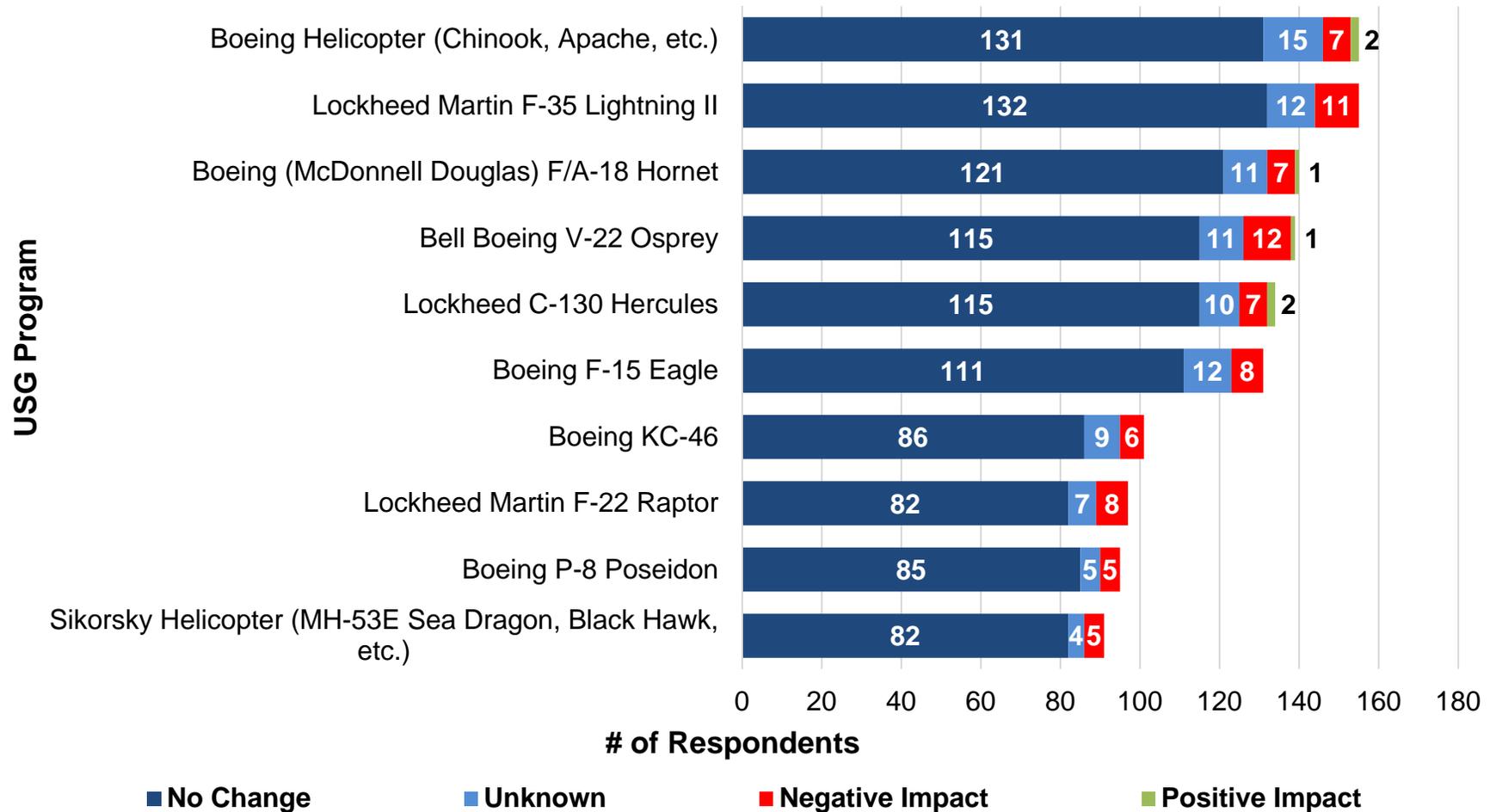
420 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



USG Program Support

Top DoD Programs Supported and C-17 Termination Impact



Q4, C

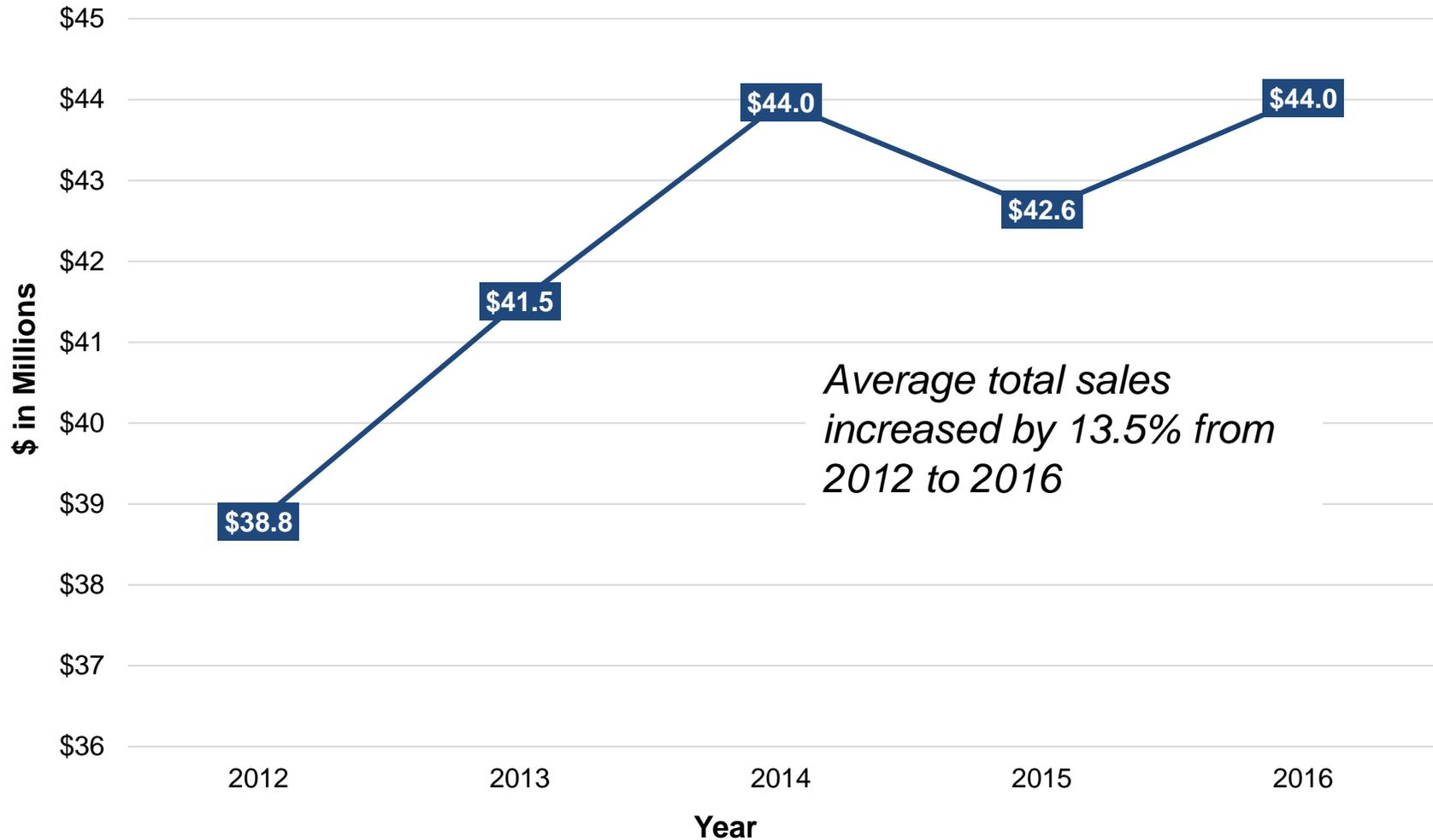
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Sales and Customers

Average Sales Per Year 2012-2016



Q5, A

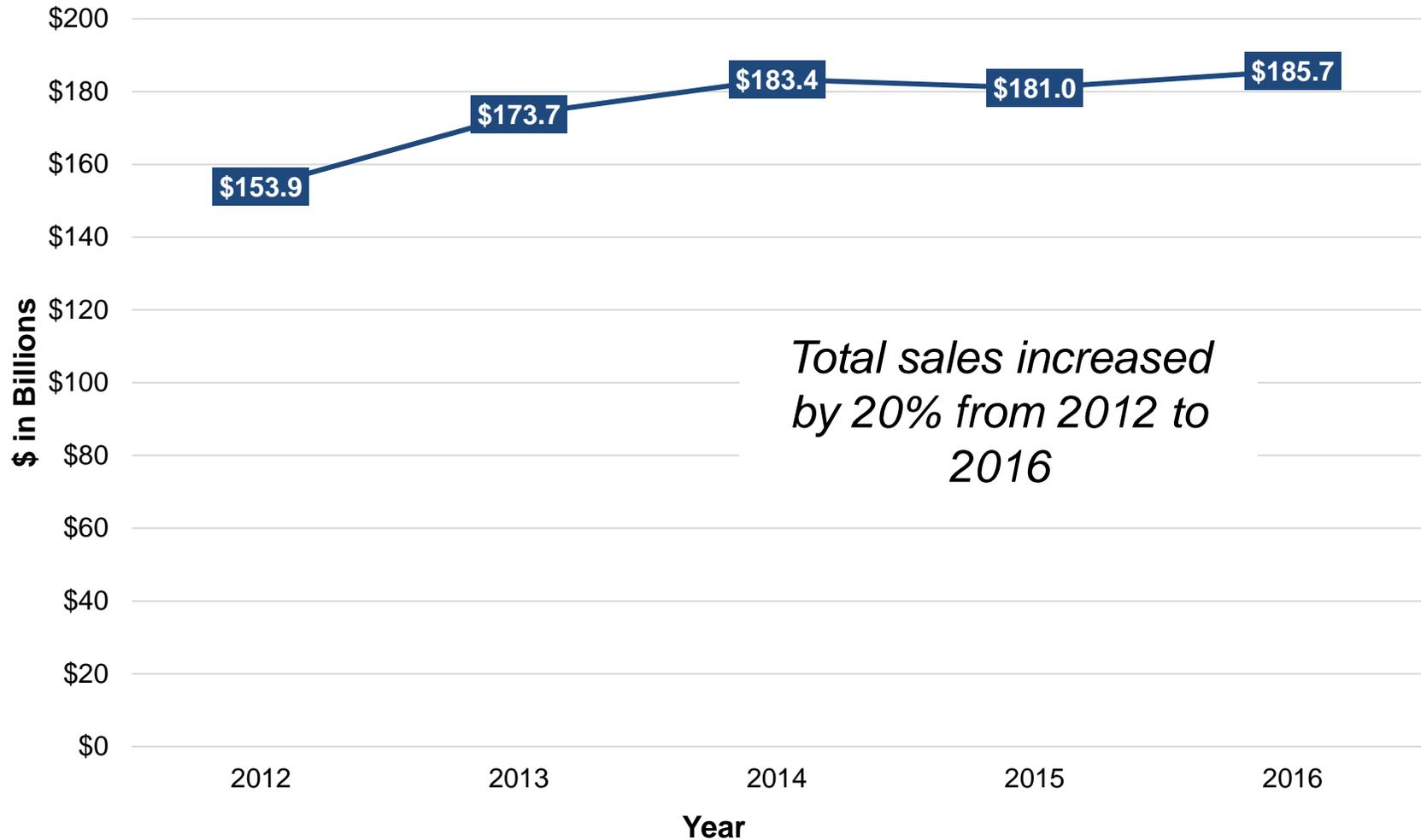
Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Sales and Customers

Aggregate Sales Per Year: 2012-2016



Q5, A

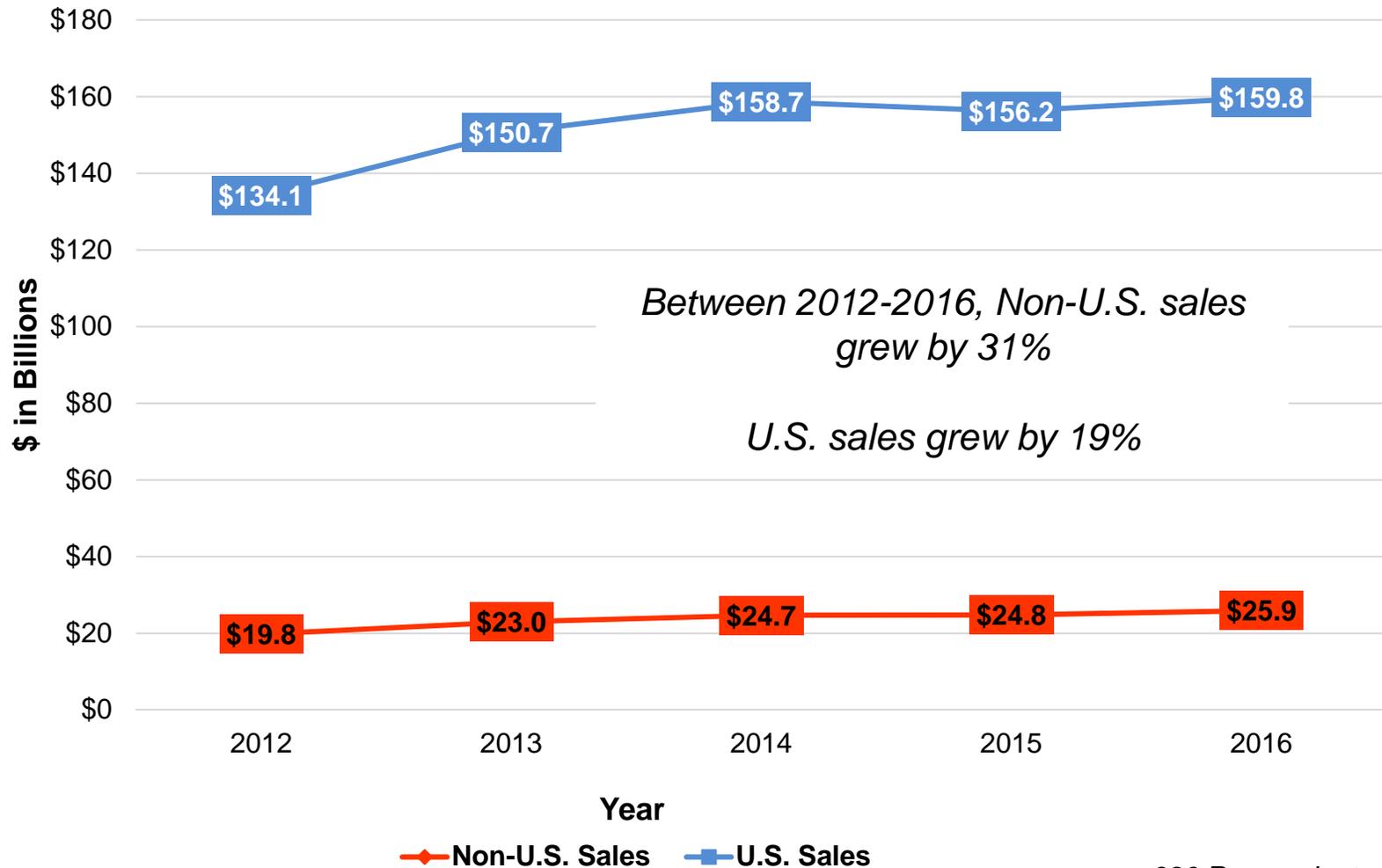
420 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Sales and Customers

Aggregate U.S. and Non-U.S. Sales: 2012-2016



Q5, A-B

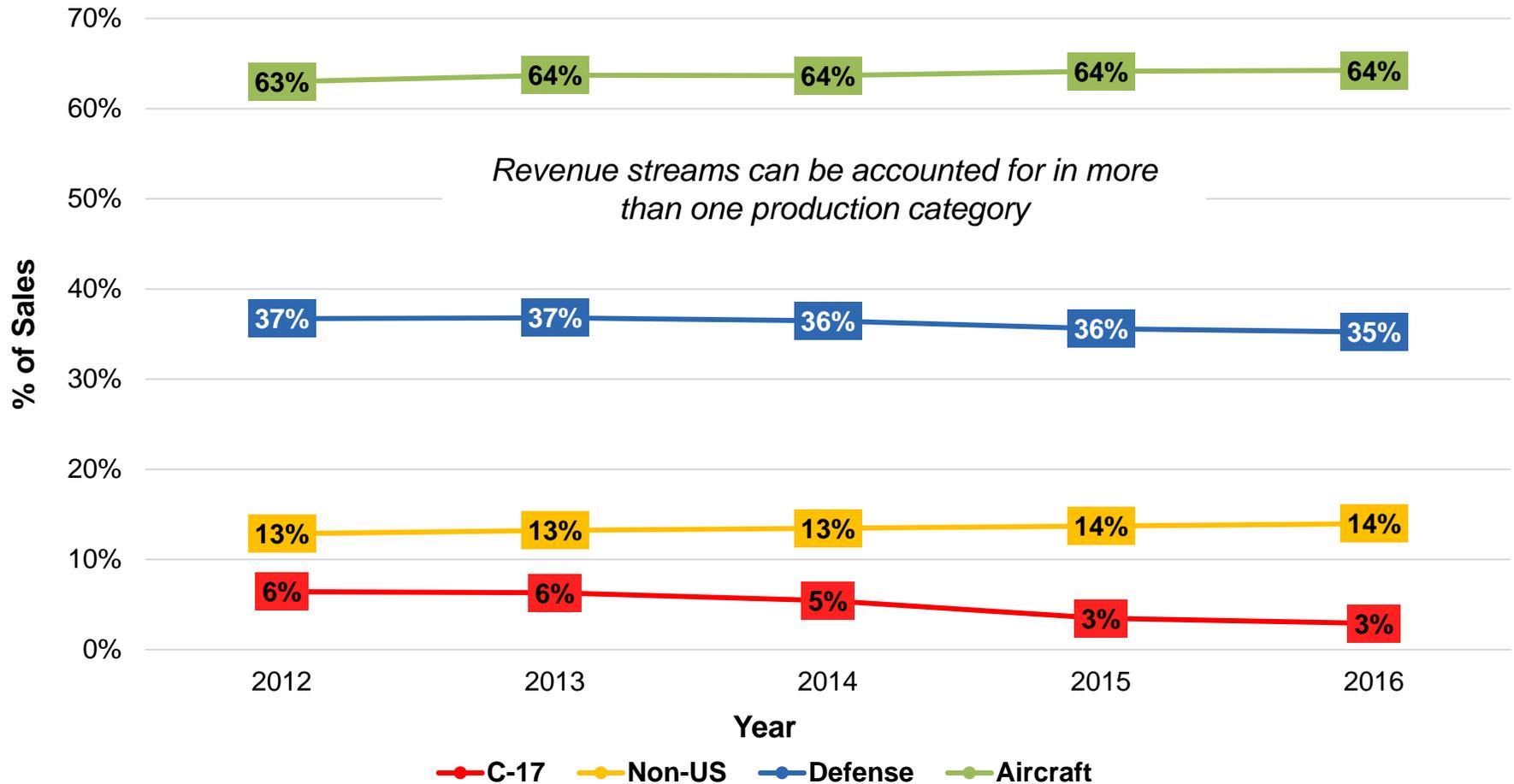
396 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Average Percentage of Attributable Sales

Broken Down By Category: 2012-2016



Q5, B-E

420 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Sales and Customers

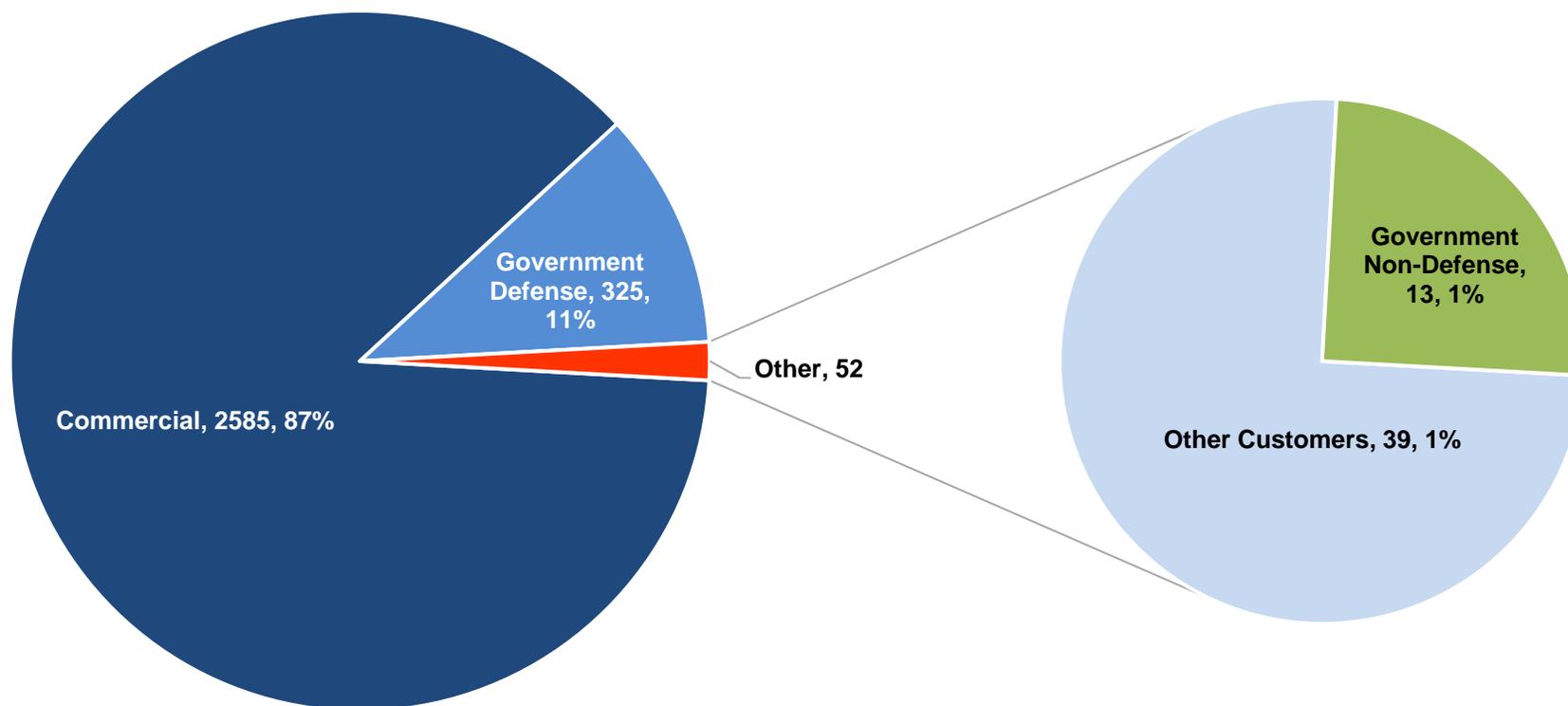
Estimated Direct Customers Per Respondent: 2012-2016

- 420 respondents supported an estimated 433,000 direct customers
- The average respondent supported 182 direct customers
- Only 77 respondents reported over 1,000 direct customers
 - 57% (44) of these respondents were categorized as distributors



Type of Customer Supported

Number of Respondents By Type of Customer 2012-2016



Q5, B

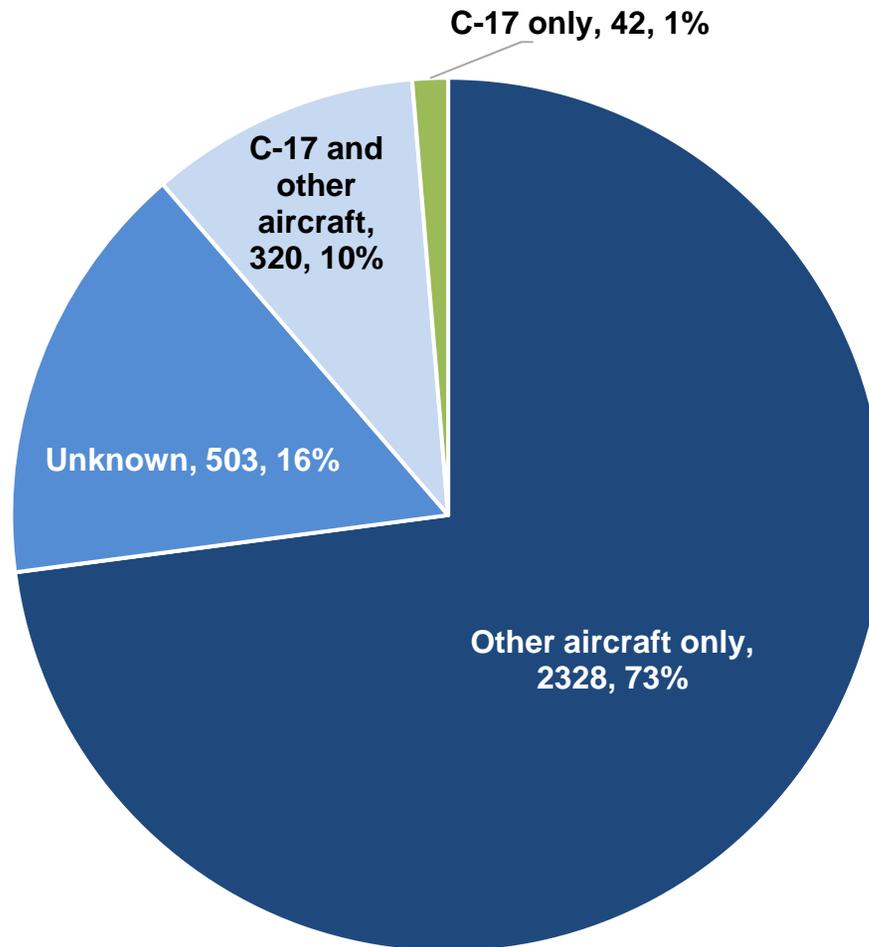
Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Type of Aircraft Supported

Number of Customers By Aircraft Supported: 2012-2016



1.3% of identified customers were exclusively involved with C-17 production

Q5, B

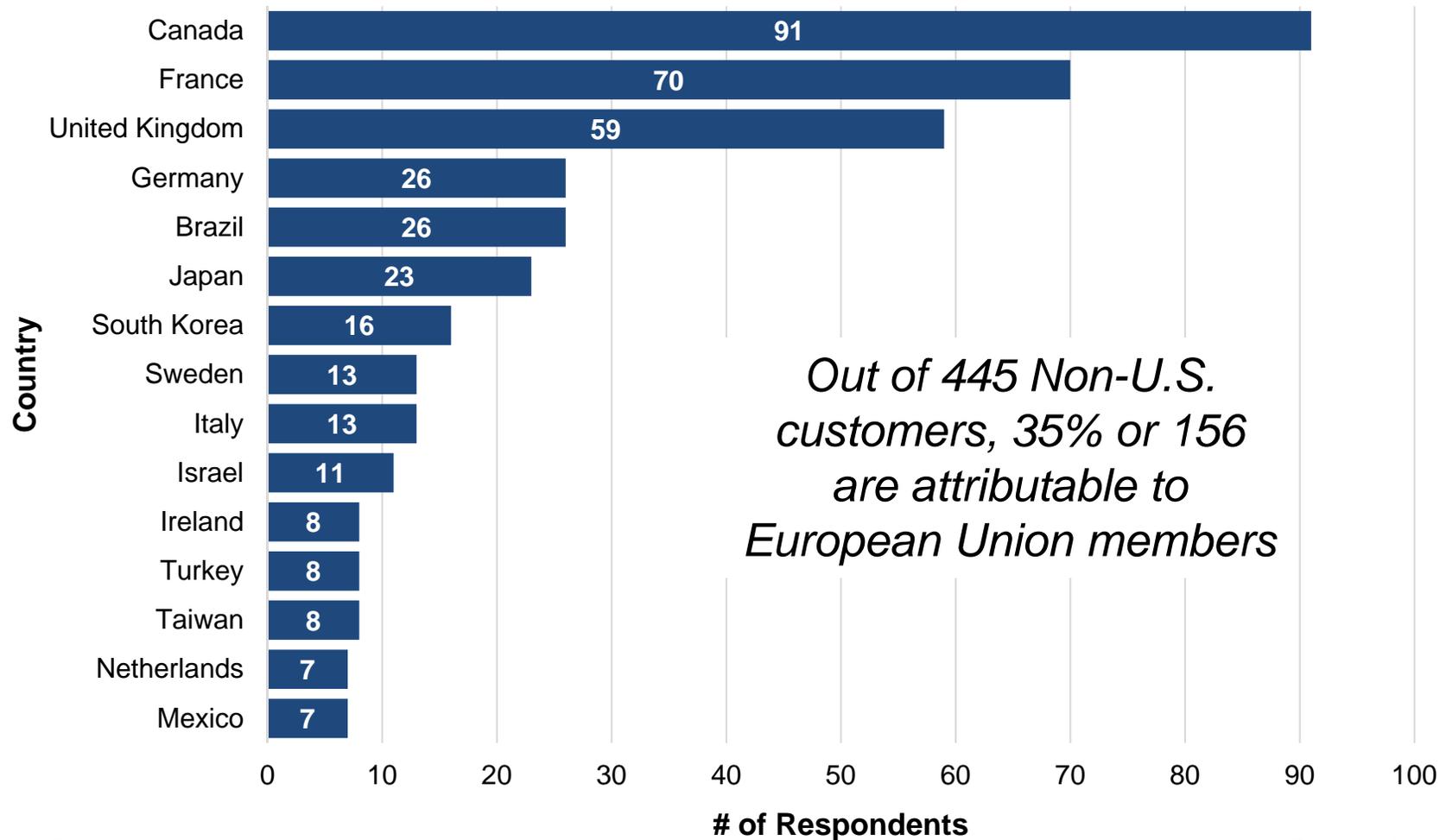
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Sales and Customers

Top 15 Non-U.S. Customers by Country 2012-2016



Q5, B

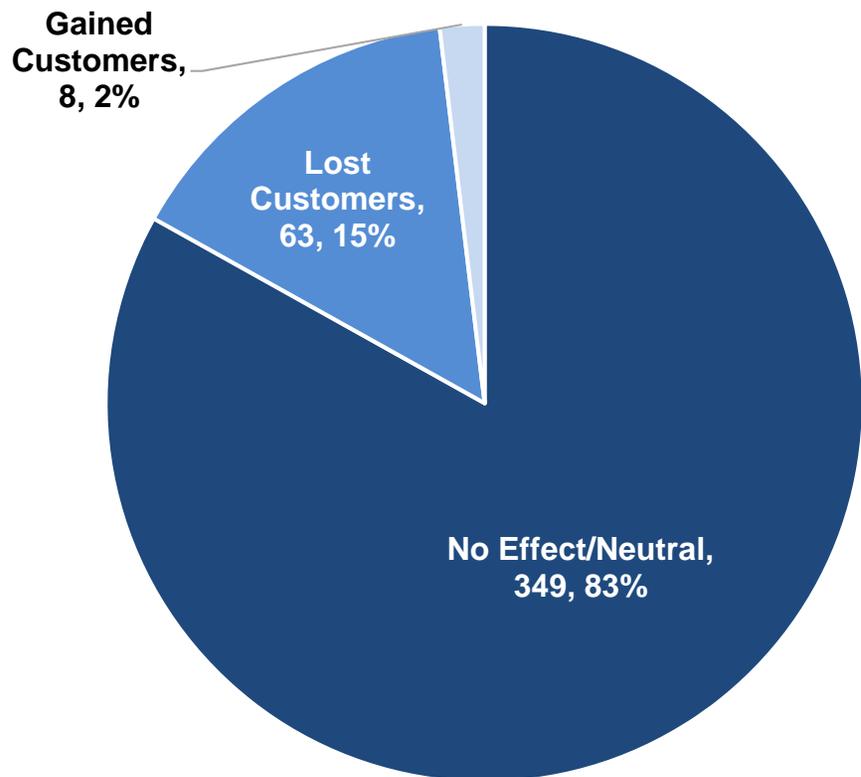
420 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



C-17 Termination

Impacts Due To The Termination of The C-17 Program 2012-2016



15% of respondents lost customers due to the termination of the C-17 program

Q5, C

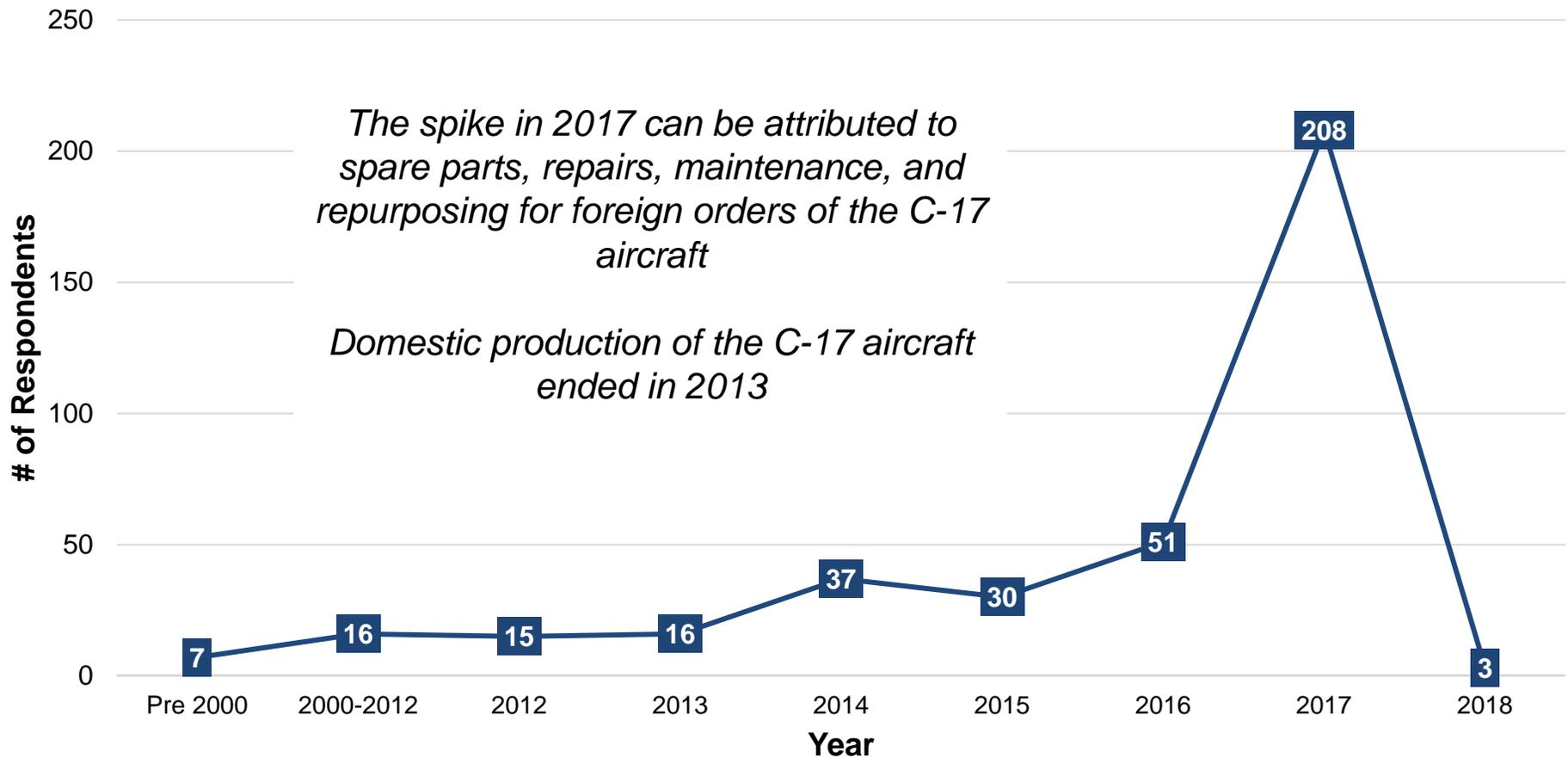
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Pre-Termination Business Model

Respondents' Most Recent Year of C-17-Related Activities



Q6, A1

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

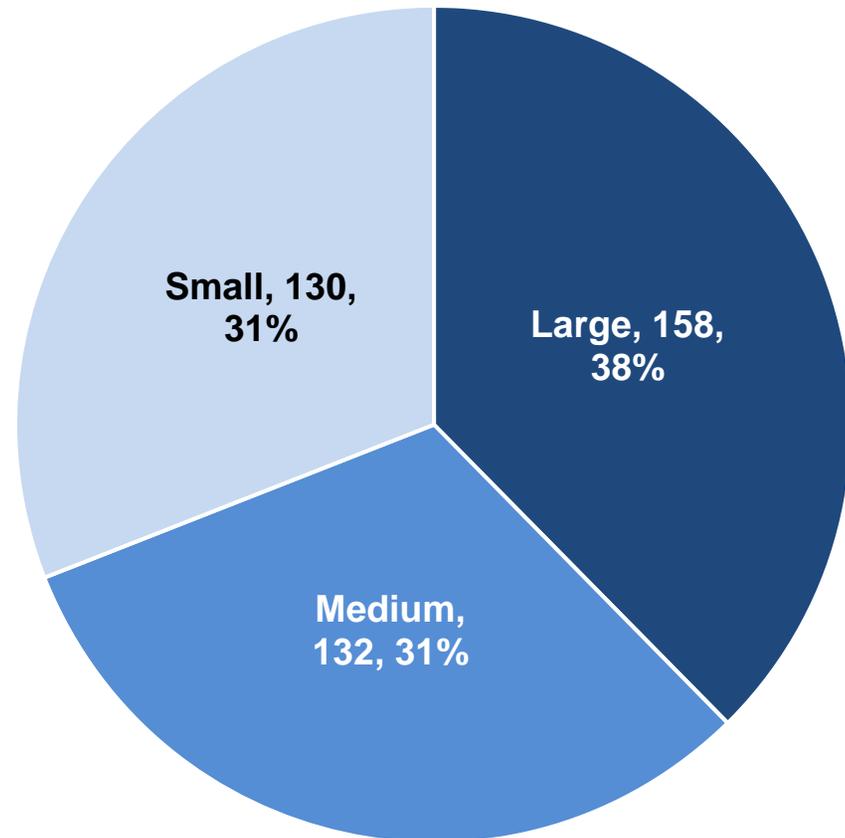
420 Respondents



C-17 Production by Company Size

What type of businesses were involved in the C-17 Aircraft Supply Chain?

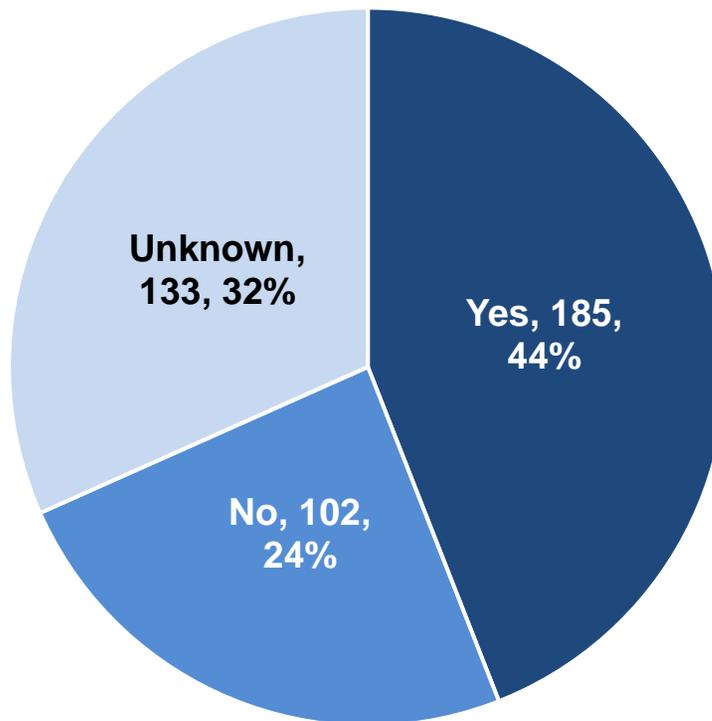
Approximately 30% of companies involved in C-17 aircraft production were small businesses





C-17 Termination Notification

Was your organization notified in advance of the C-17 aircraft program termination?

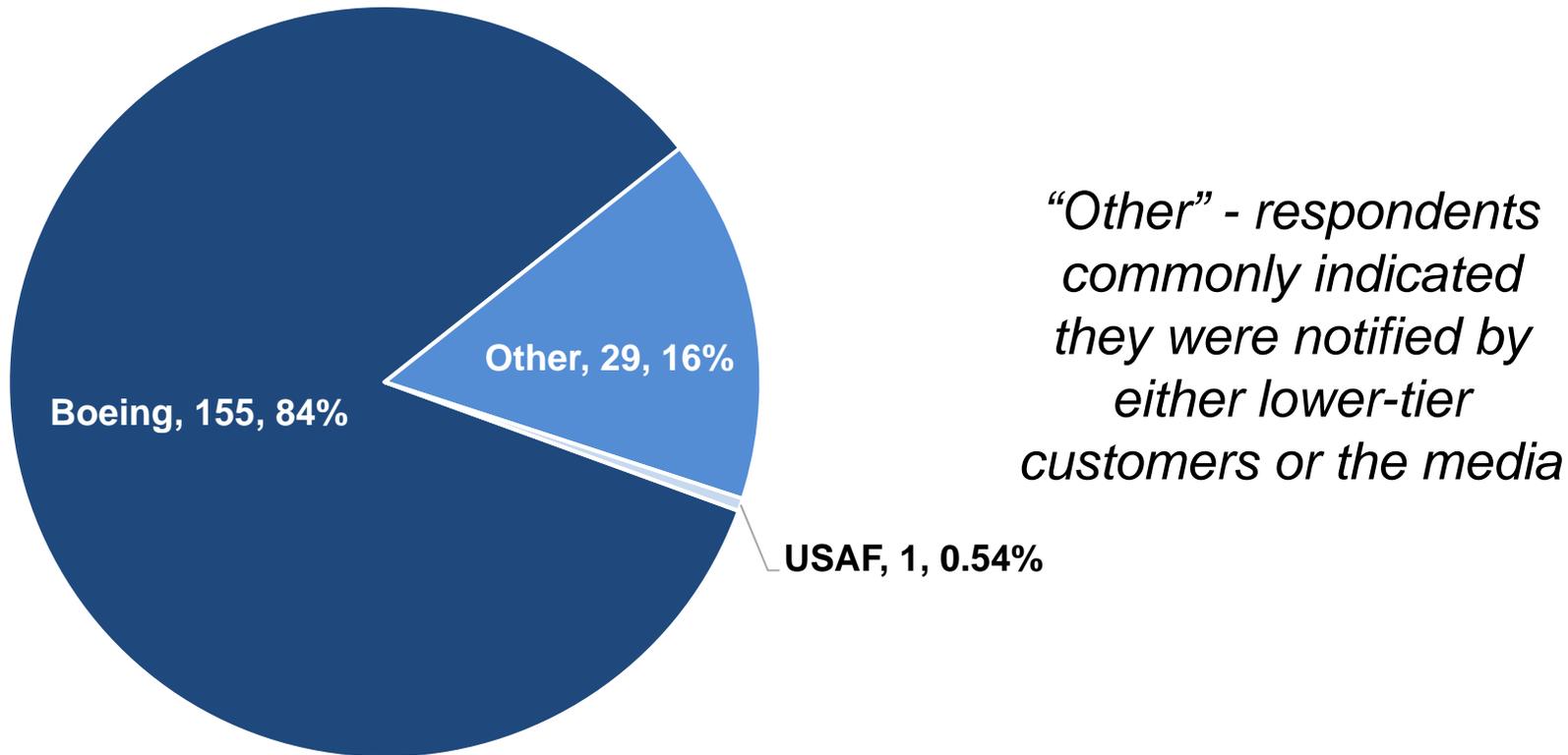


25% of respondents were not notified of the termination of the C-17 program



C-17 Termination Notification

Source of Notification of the Termination of C-17 Production



Q6, A2

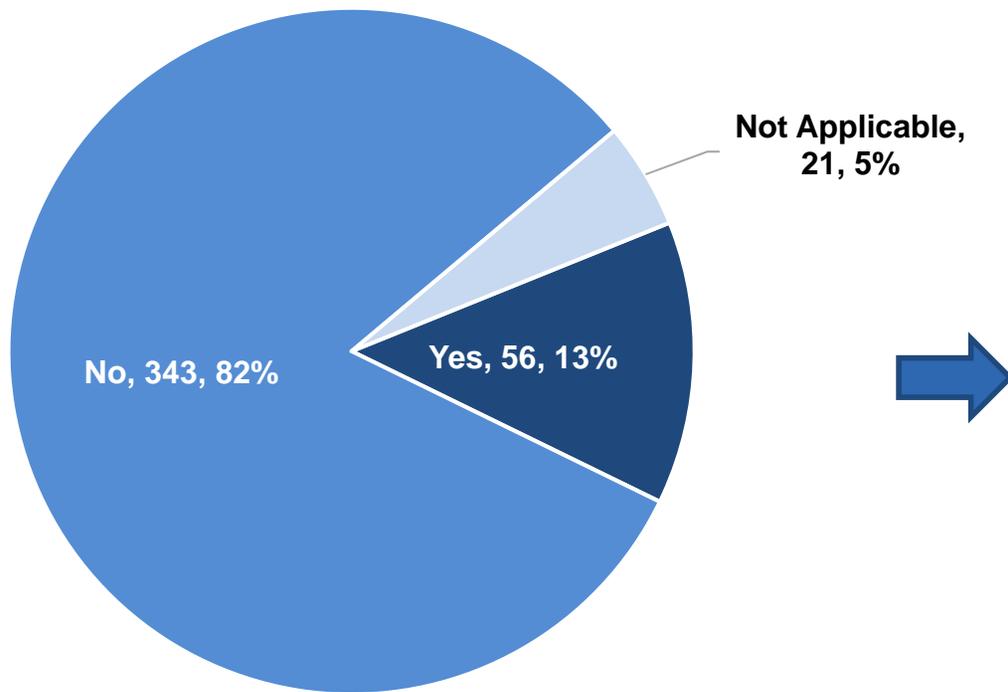
Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

185 Respondents



C-17 Termination Business Transition

Did the termination of the C-17 program change your organization's involvement in the defense industry?



How was your participation in the defense industry affected?	
Reduced Involvement in Defense	49
Increased Involvement in Defense	3
Left Defense Industry	4
Total:	56

Q6, B1

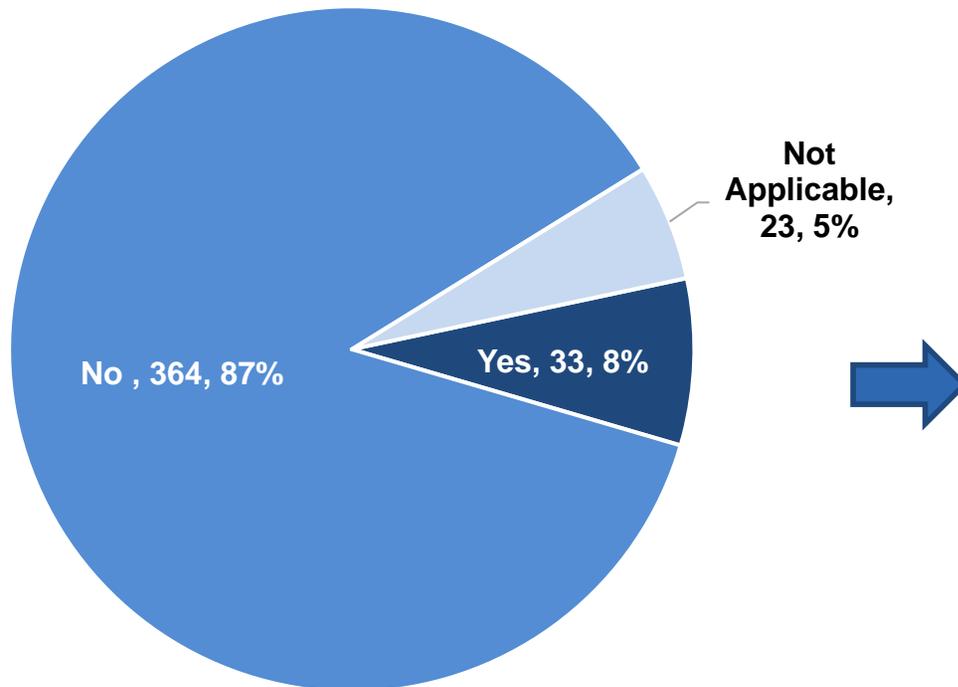
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



C-17 Termination Business Transition

Did the termination of the C-17 program change your organization's involvement in the aerospace industry?



How was your participation in the aerospace industry affected?	
Reduced Involvement in Aerospace	24
Increased Involvement in Aerospace	7
Left Aerospace Industry	2
Total:	33

Q6, B2

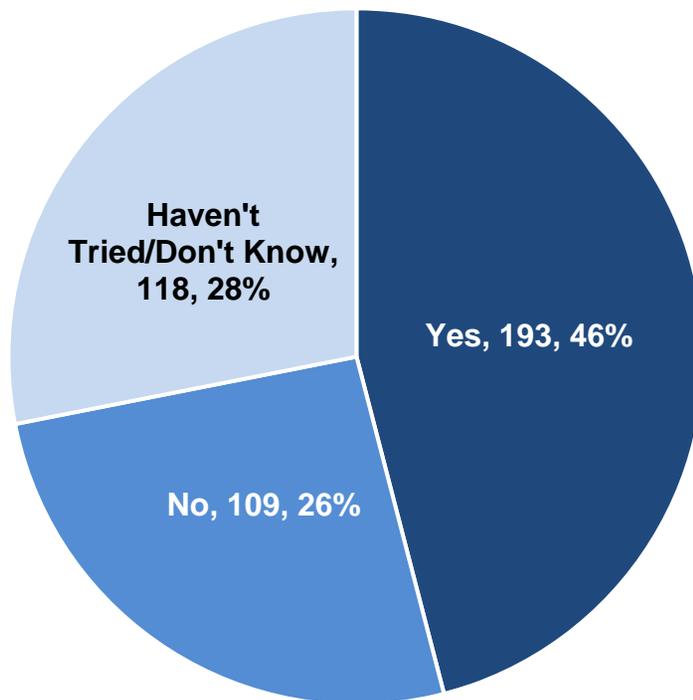
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



C-17 Termination Business Transition

Did your organization substitute your C-17 sales with a new or different program?



Platform for C-17 sales substitutions	
USG	21
Commercial	60
Both USG and Commercial	112
Total	193

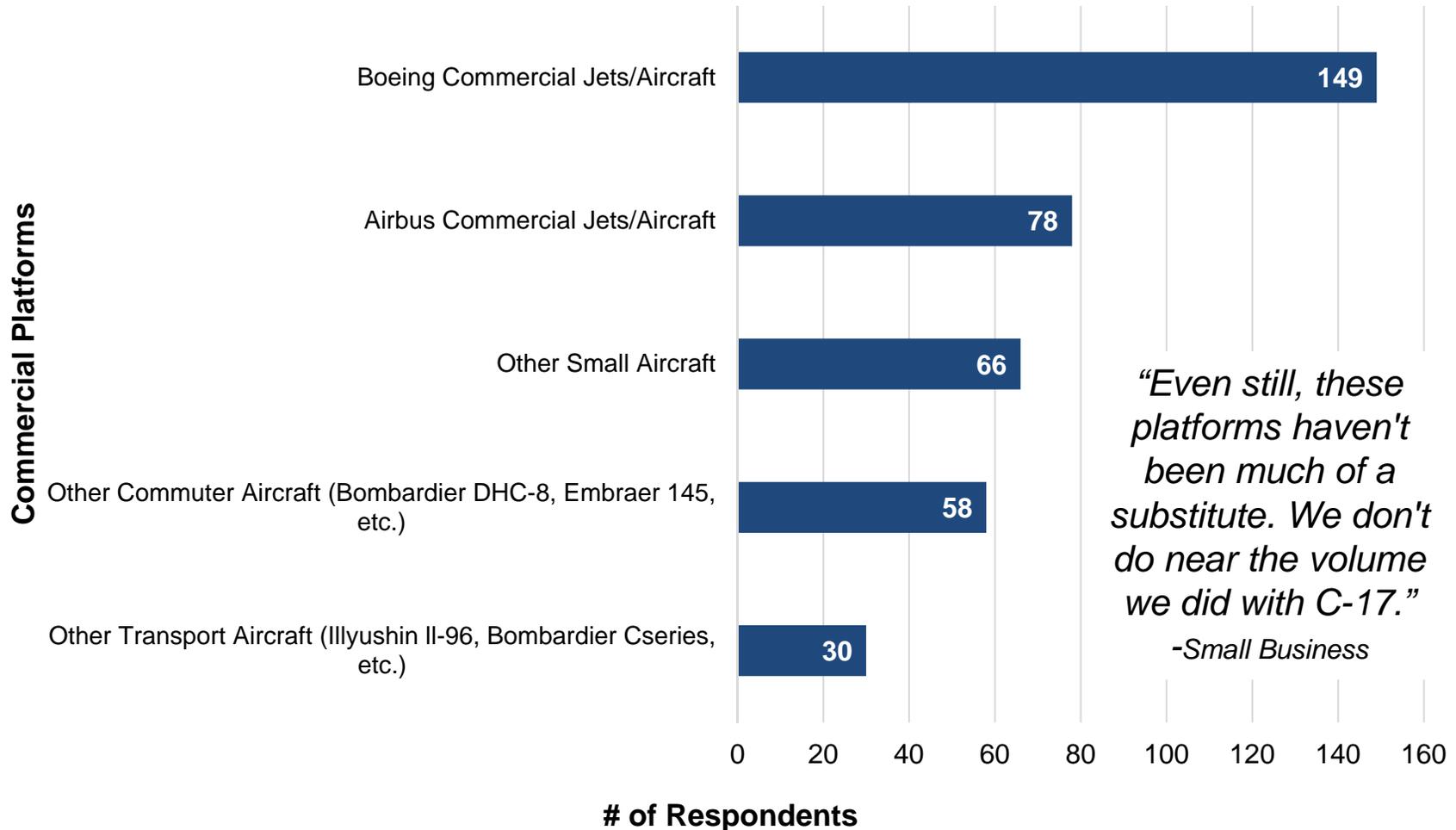
Q6, B3

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



C-17 Termination Business Transition Commercial Platforms Used as Substitute for C-17 Program



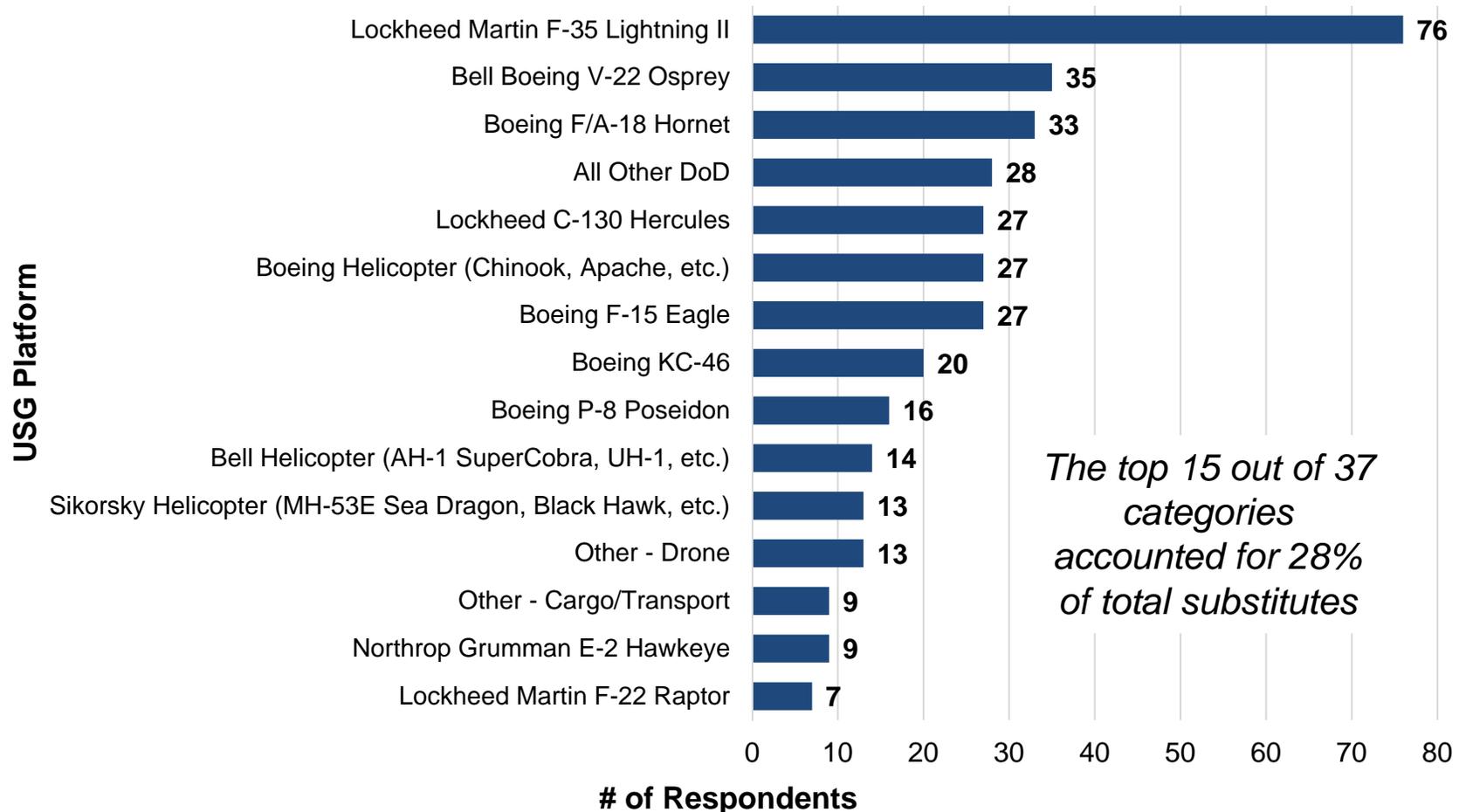
Q6, B4

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



C-17 Termination Business Transition Top 15 DoD Platforms Used as Substitute for C-17 Program



Q6, B4

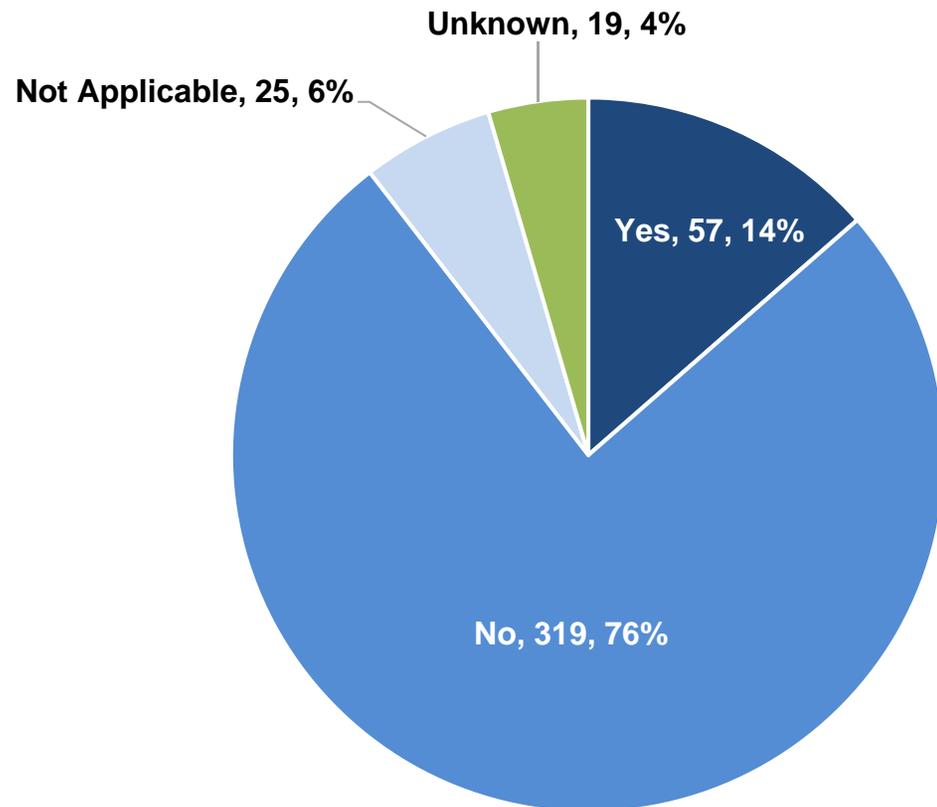
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



C-17 Termination Lessons Learned

Did your organization adjust its business plan in response to the C-17 Aircraft program's termination?

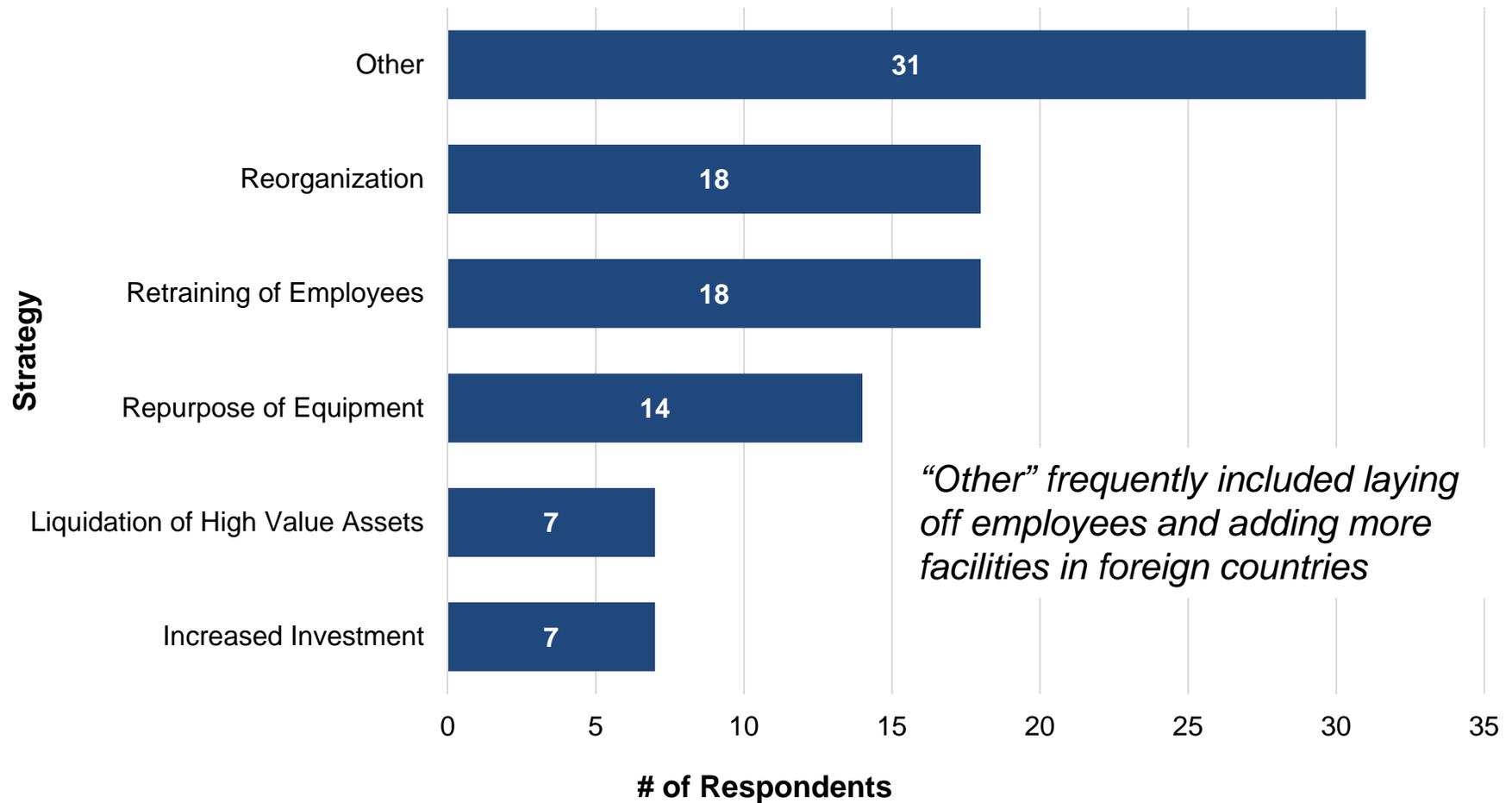


14% of organizations adjusted their business plans due to the C-17 programs termination



C-17 Termination Lessons Learned

Leading Actions Used for Business Plan Alterations After C-17 Termination



Q6, C1B

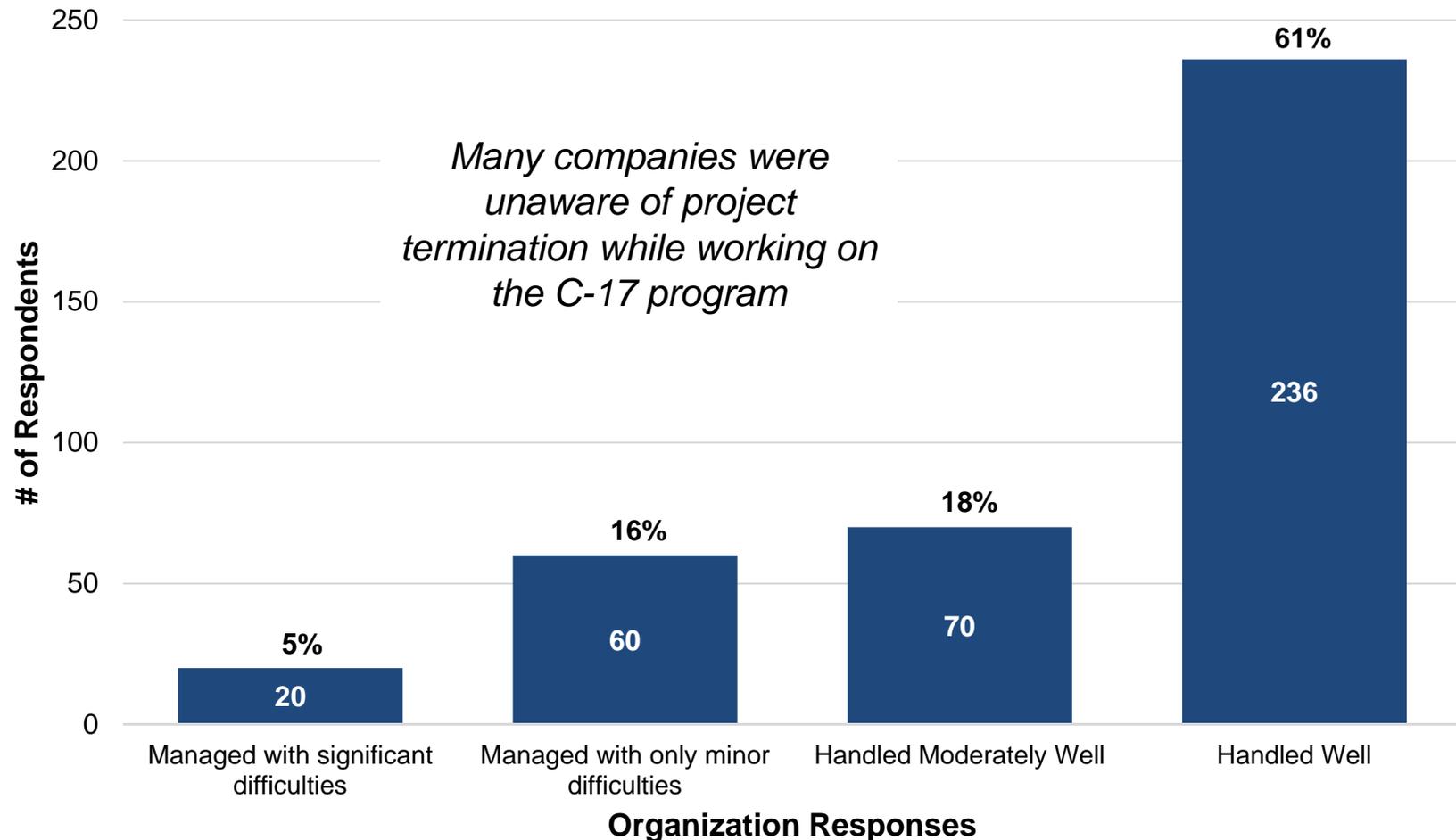
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



C-17 Termination Lessons Learned

Self-Scoring of Organizations' Response to C-17 Termination



Q6, C2

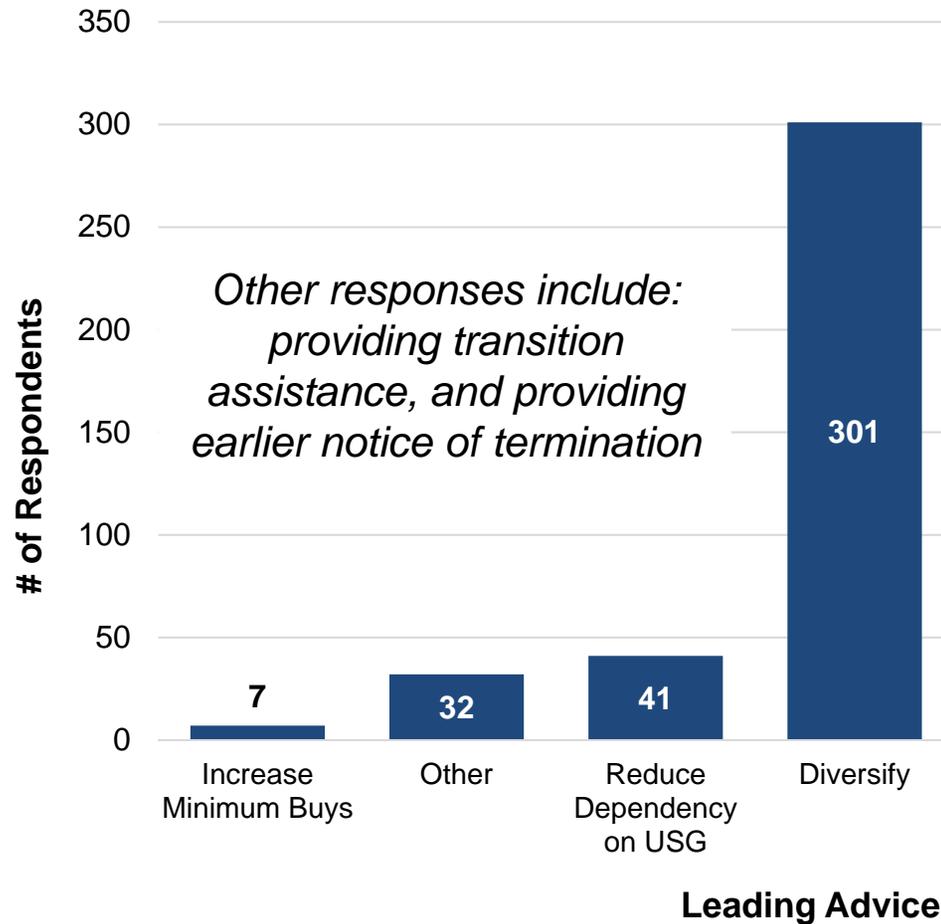
386 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



C-17 Termination Lessons Learned

Leading Advice for Vendors Experiencing the Loss of a USG Program



“Less concentration of customers and products offers less risk.”

-Small Business

“Try to implement a balance of commercial work with multiple defense programs.”

-Large Business

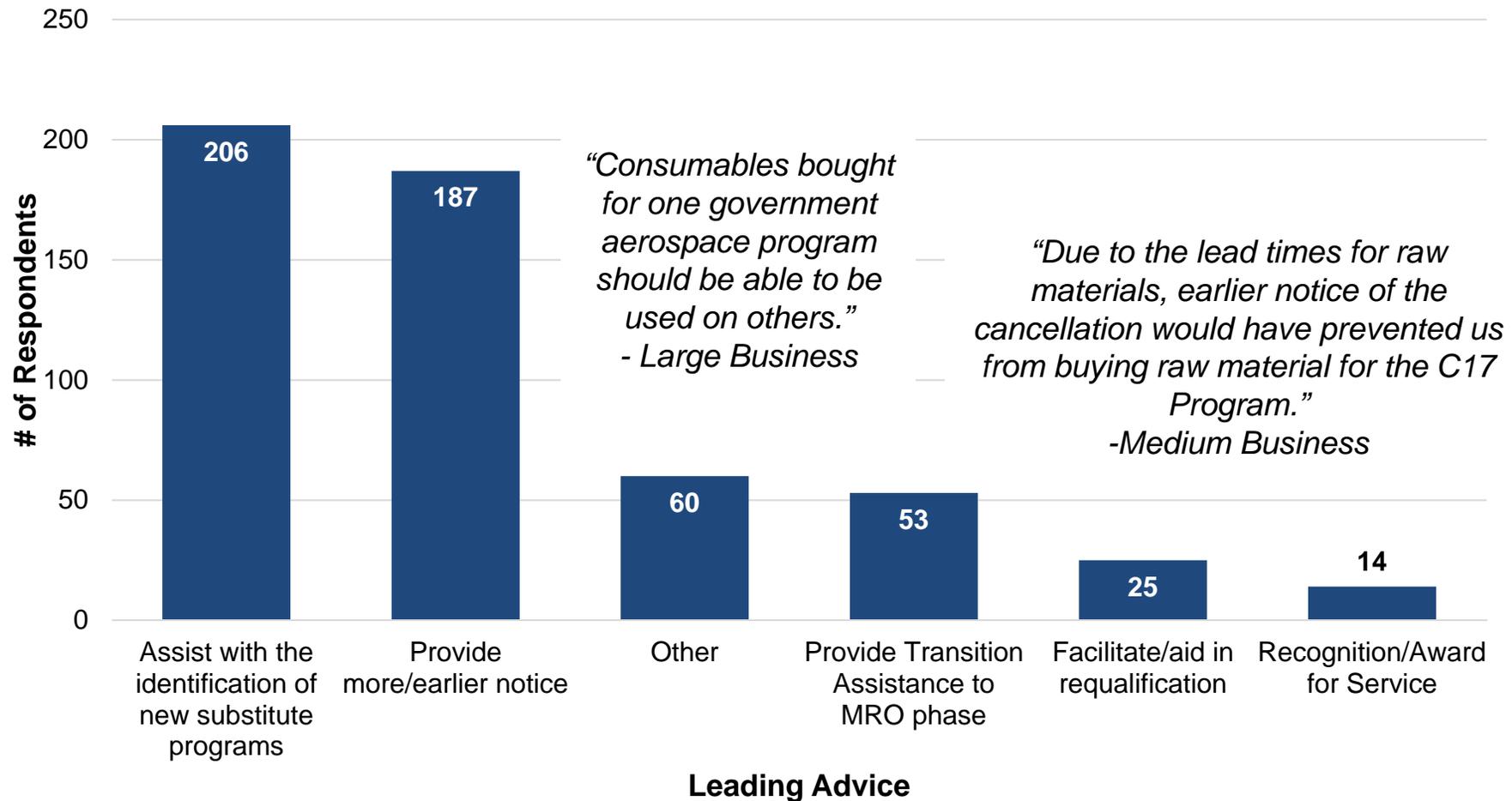
“Find other programs, sell, sell, sell.”

-Small Business



C-17 Termination Lessons Learned

Supplier Advice for Government and Defense Prime Contractors when Handling the Closure of a Major Program



Q6, C4

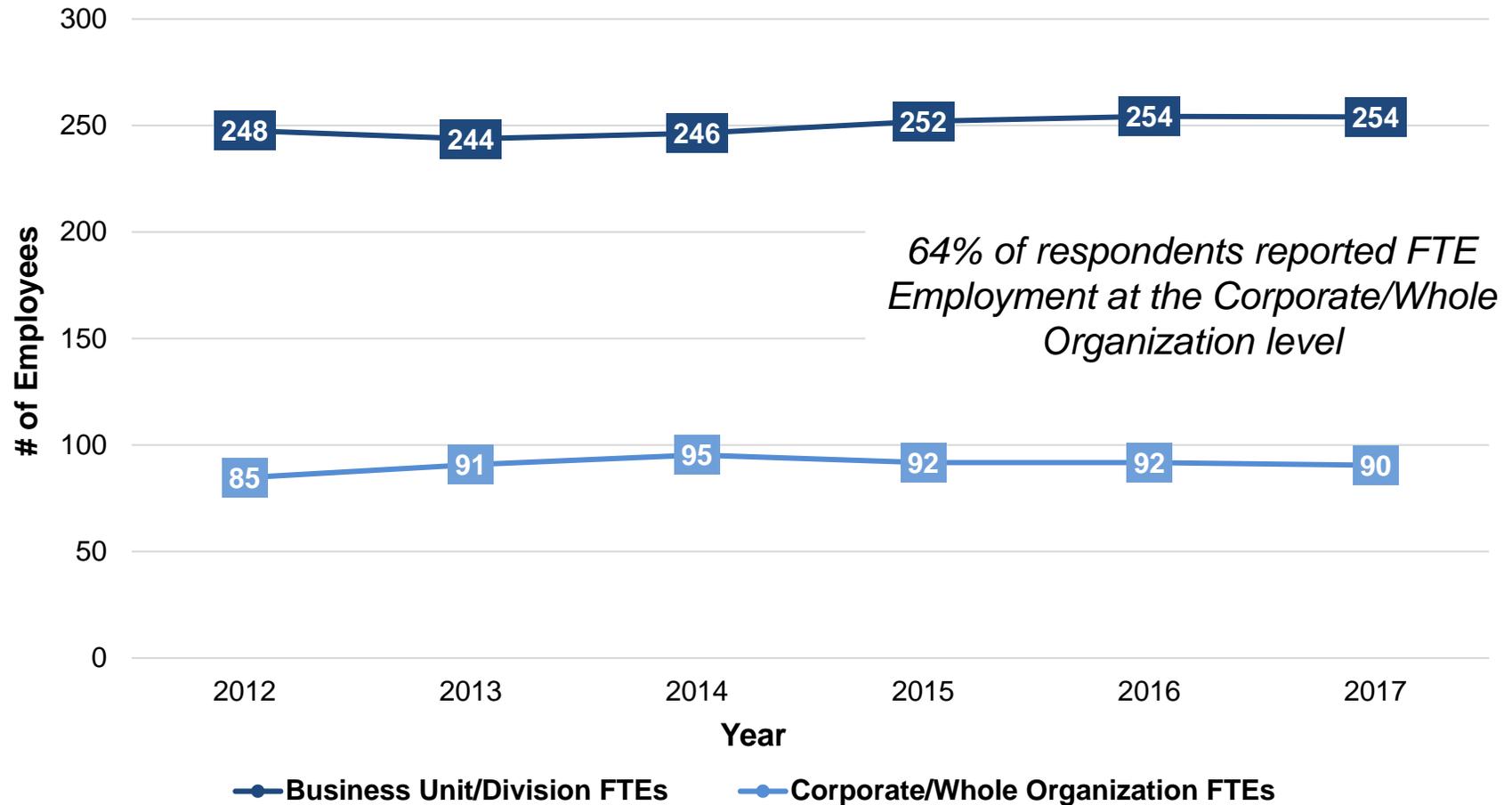
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Full Time Equivalent Employment

Average Number of FTE Employees Reporting at the Corporate and Division Level from 2012-2017



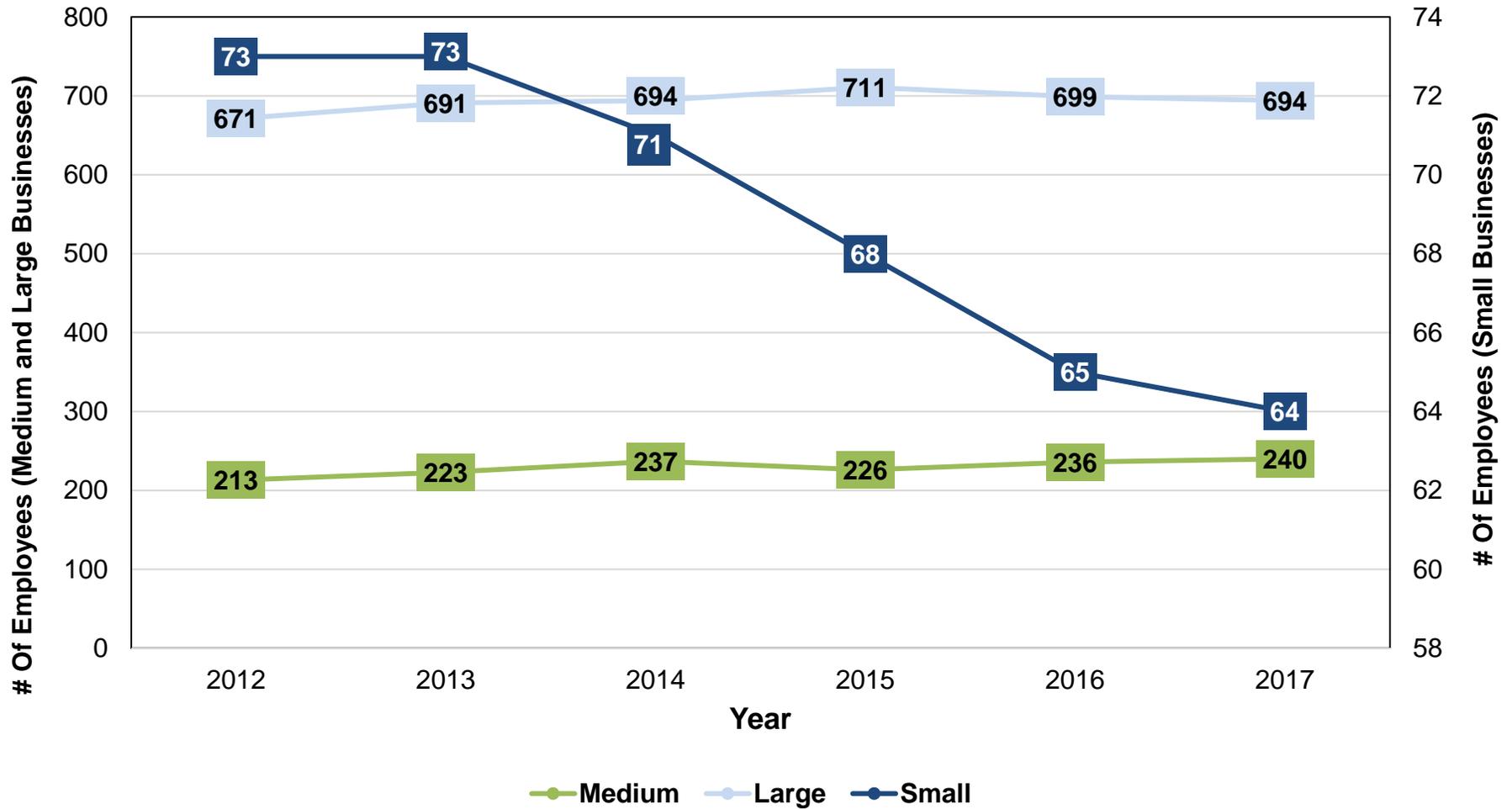
Q7a, A

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Full Time Equivalent Employment Average FTE Employment by Company Size



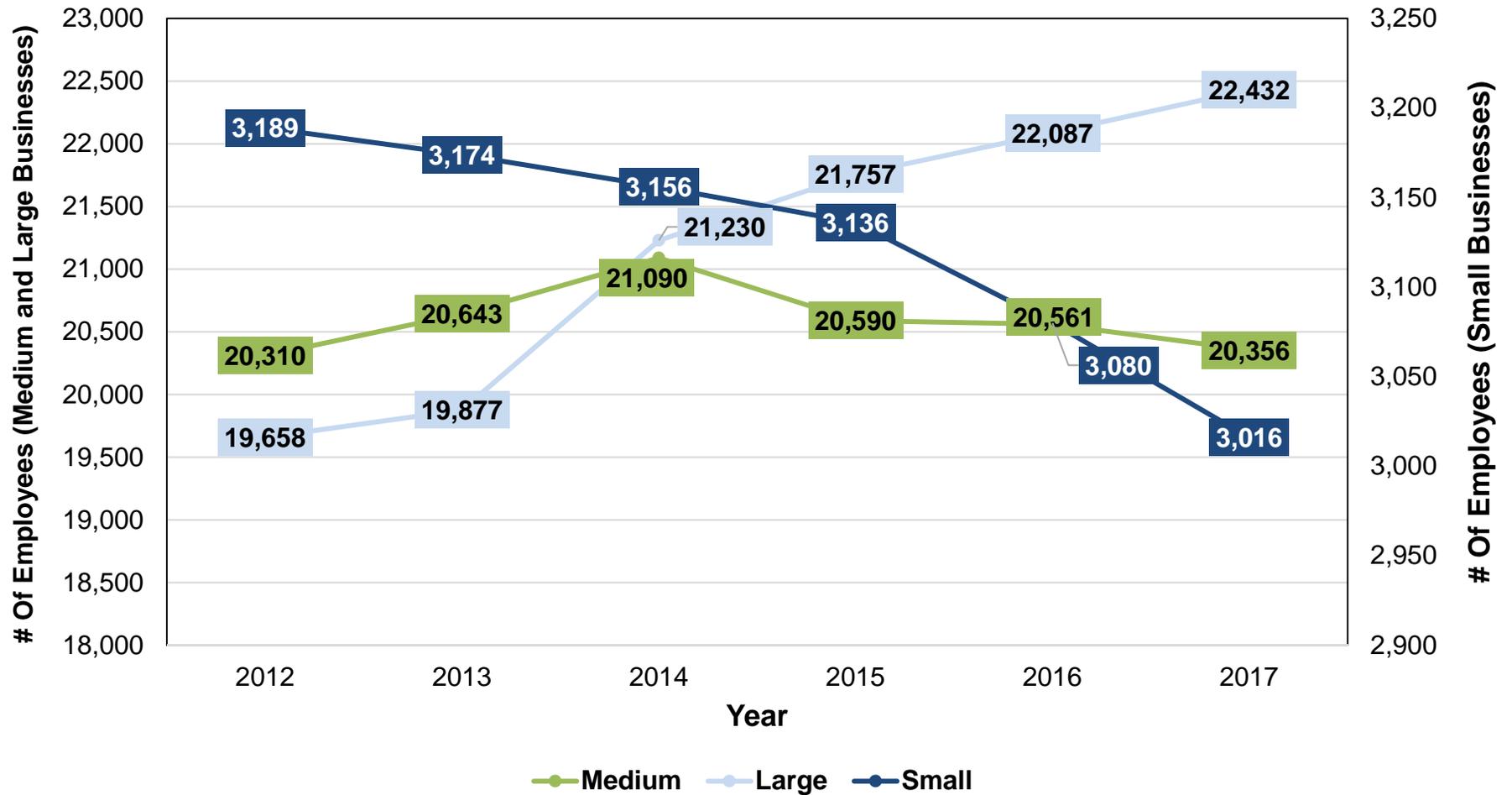
Q7a, A

Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Full Time Equivalent Employment Aggregate FTE Employment by Company Size



Q7a, A

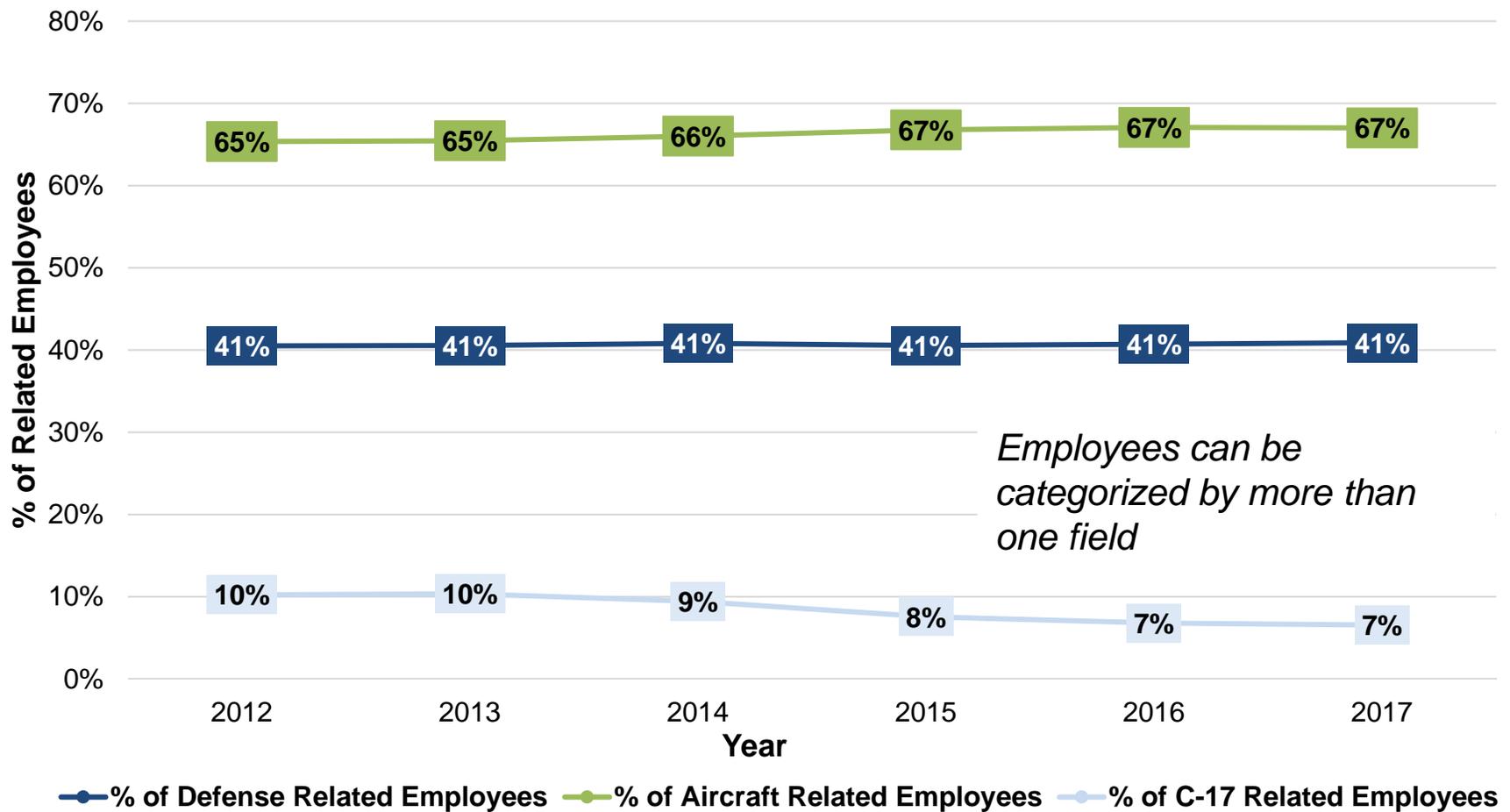
Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



FTE Employee Work Designations

Average Percentage of Defense, Aircraft, and C-17 Related Employees from 2012-2017



Q7a, A

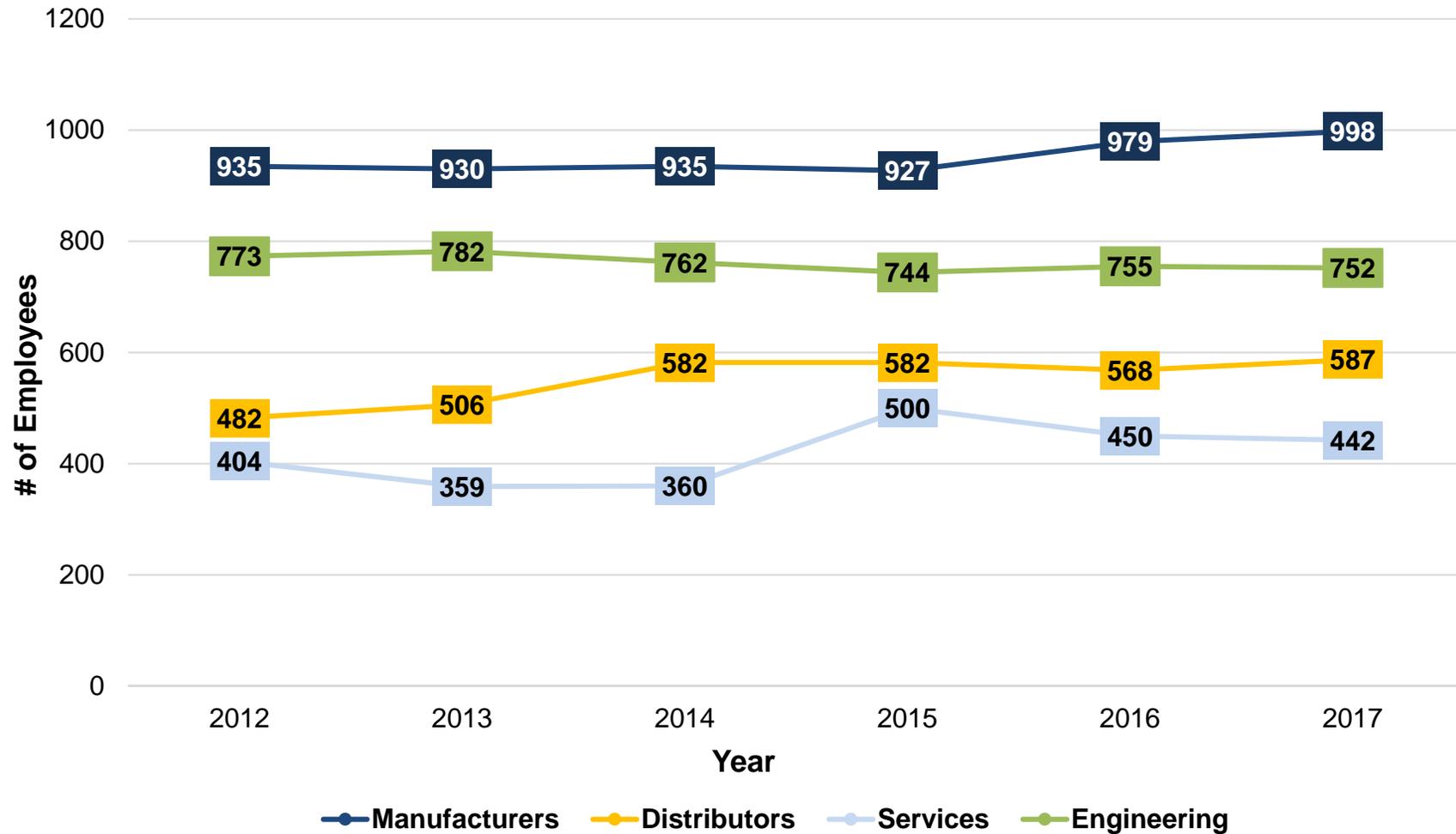
420 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Full Time Equivalent Employment

Primary Business Line Full Time Employment Averages 2012-2017



Q7a, B

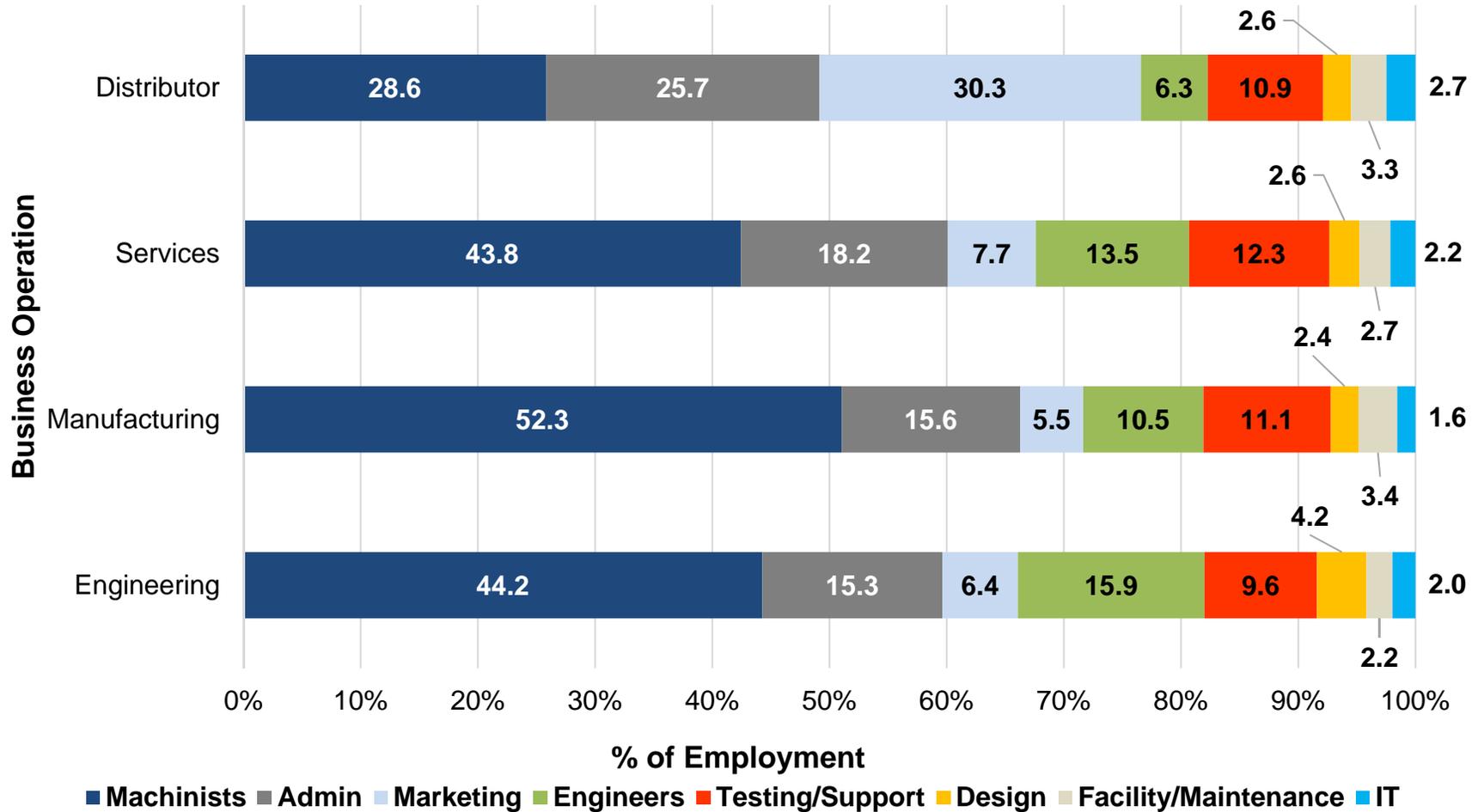
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Workforce Operations

Primary Business Operation Lines of Employment



Q7a, B

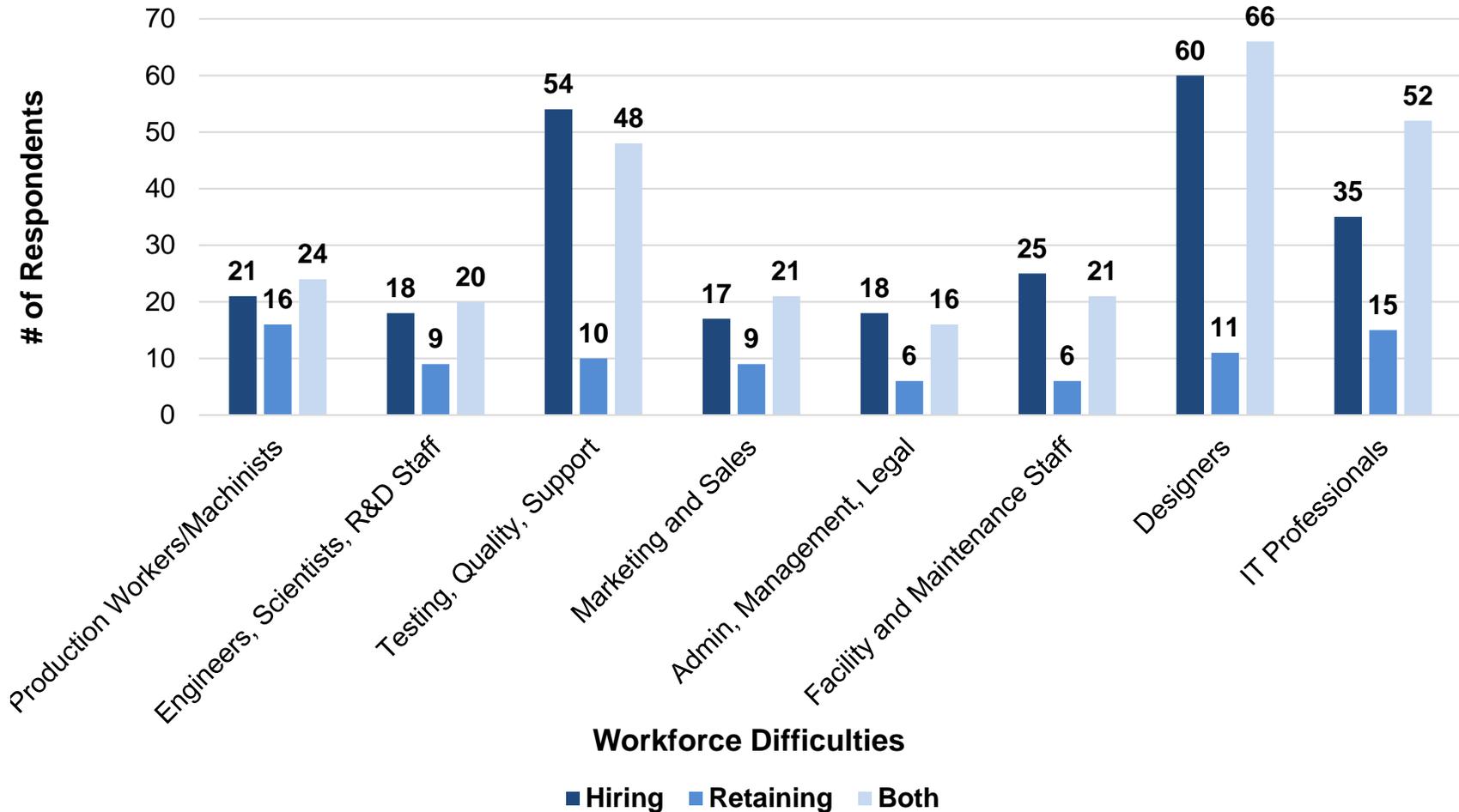
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Difficulties Hiring and Retaining Workforce

Workforce Difficulties Stratified by Occupation



Q7a, B

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents

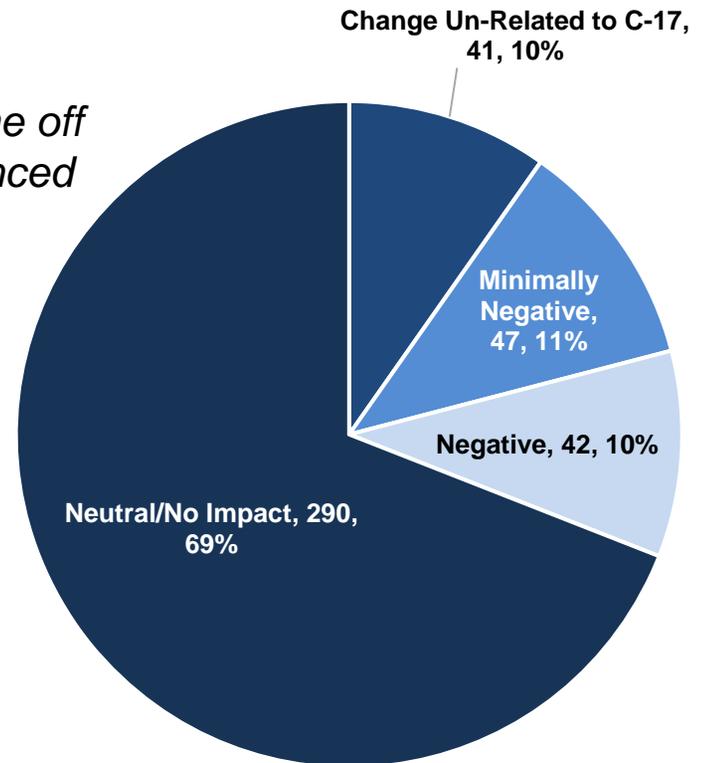


Impact of C-17 Termination on Workforce

Respondent Self-Identified Impact Severity on Workforce

Respondents indicated layoffs, reduction in benefits, reduction in overtime, and forced time off as the leading workforce impact they experienced

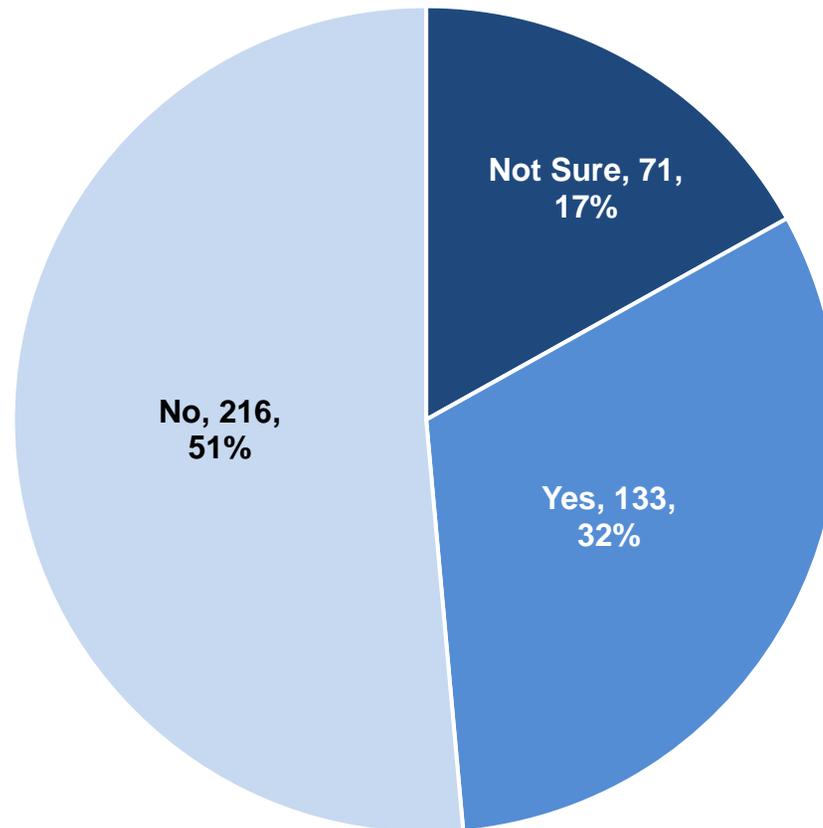
Some large companies indicated that the C-17 termination allowed them to reallocate resources to new business opportunities, and to develop new technological advancements to replace losses in employment





Workforce Preservation Plan

Do you have a workforce preservation plan for the post C-17 environment?



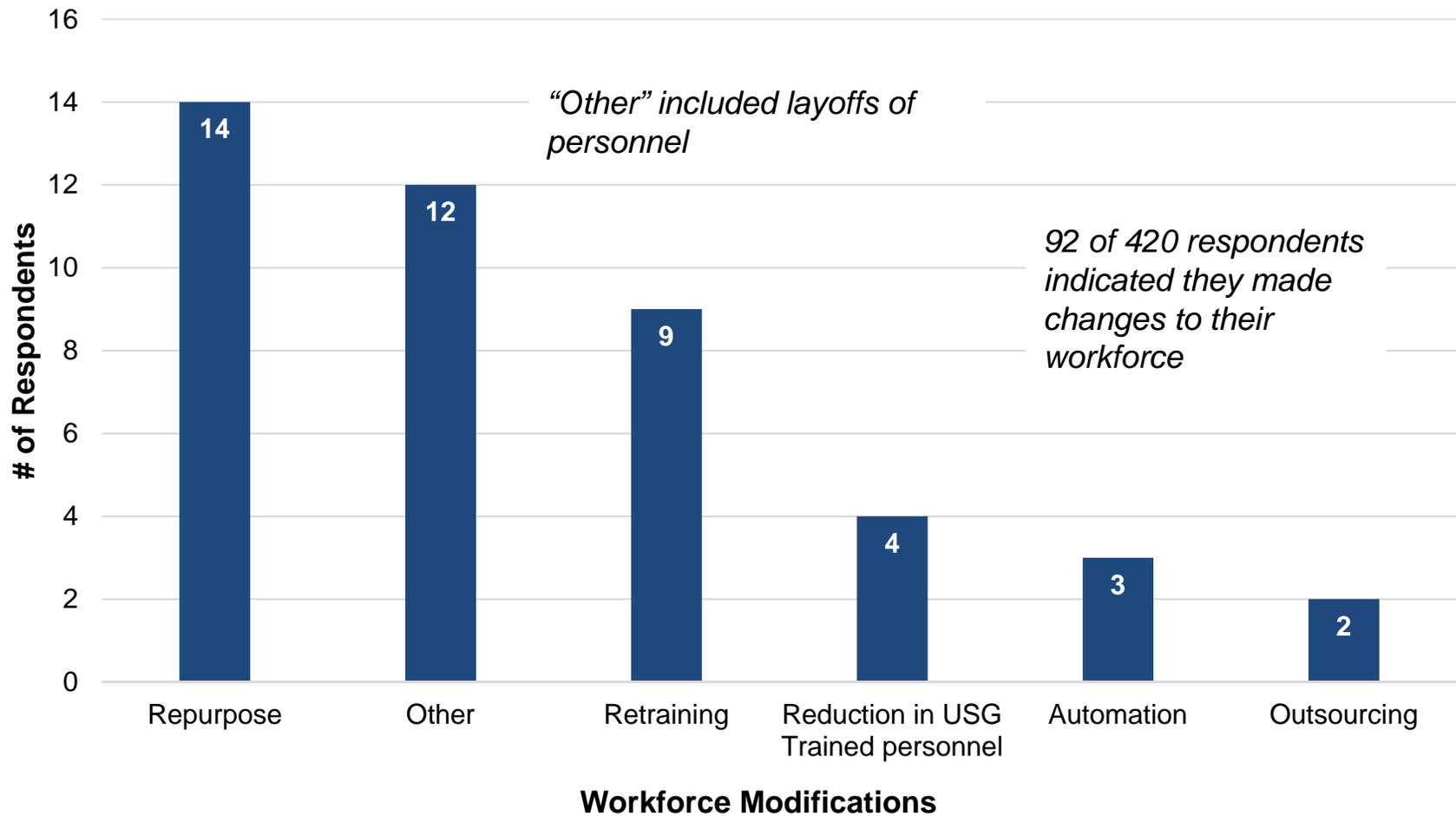
“Headcount is adjusted commensurate with sales volume to maintain profitability required by our investors.”
-Large Company

“We have additional contracts to sustain the workforce.”
-Large Company

“[We implemented] redeployment to project work for other customers, including non-aerospace customers.”
-Large Company



Implemented Workforce Modifications Changes Made In Response to C-17 Termination



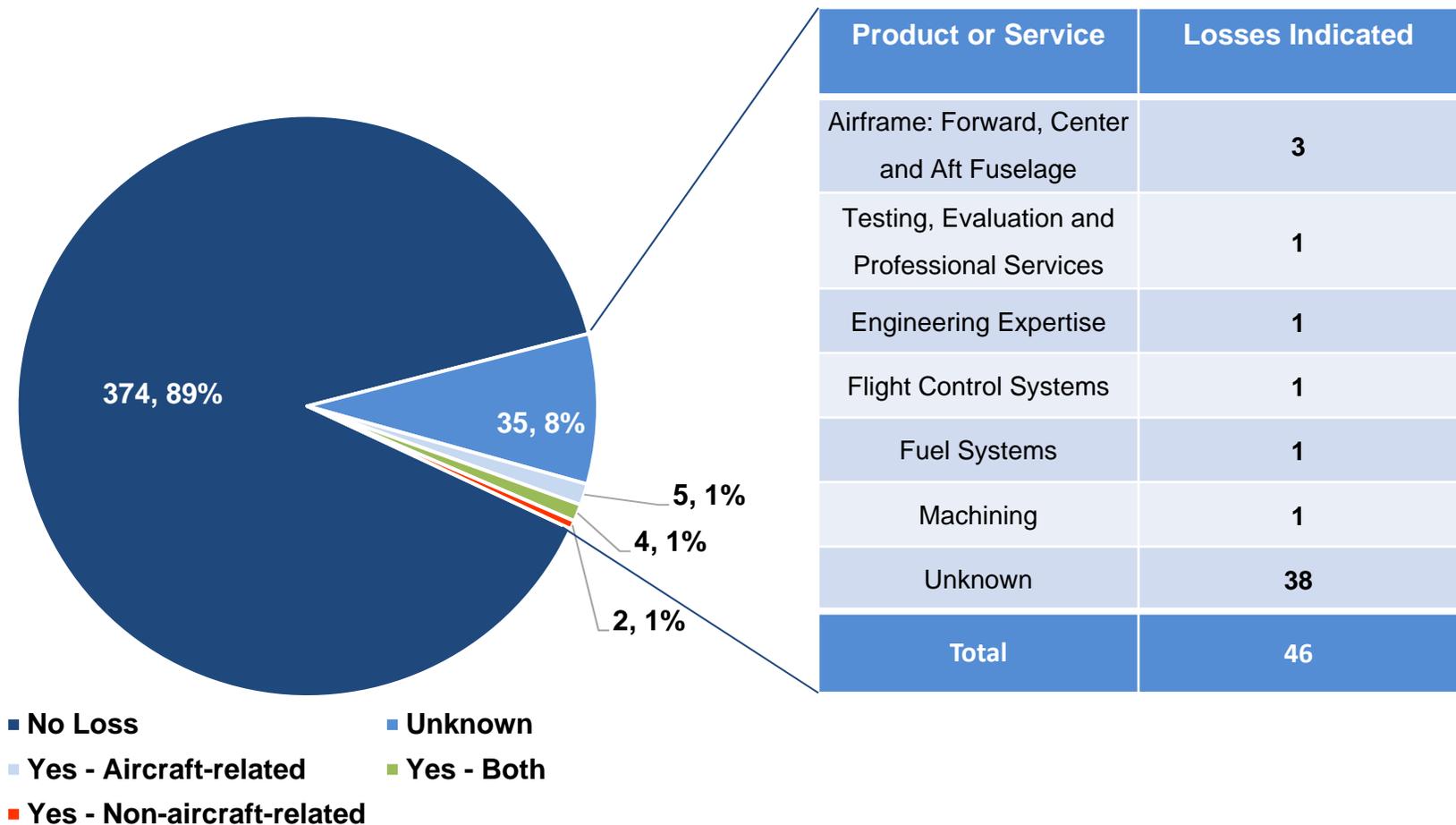
Q7b, A3

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Loss of Critical Skills/Capabilities Broken Down by Product or Service Line



Q7b, A4

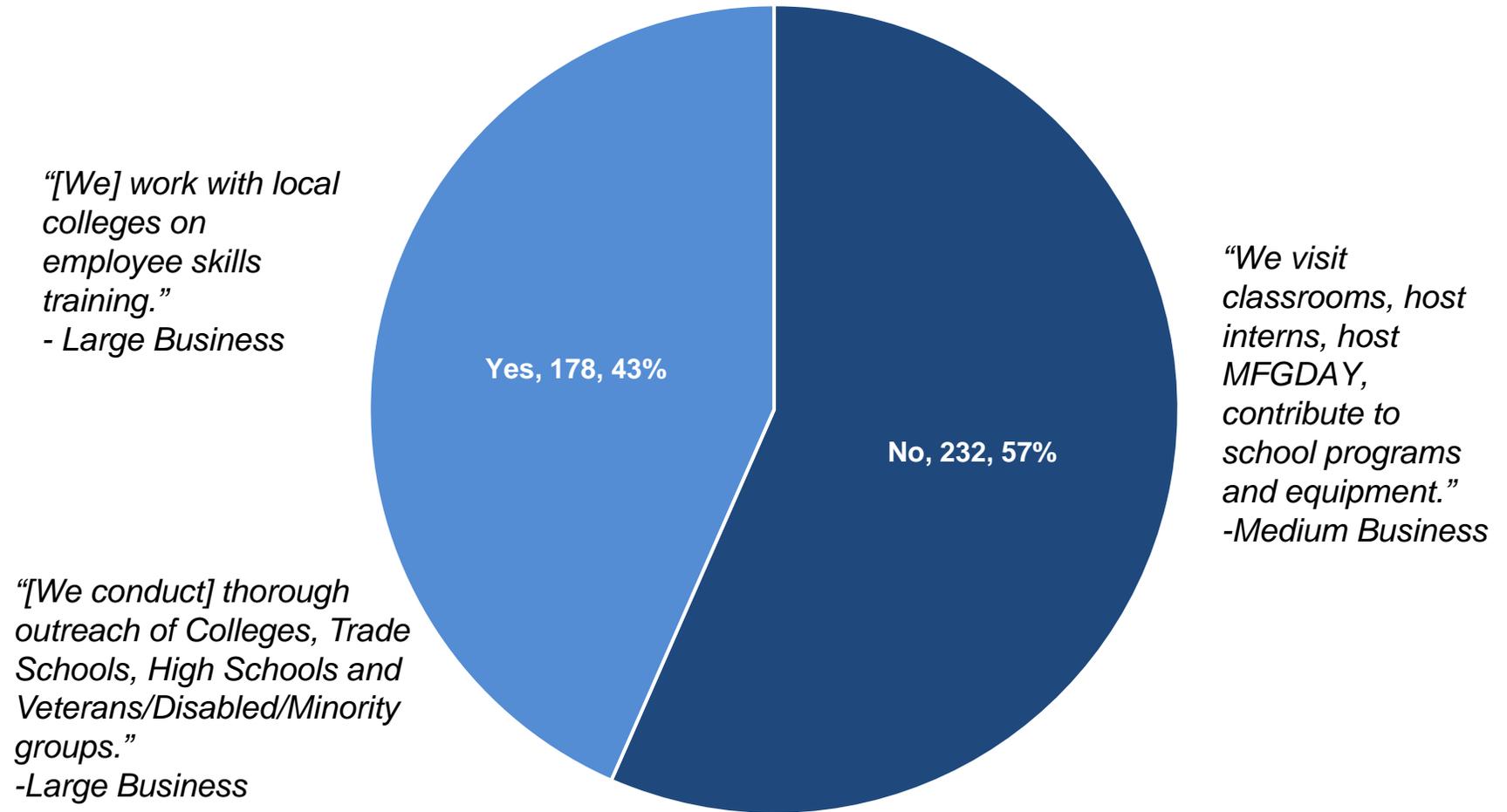
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

394 Respondents



Developmental Work With Outside Institutions

Respondents' Indication of Work with Outside Institutions on Development/Training



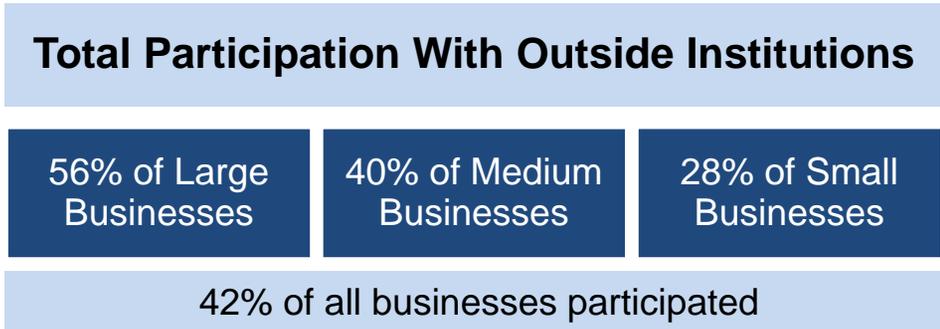
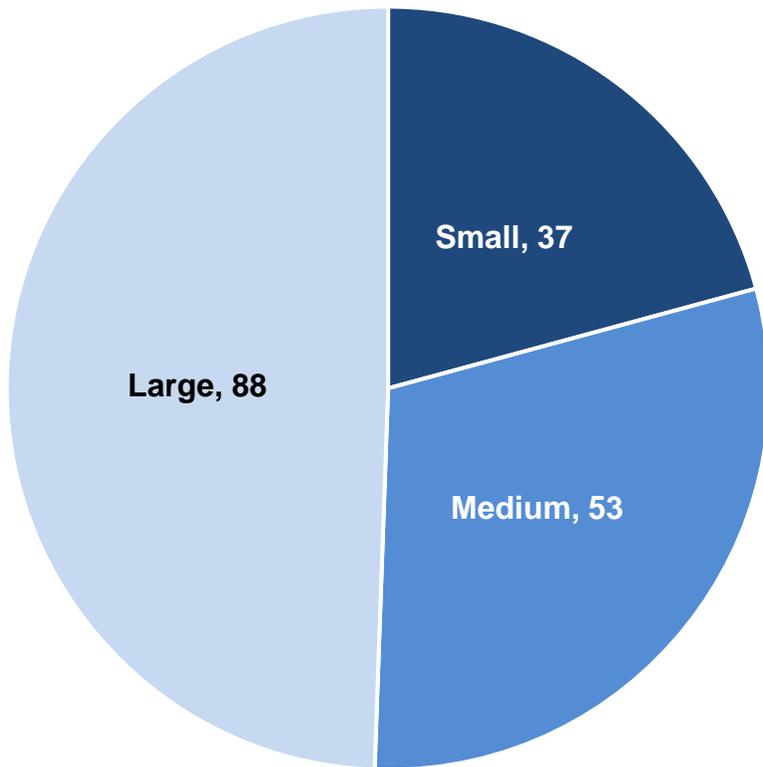
Q7b, B1

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Developmental Work With Outside Institutions Participation Broken Down by Business Size



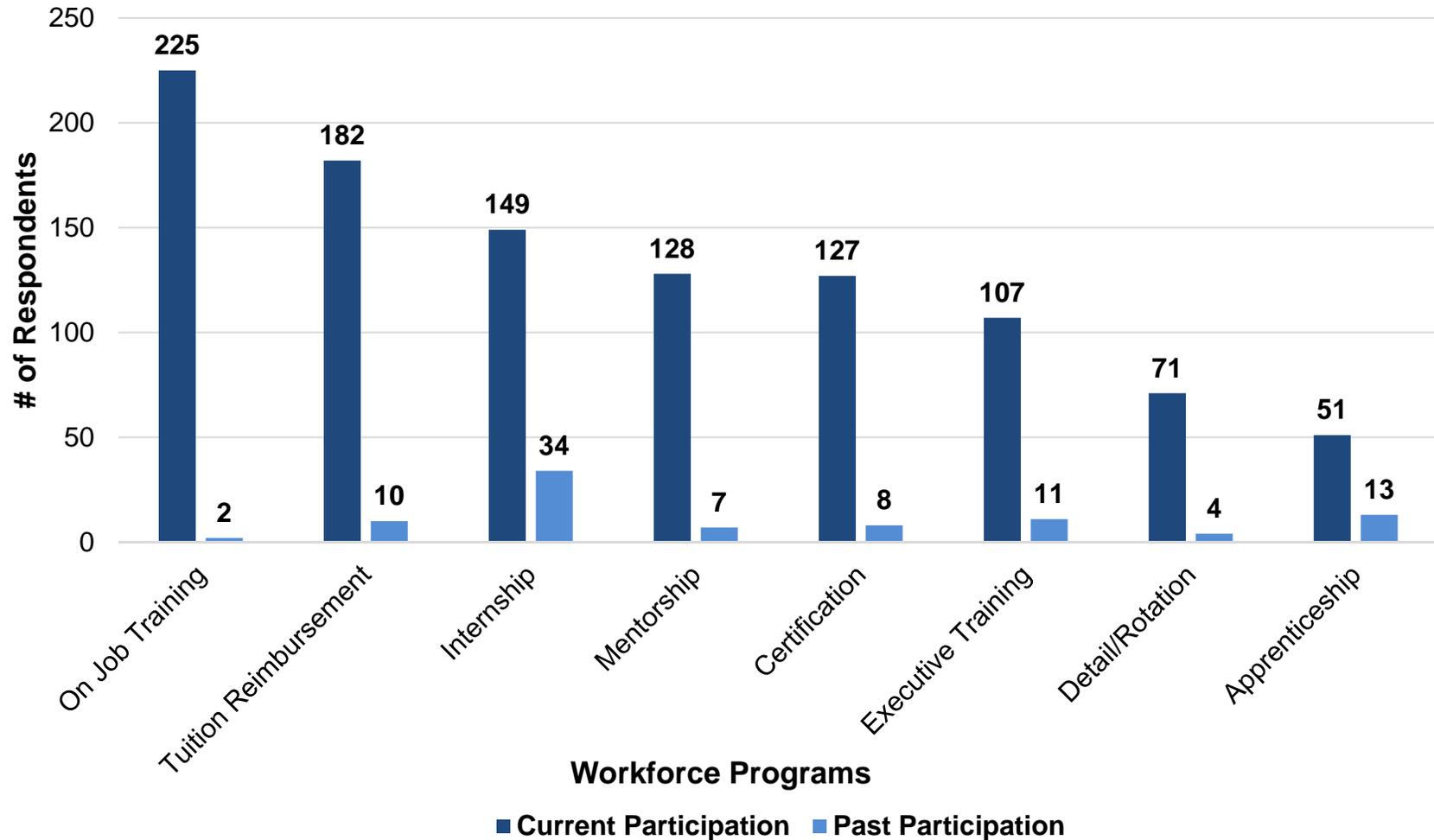
Q7b, B1

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

178 Respondents



Workforce Development Programs Participation in Workforce Development Programs



Q7b, B2

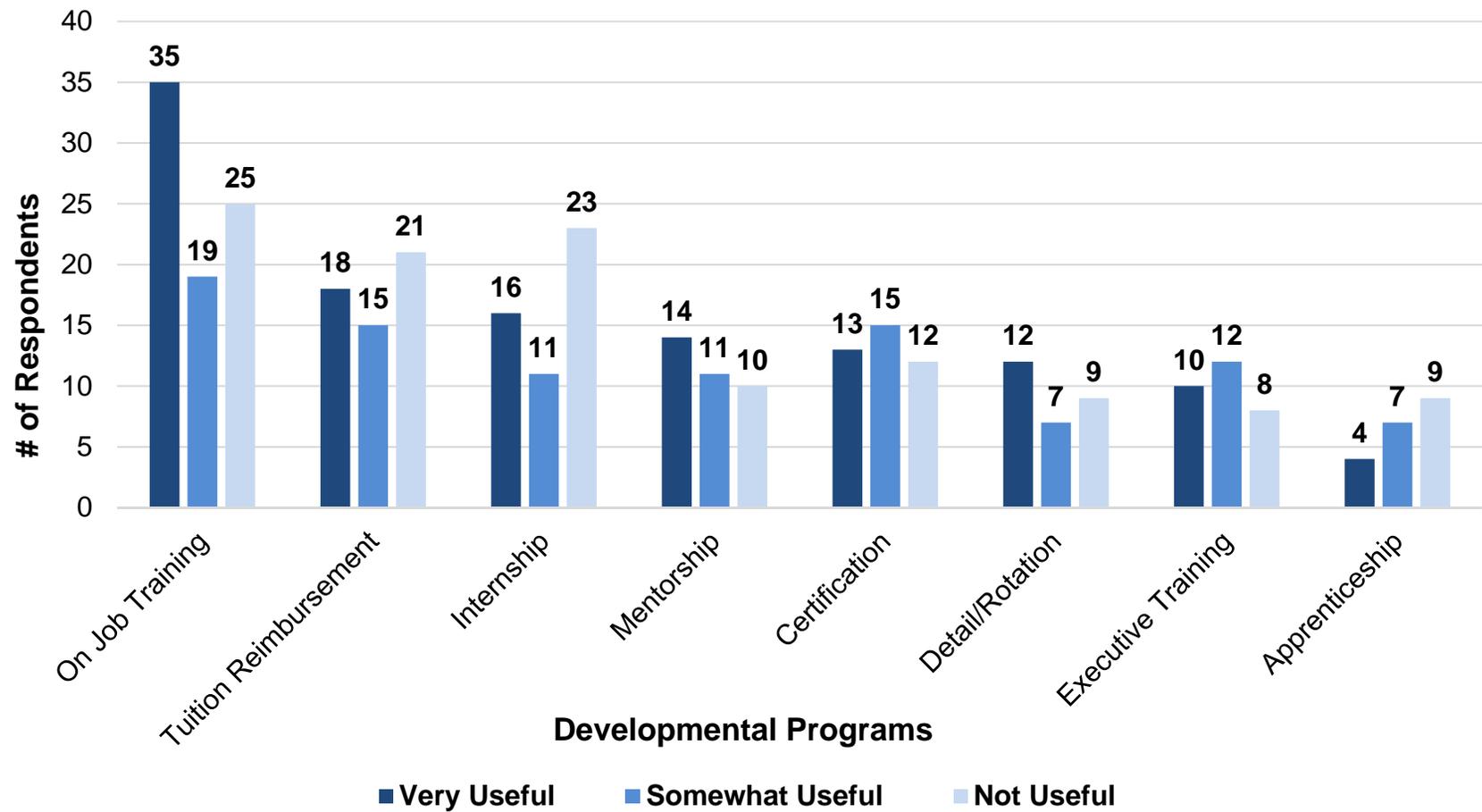
Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Workforce Development Programs

Developmental Programs Deemed Most and Least Useful Among Respondents in Post C -17 Transition



Q7b, B2

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Critical Vendors & Suppliers

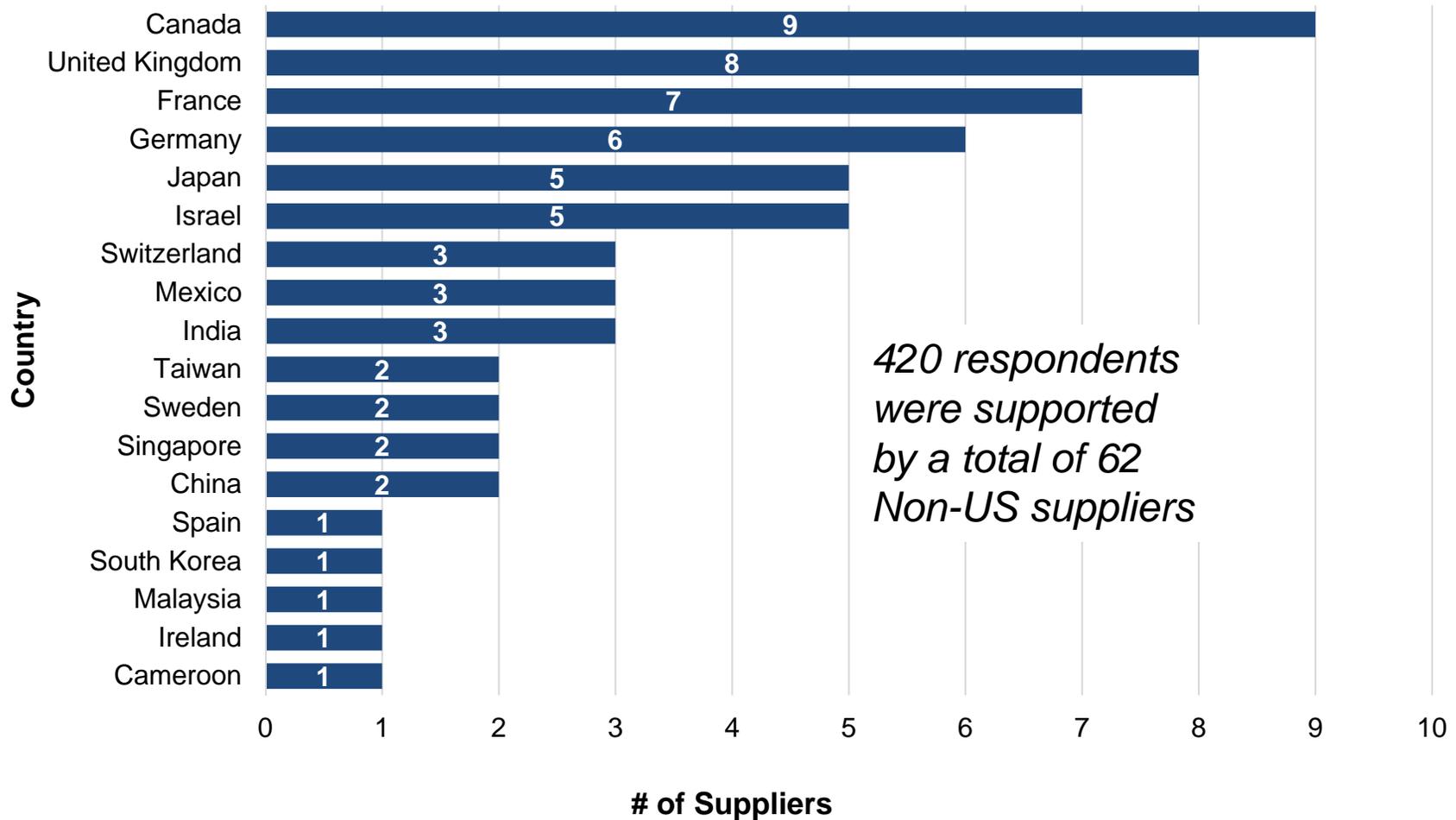
Total Supplier Support

- 1,307 unique suppliers supported 420 respondents
- The top 15 most cited suppliers only accounted for 7% of all supplier support
- 97% (1,267) of all identified unique suppliers are considered domestic



Critical Vendors & Suppliers

Suppliers by Country



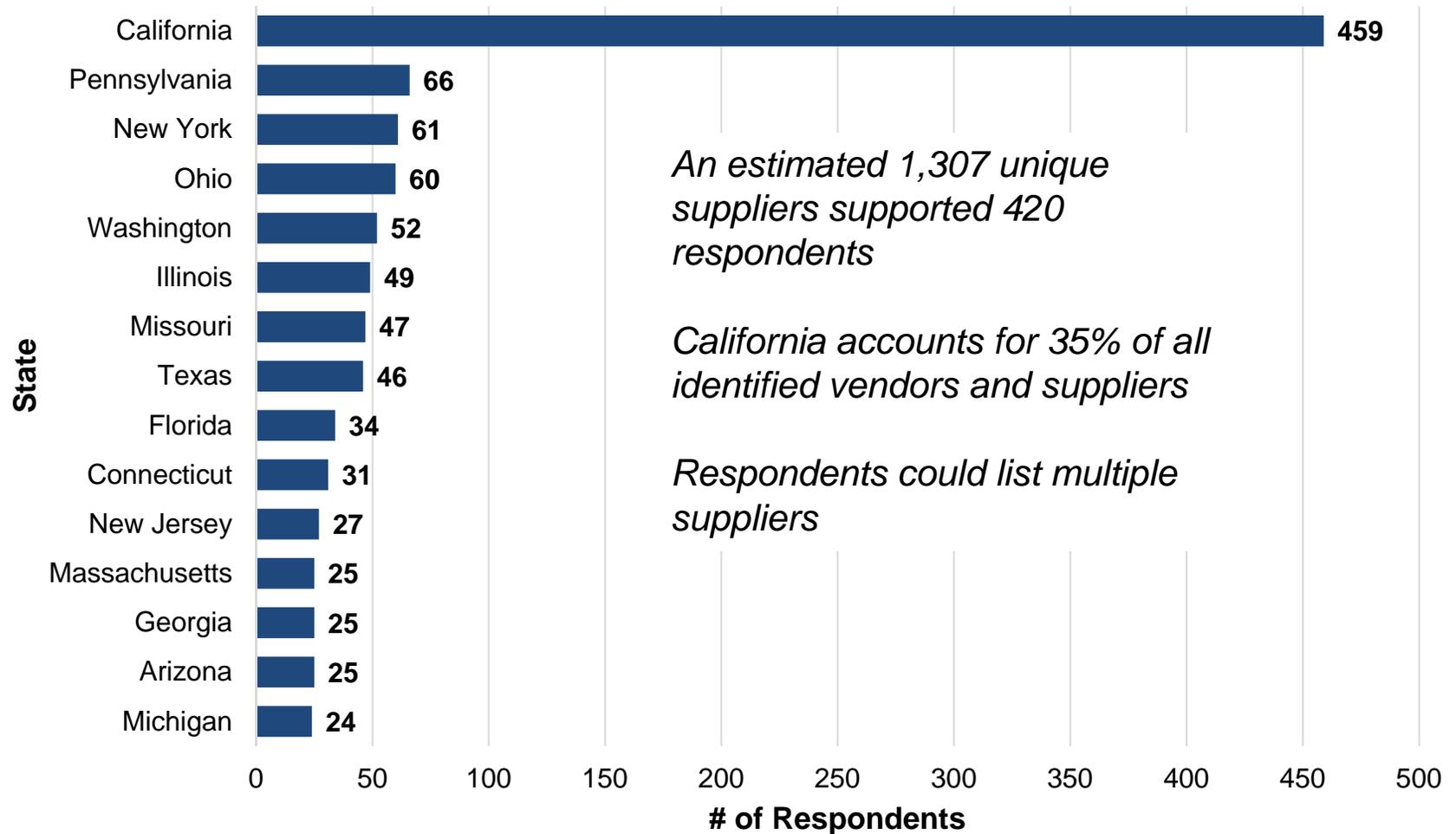
Q8, A

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Critical Vendors & Suppliers Suppliers by Top 15 State

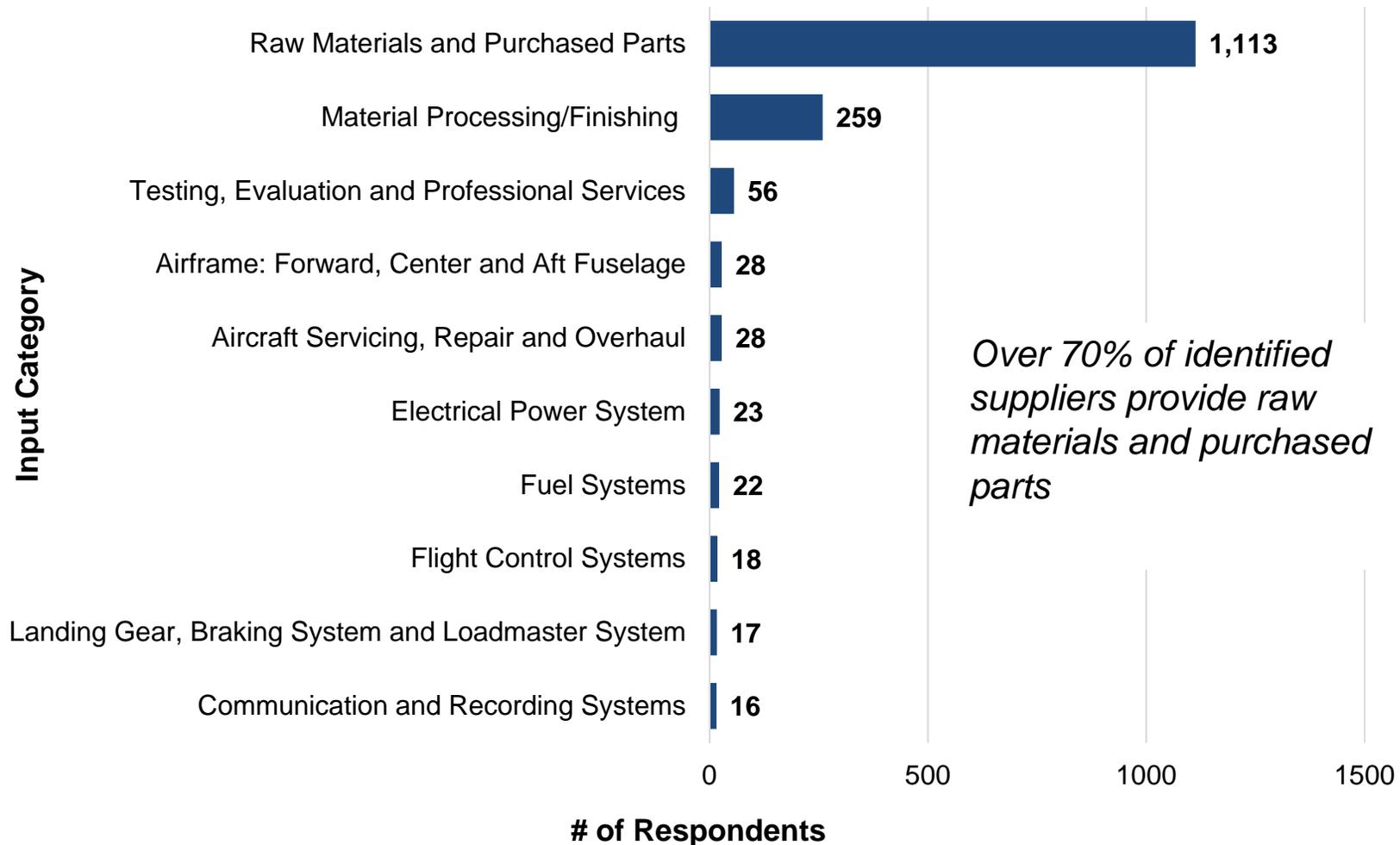


Q8, A

420 Respondents



Critical Vendors & Suppliers Top 10 Supplier Input Categories



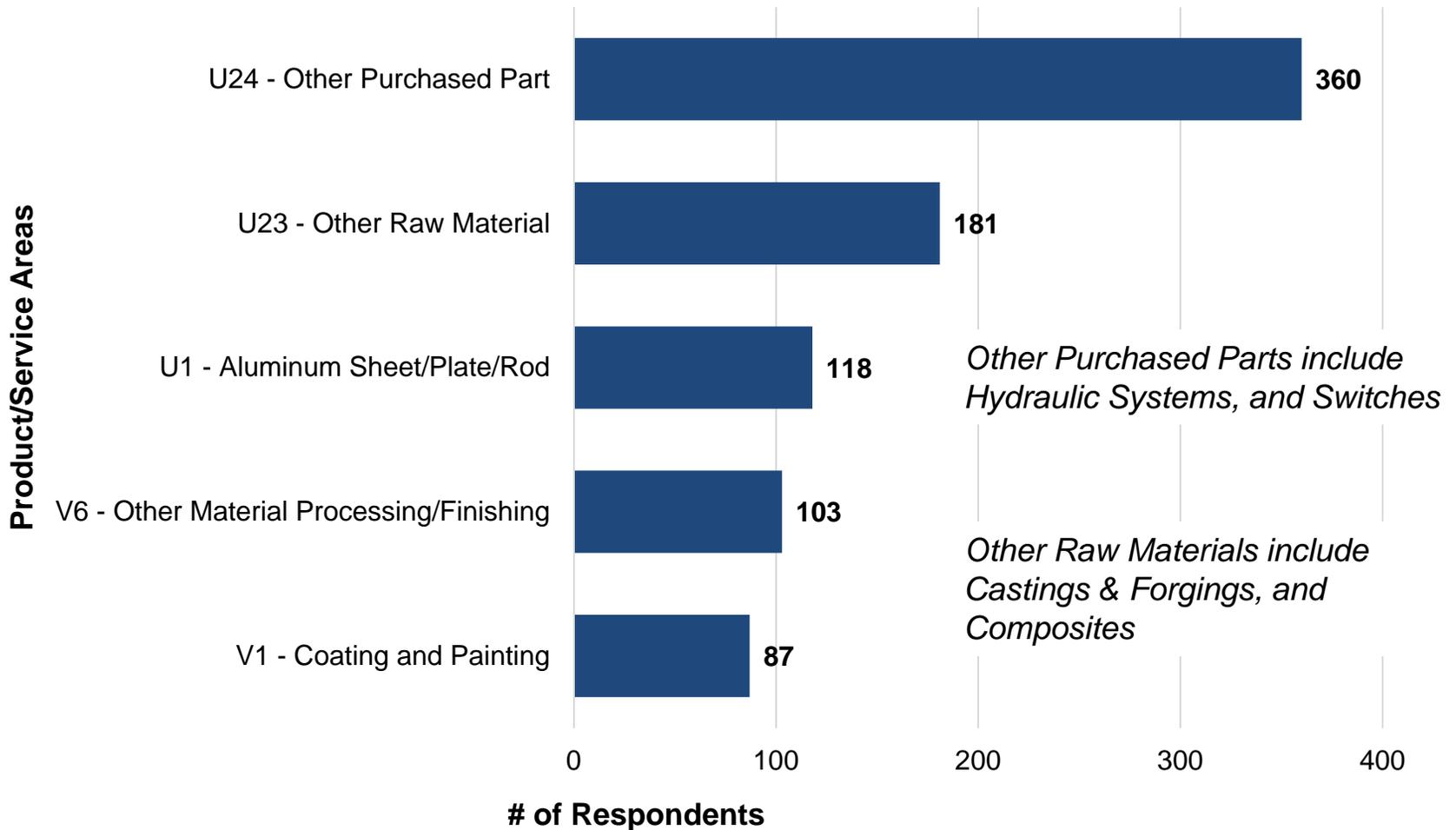
Q8, A

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Critical Vendors & Suppliers Top 5 Supplier Input Product/Service Areas



Q8, A

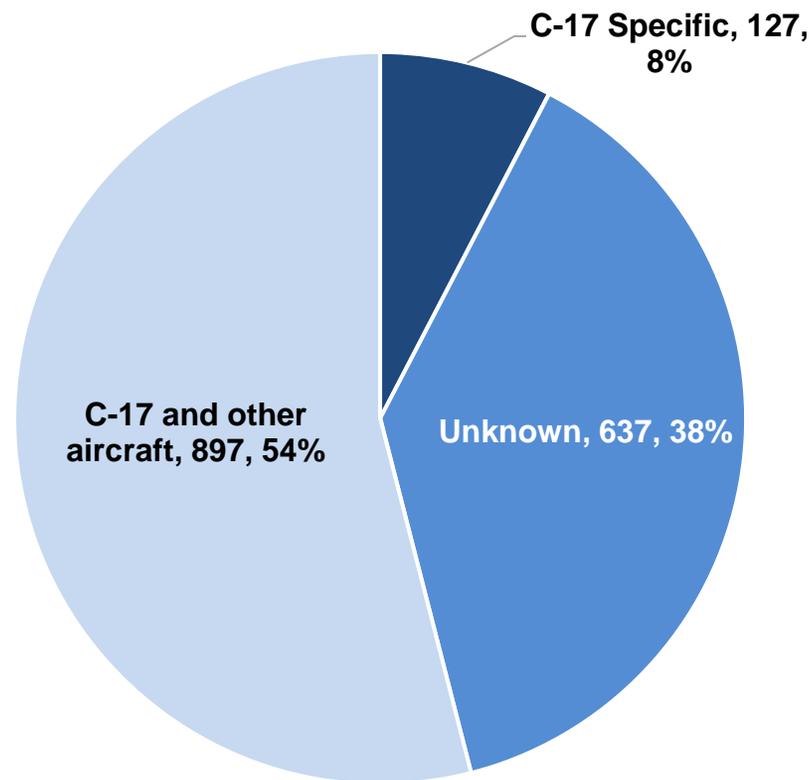
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Supplier Association With C-17 Program

Number of Respondent Suppliers Associated With C-17 Program



8% of 1,661 identified suppliers were exclusively involved in C-17 specific operations

Q8, A

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Supplier Impacts

Impact of C-17 Termination On Domestic Supplier Shut Downs

Only one respondent indicated that one or more of their suppliers ceased operations following the termination of the C-17 program. Both suppliers were located in California. Both sold raw materials and purchased parts.

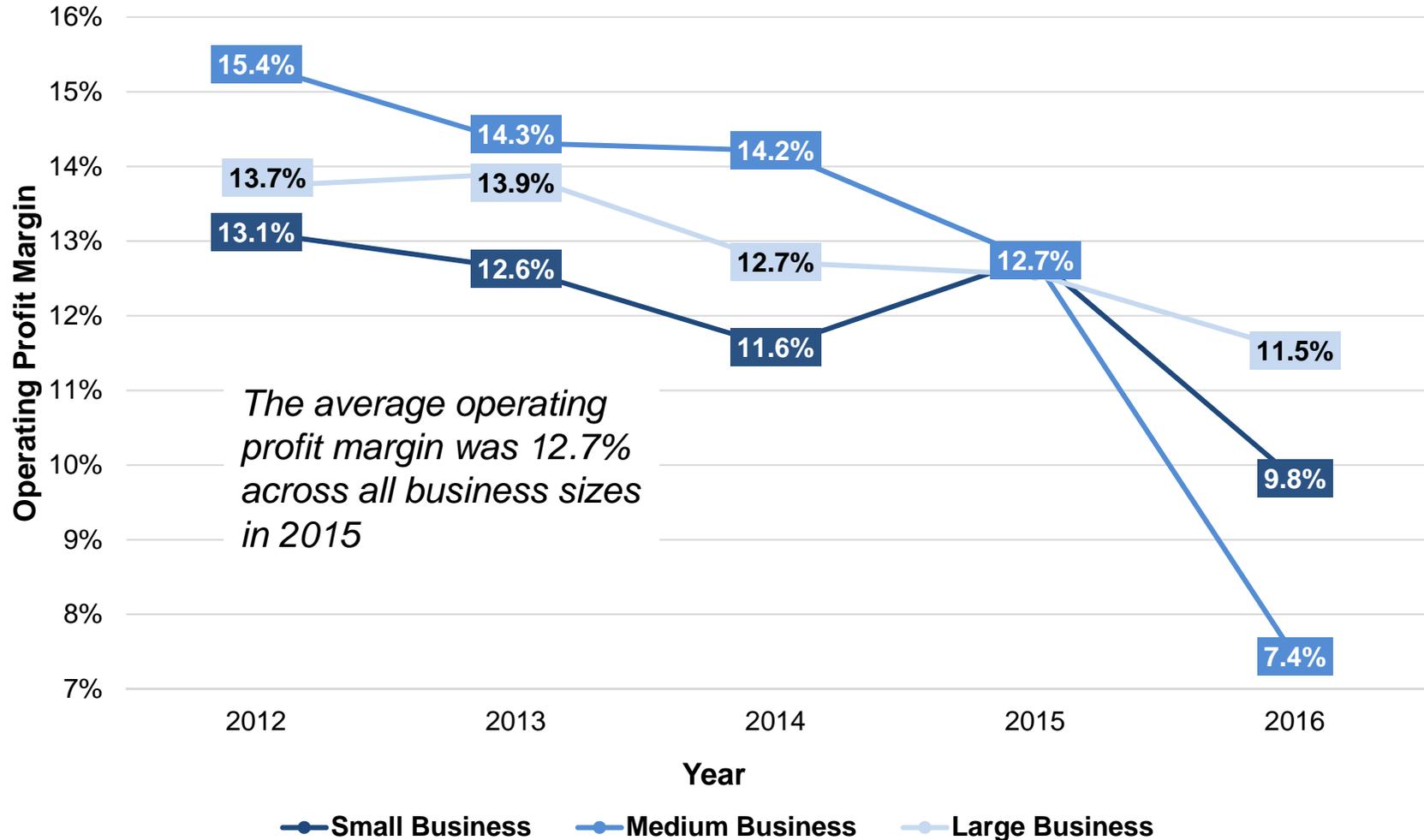
“Less income. Had to lay off long time employees.”

-Small Business



Operating Profit Margin

Average Operating Profit Margin Across Small, Medium, and Large Businesses
2012-2016



Q9

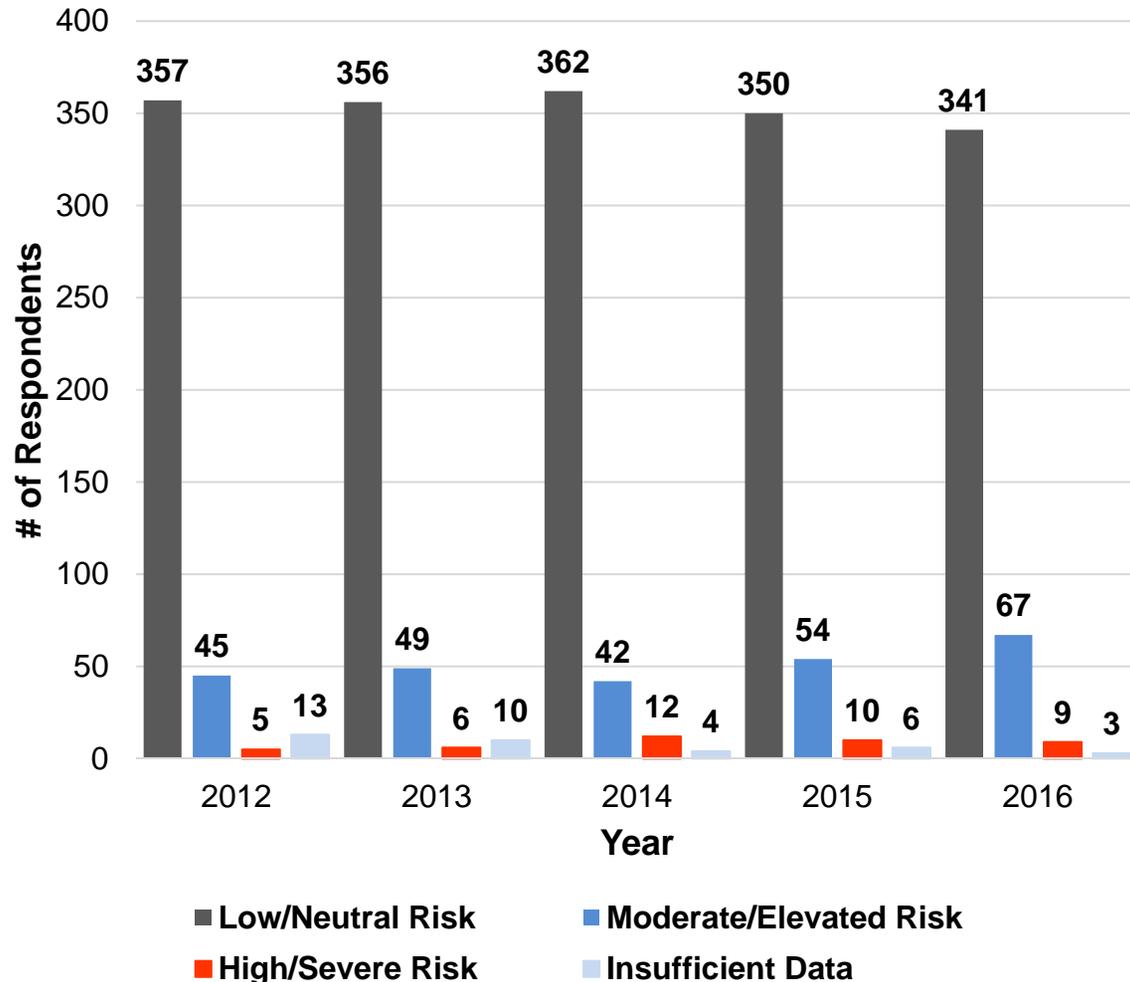
396 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Financial Risk Levels

Number of Companies and Financial Risk Level



Financial Risk calculation based primarily on profit margins, debt levels, liquidity

Reasons for lack of measurement:

Source data mismatches (e.g. reporting income statement data at the facility level and balance sheet data at the corporate level)

Unavailable or missing data (e.g. no assets or sales listed, newly formed business)

Q9

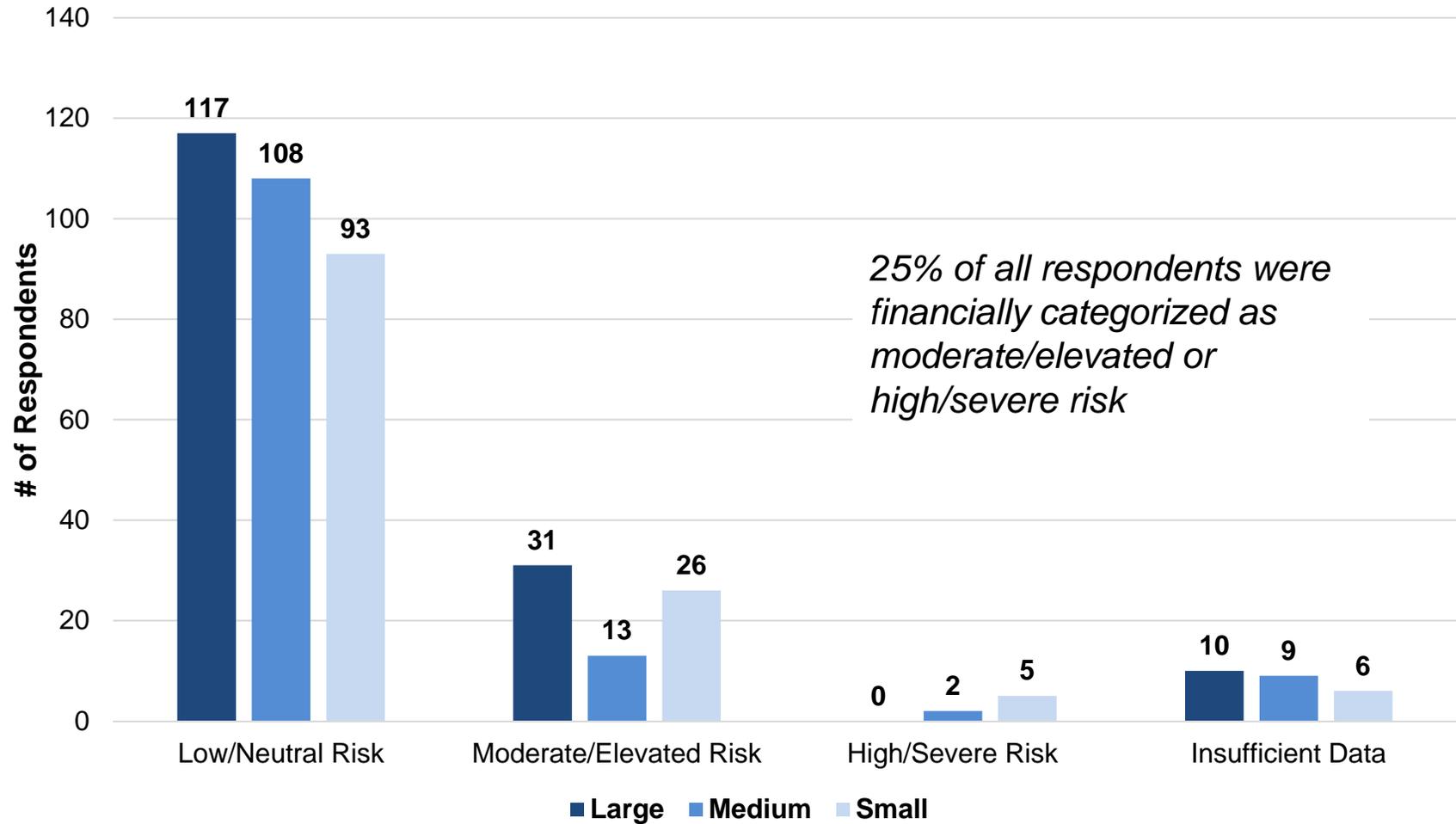
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Financial Risk Levels

Company Sizes for Overall Financial Risk Status 2012-2016



Q9

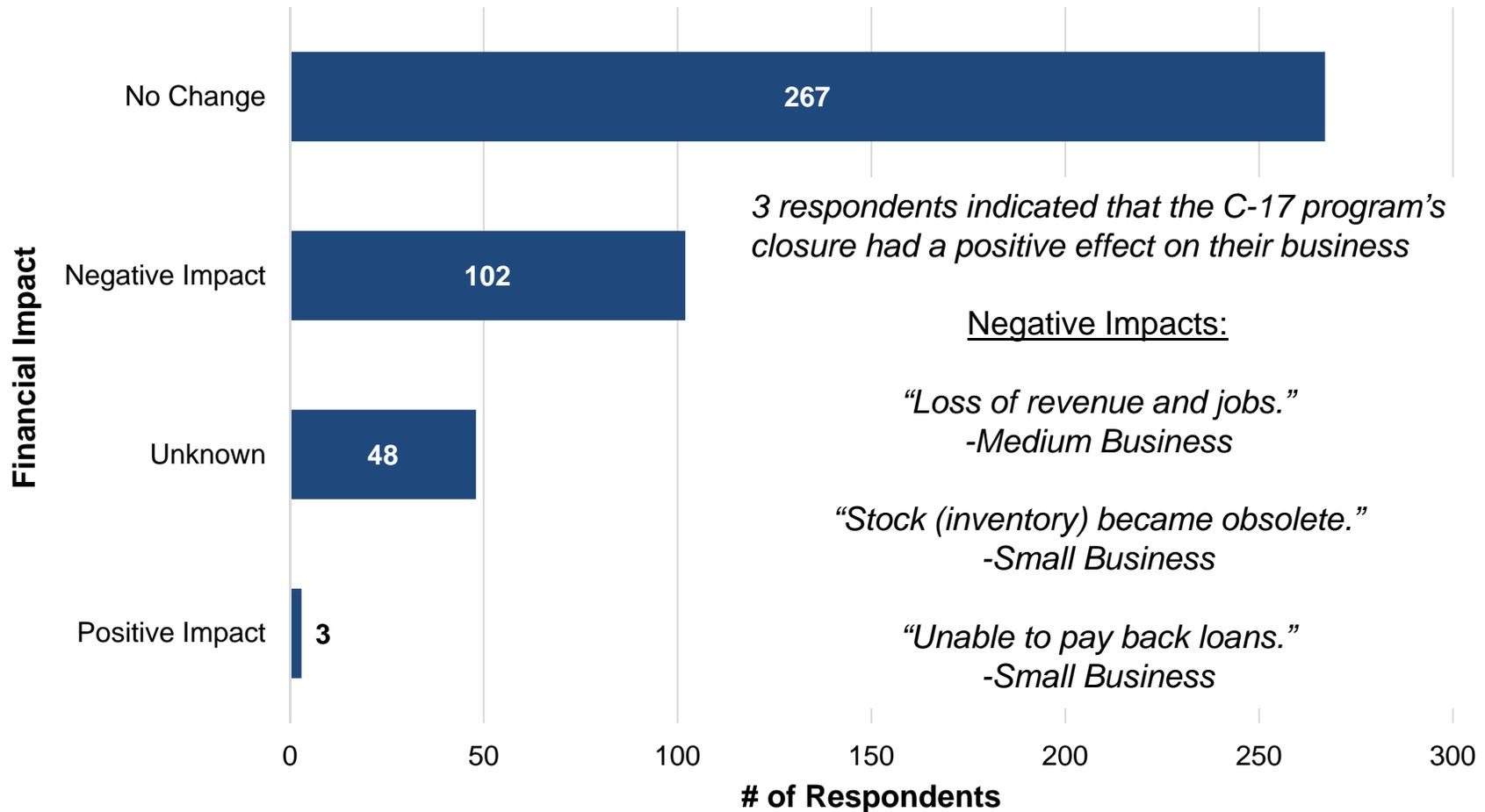
420 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Financial Impacts

Self-Assessed Financial Impacts Experienced Due To The End of C-17 Program



Q9, C1

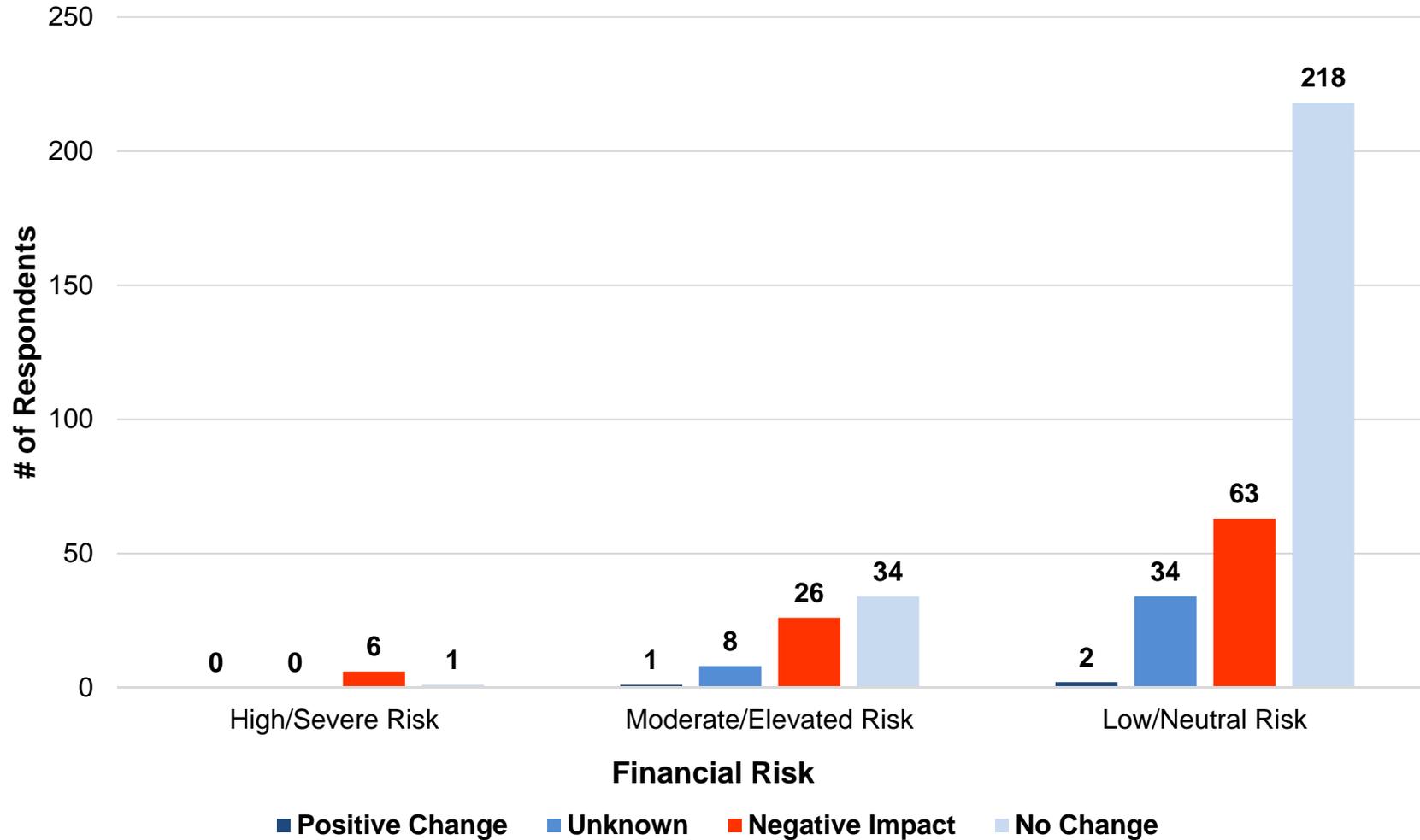
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Financial Risk Level vs. Financial Impact

Financial Impact Due To Termination of C-17 Program According To Financial Risk Levels



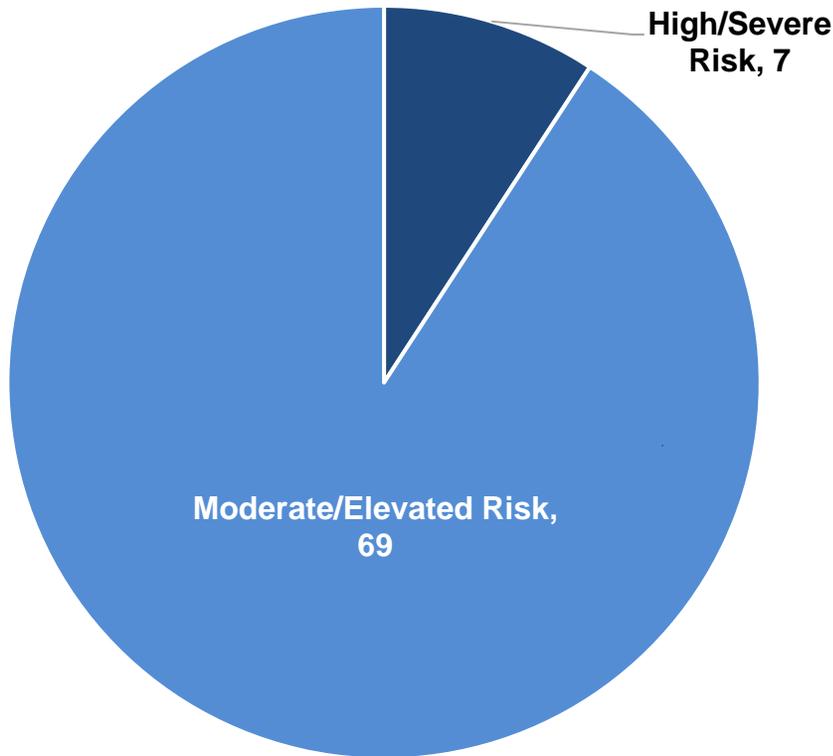
Q9, C1

393 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Financial Risk Level vs. Financial Impact High/Severe Risk and Moderate/Elevated Risk Companies



High/Severe Risk Commonalities:

6 out of 7 Respondents have known C-17 support and all production is aircraft-related

Primary business line is manufacturing

Locations in different states, Only 2 are in California

Majority small businesses

Moderate/Elevated Risk Commonalities:

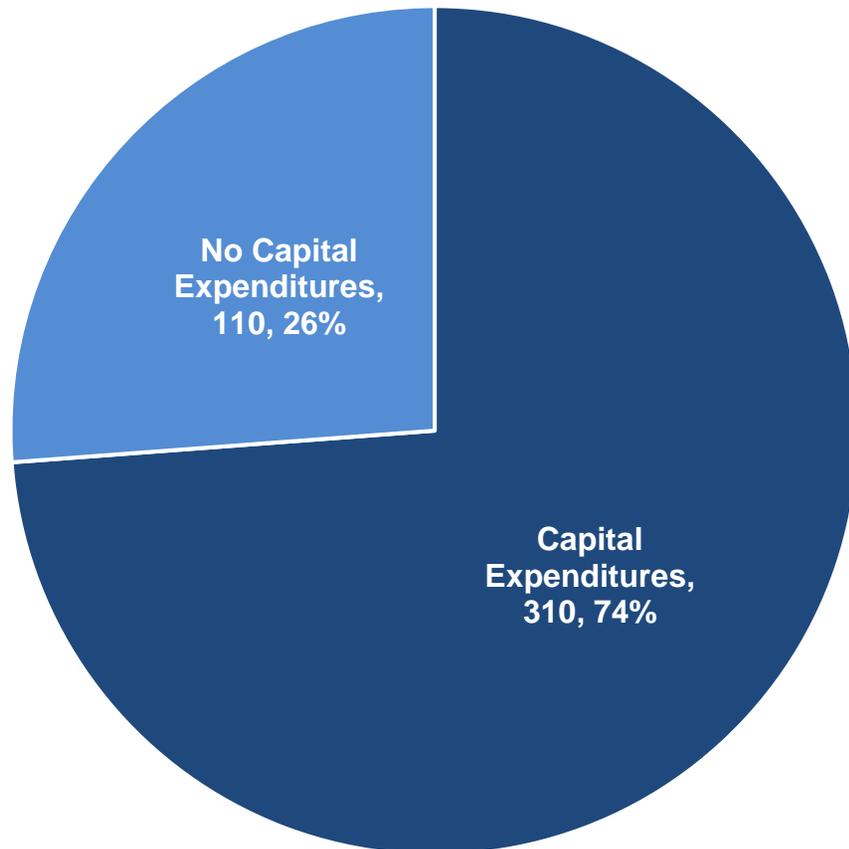
Majority large businesses

44% stated C-17 termination had a negative impact on their business



Capital Expenditures Reporting

Number of Respondents with Capital Expenditures 2012 - 2016



26% (110) of respondents had no capital expenditures

Over 50% (55) with no capital expenditures were small businesses

Q10, A

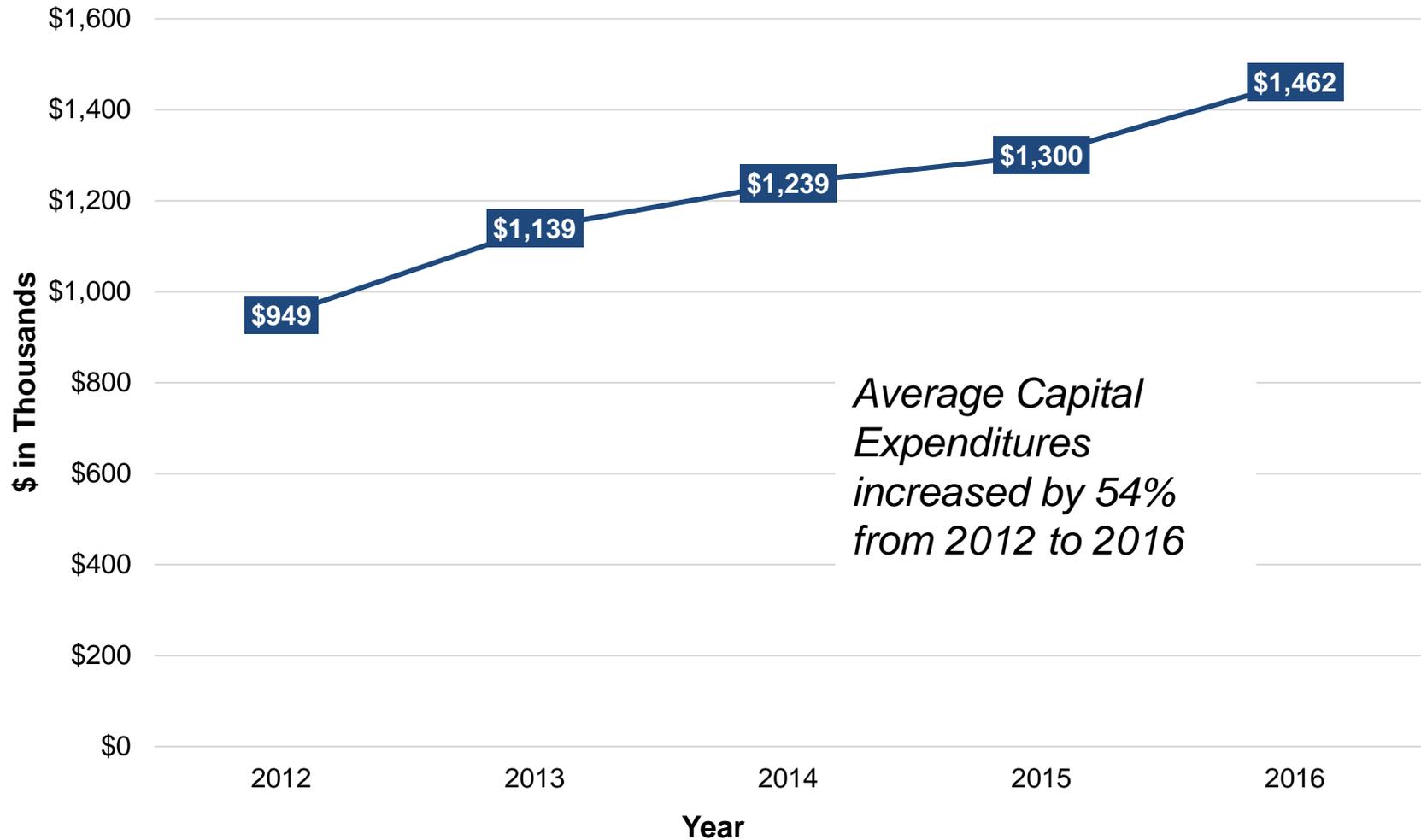
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Capital Expenditures

Average Capital Expenditures 2012-2016



Q10, A

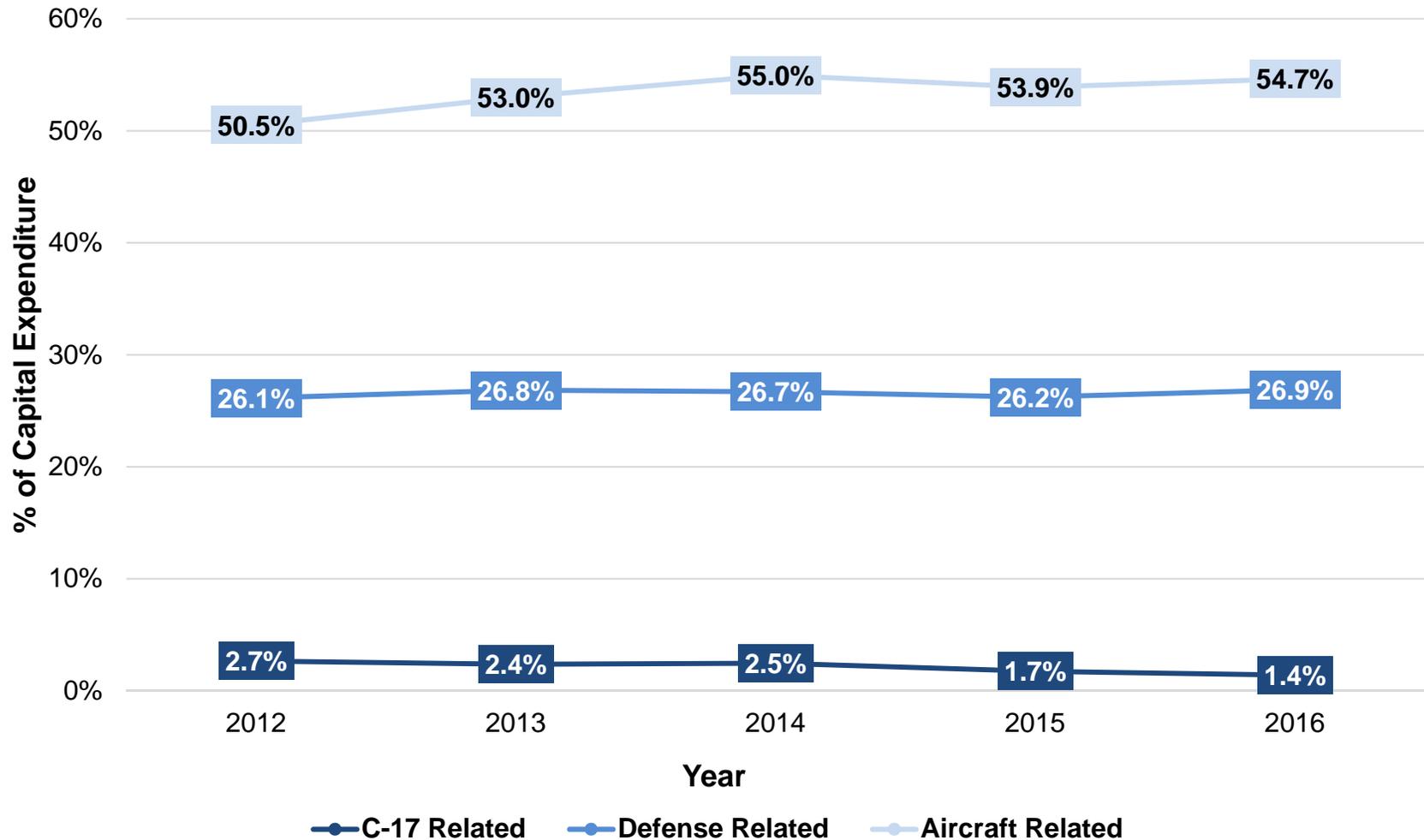
310 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Capital Expenditures

Average Capital Expenditures Broken Down By Allocation



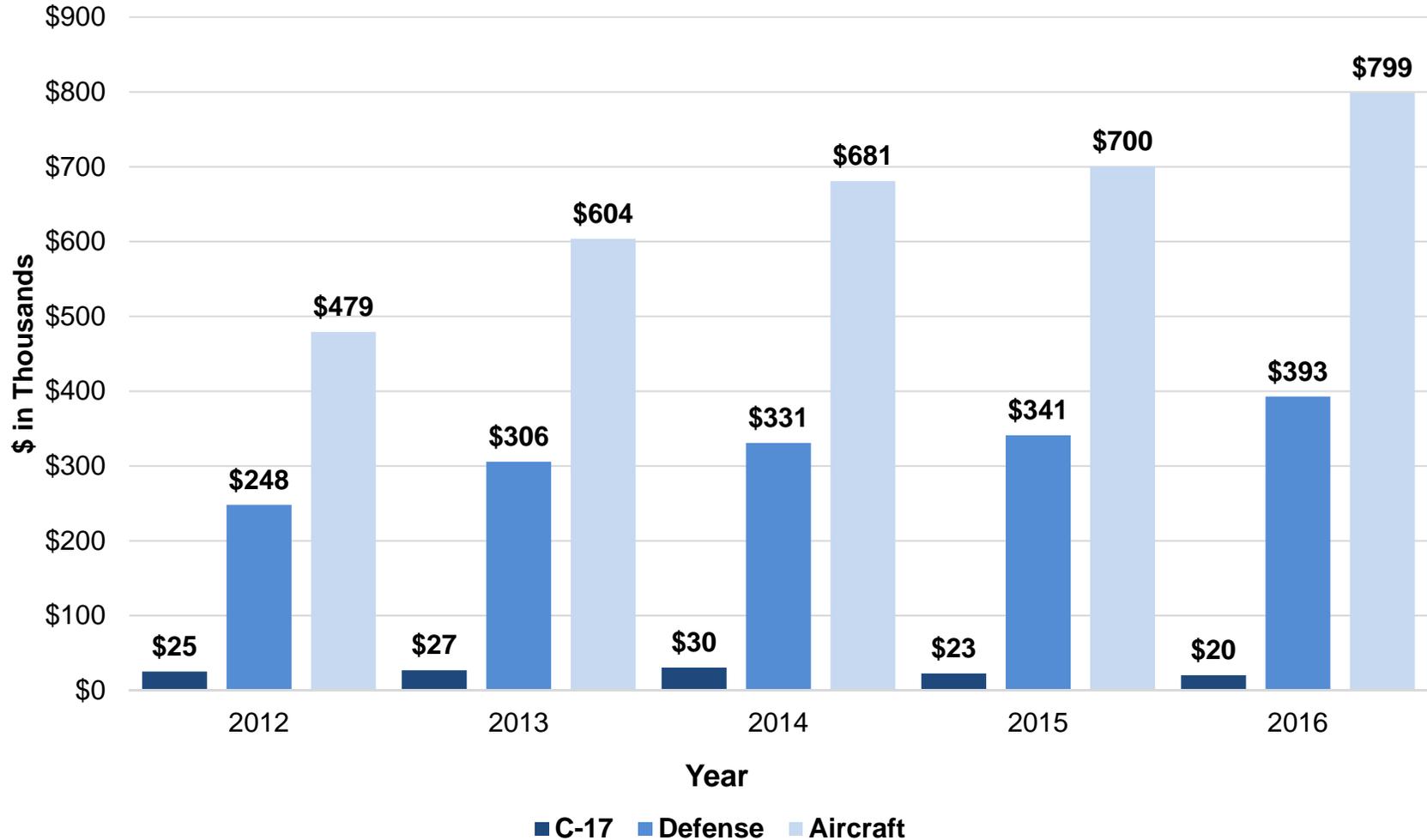
Q10, A

310 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Average of Attributable Capital Expenditures Broken Down By Allocation



Q10, A

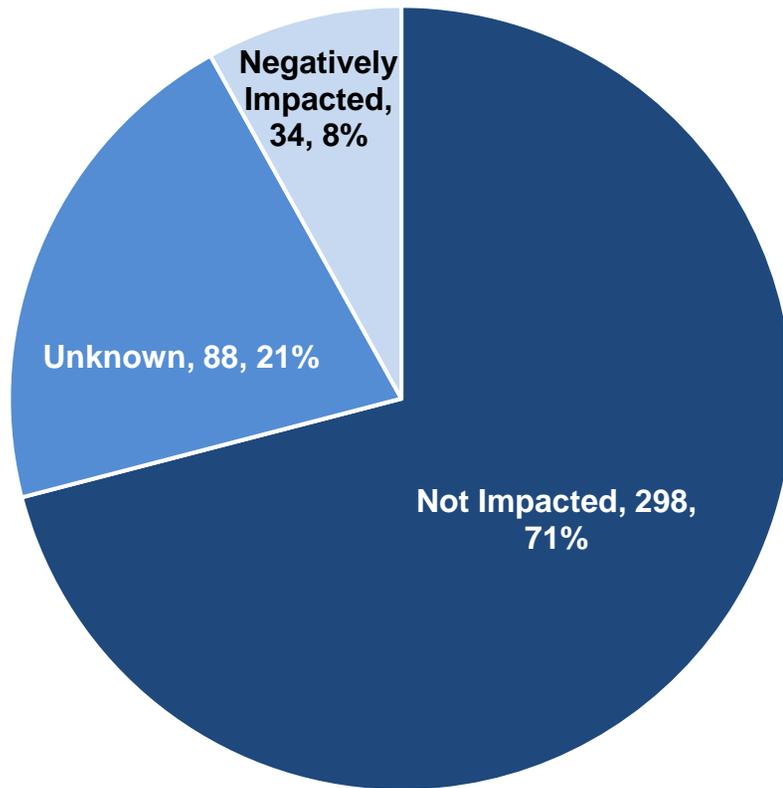
310 Respondents

Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Reduction of USG Defense Spending

Impact of Reductions In USG Defense Spending on Capital Expenditures



16 of the 34 respondents who were negatively impacted are small business enterprises.

*“We had no reason for growth. We just needed to survive, and we have so far.
-Small, Moderate/Elevated Risk Business*

*“From 2013 through 2015, there was little need for more equipment as government procurement was flat.”
-Medium, Low/Neutral Risk Business*

Q10, B

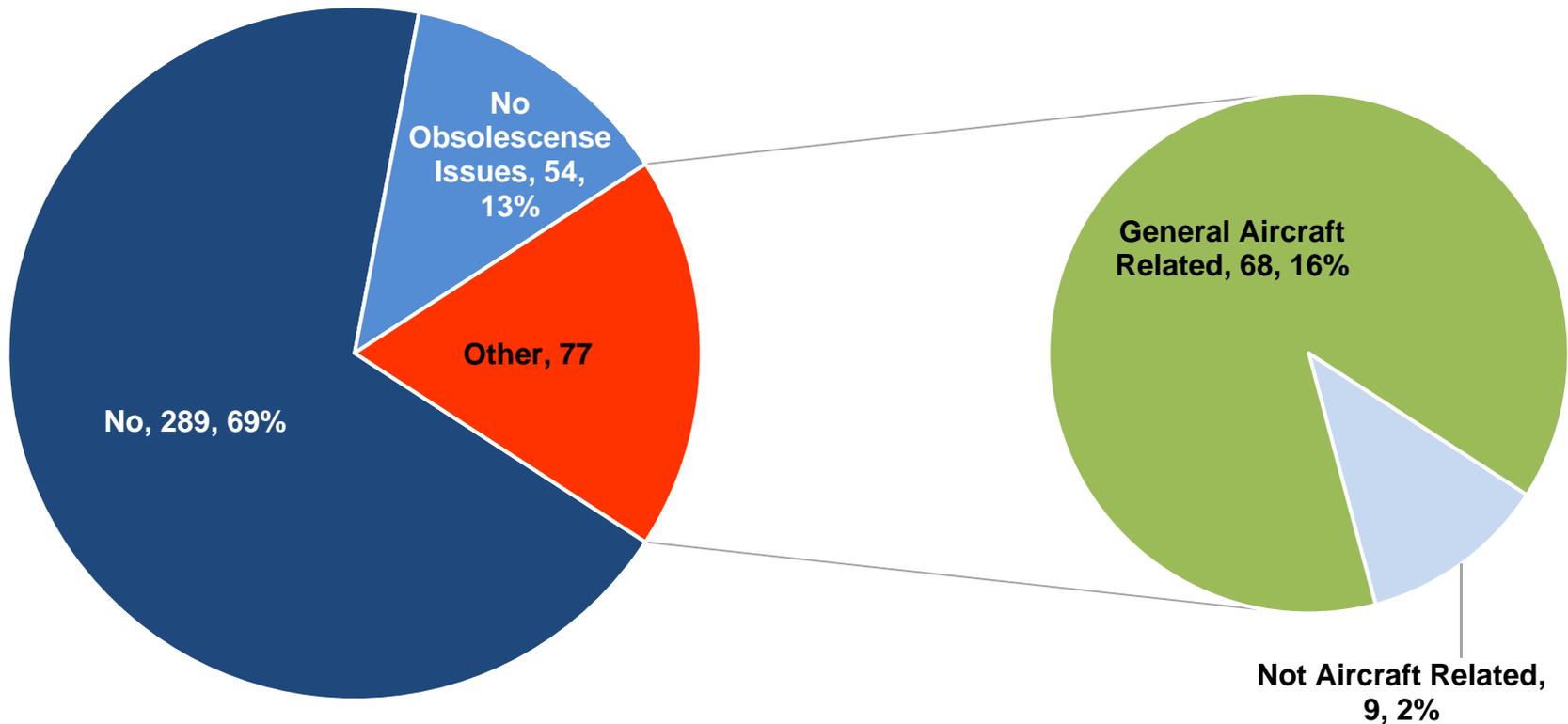
Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Use of 3D Printing for Obsolescence

Number of Respondents Utilizing 3D Printing To Manage Obsolescence Issues and Aircraft Program Applicability



Q10, C

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents

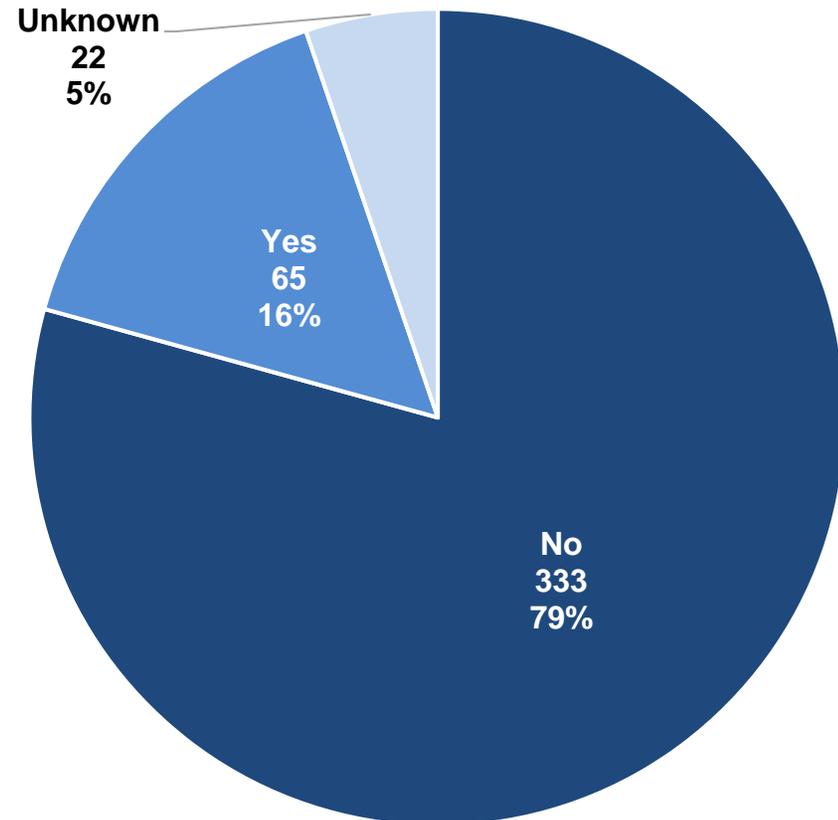


General 3D Printing Capabilities

Number of Respondents With 3D Printing Capabilities 2012-2016

Only 7 of the 65 respondents with 3D printing capabilities experienced a decline in aircraft-related capital expenditures due to a reduction in USG defense spending

None of the 65 respondents who have 3D printing capabilities are classified as high/severe risk companies



Q10, C

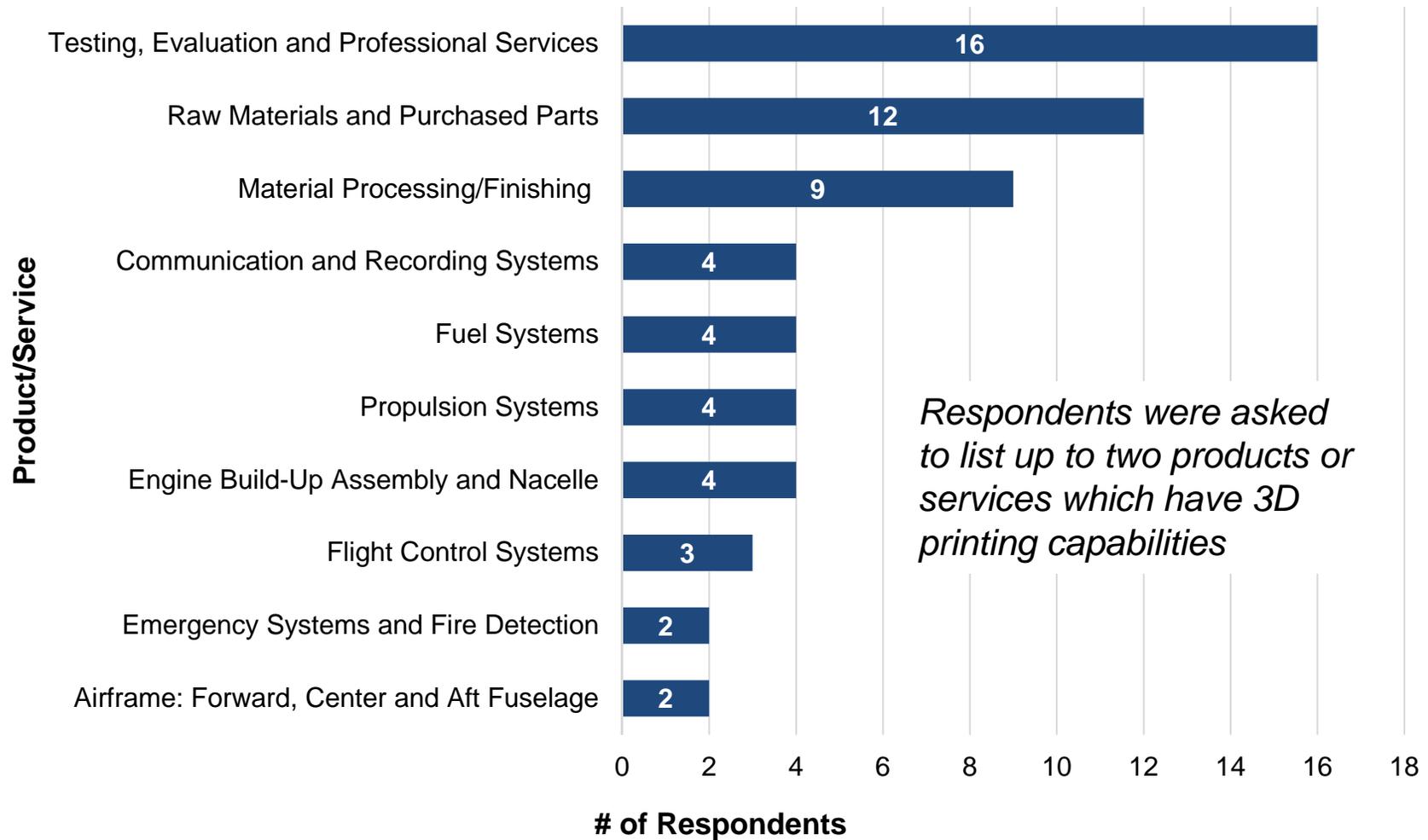
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



3D Printing

Top 10 3D Printing Product/Service Categories



Q10, C

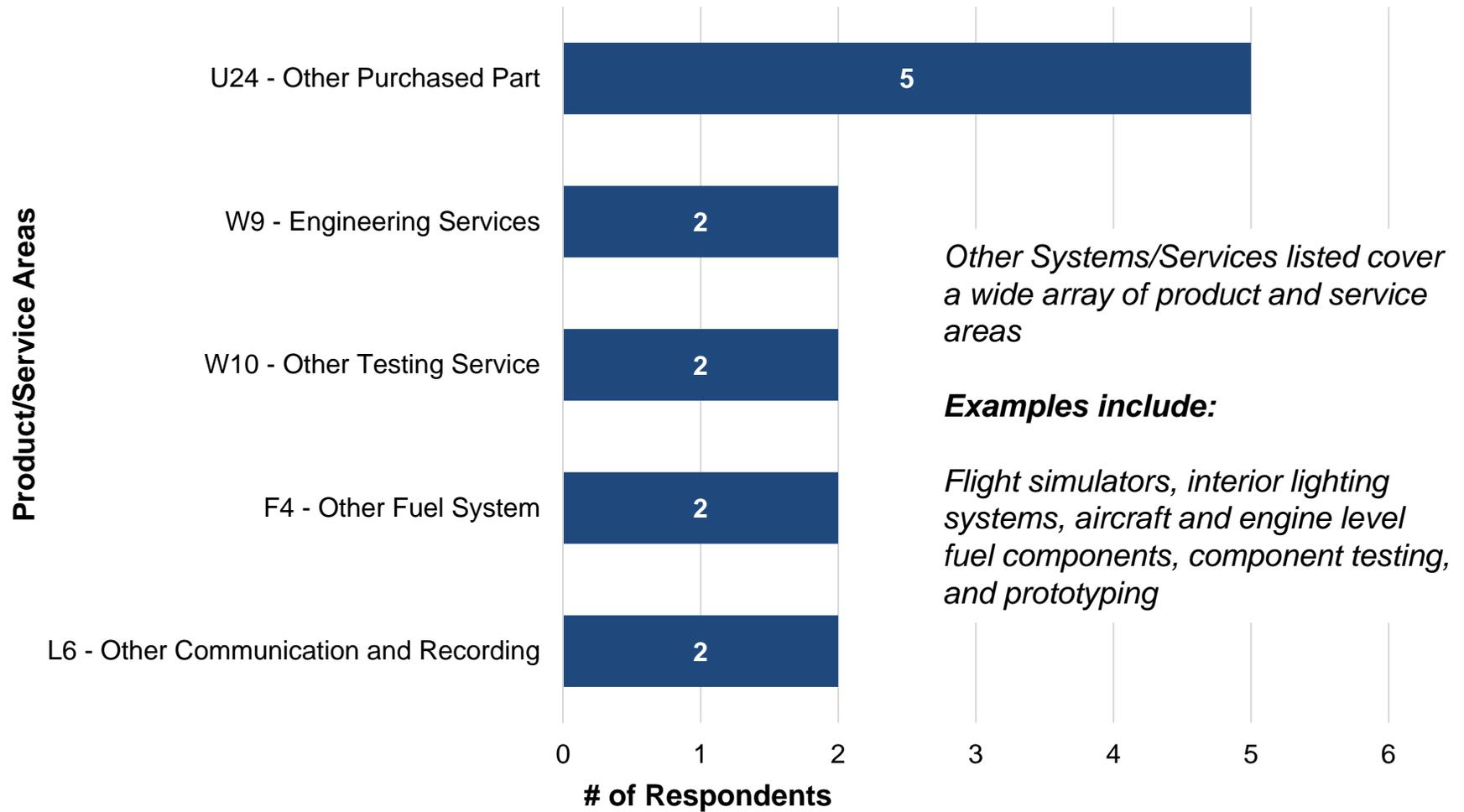
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



3D Printing

Top 5 3D Printing Product/Service Areas



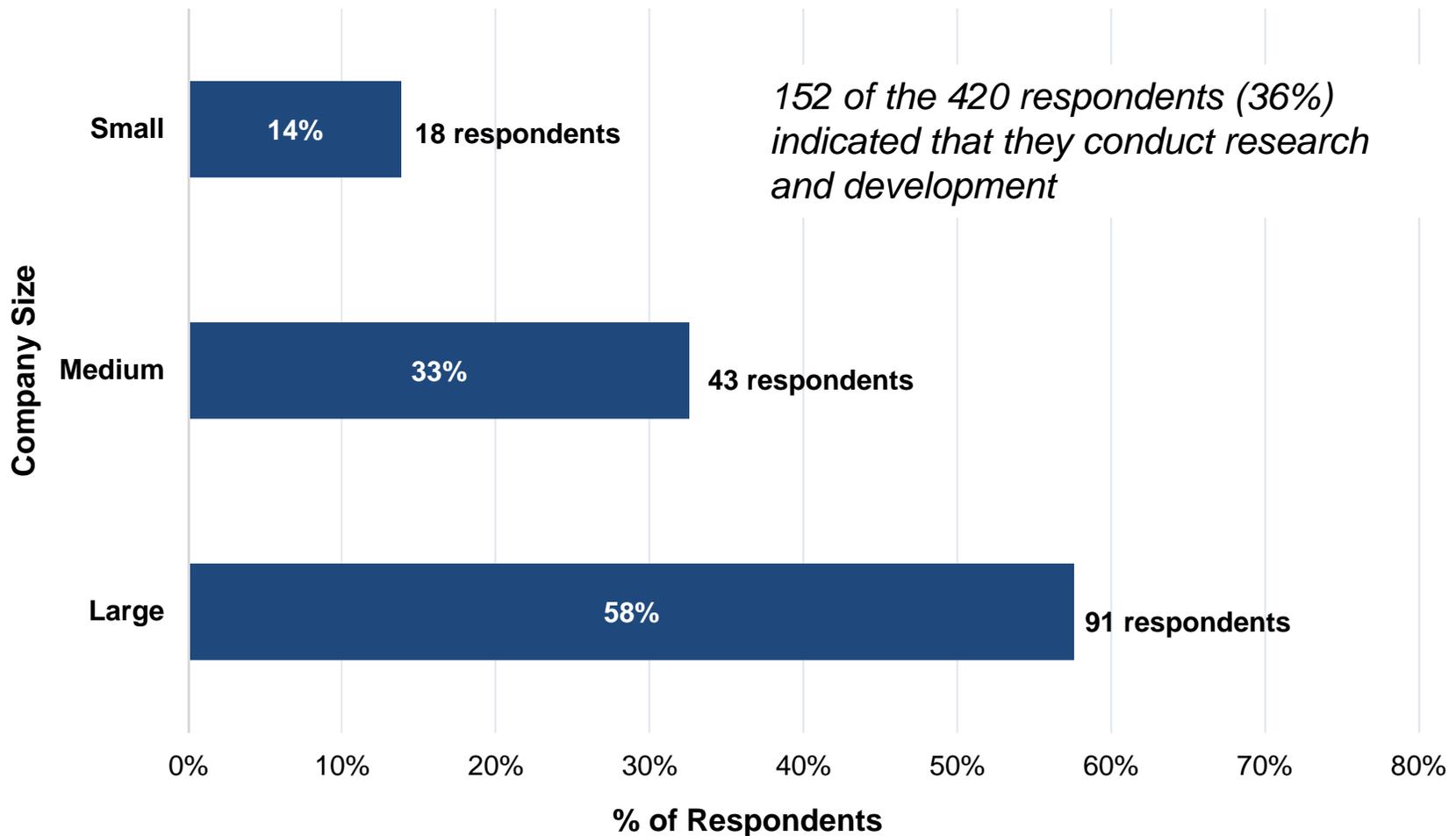
Q10, C

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Research and Development Percent of Respondents That Conduct R&D



Q11, A1

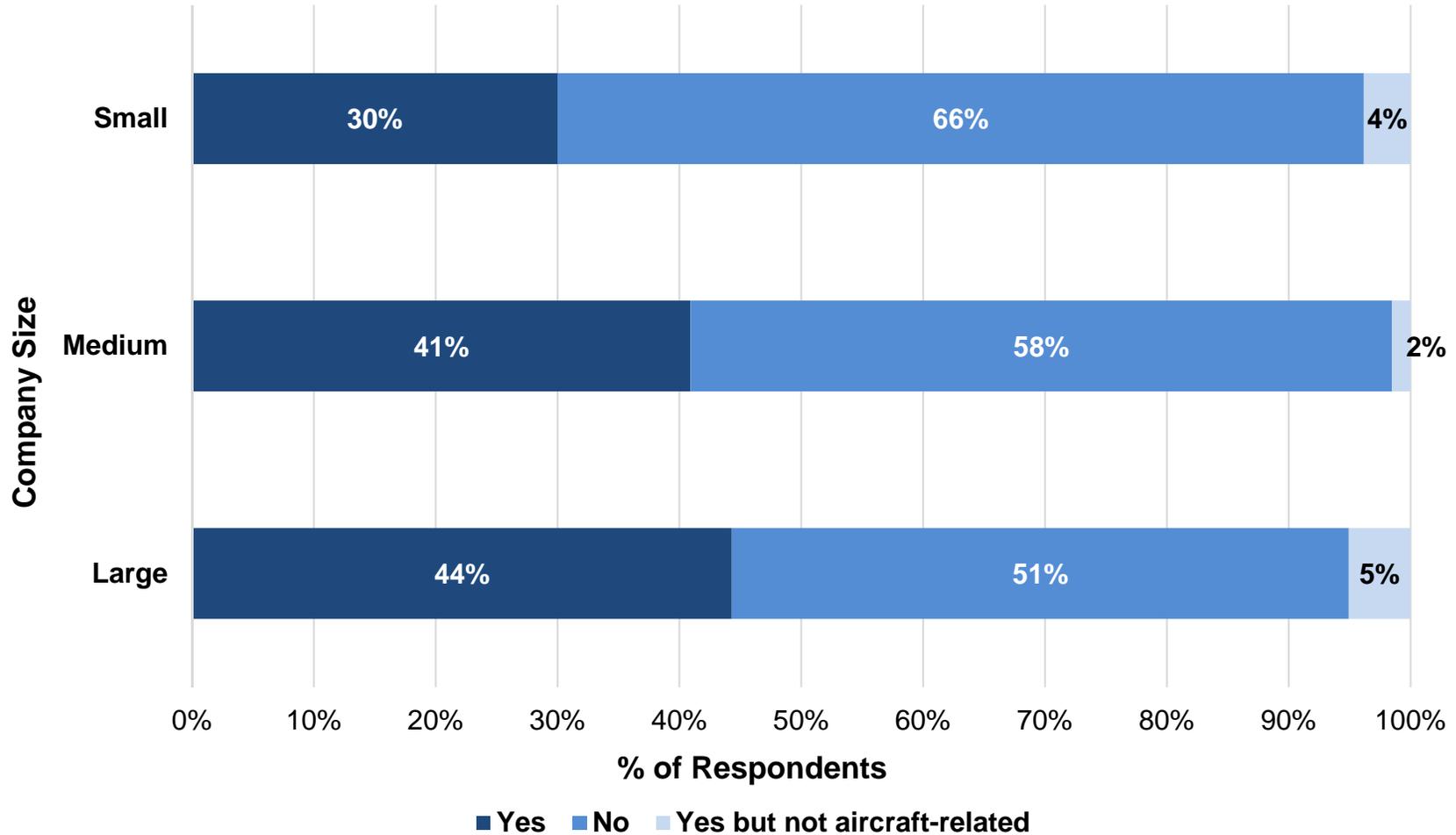
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

152 Respondents



Research and Development

Would Your Organization Conduct R&D if the U.S. Government Provided Funding?



Q11, A1

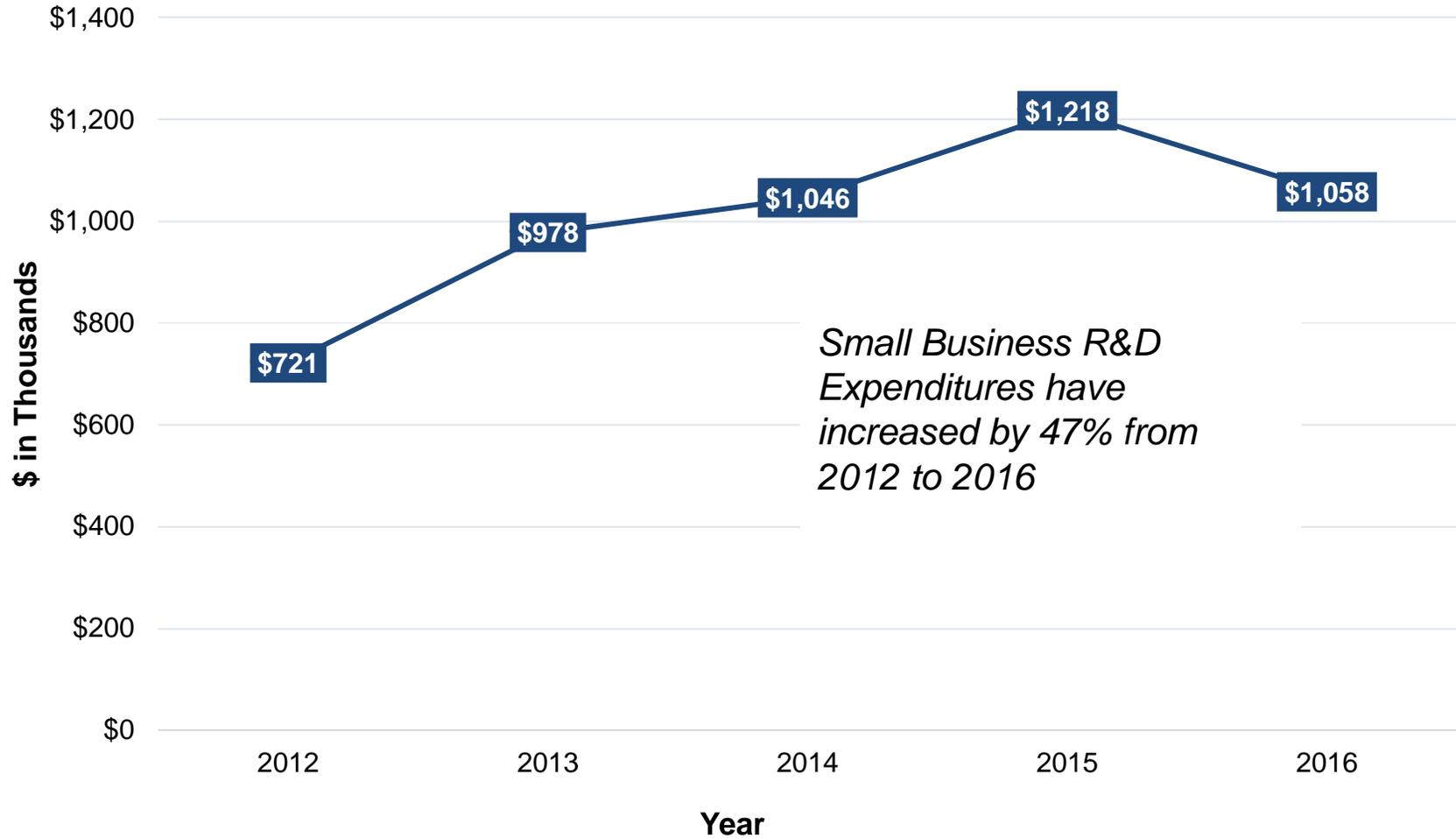
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

152 Respondents



Research and Development

Average Small Business R&D Expenditures 2012-2016



Q11, B1

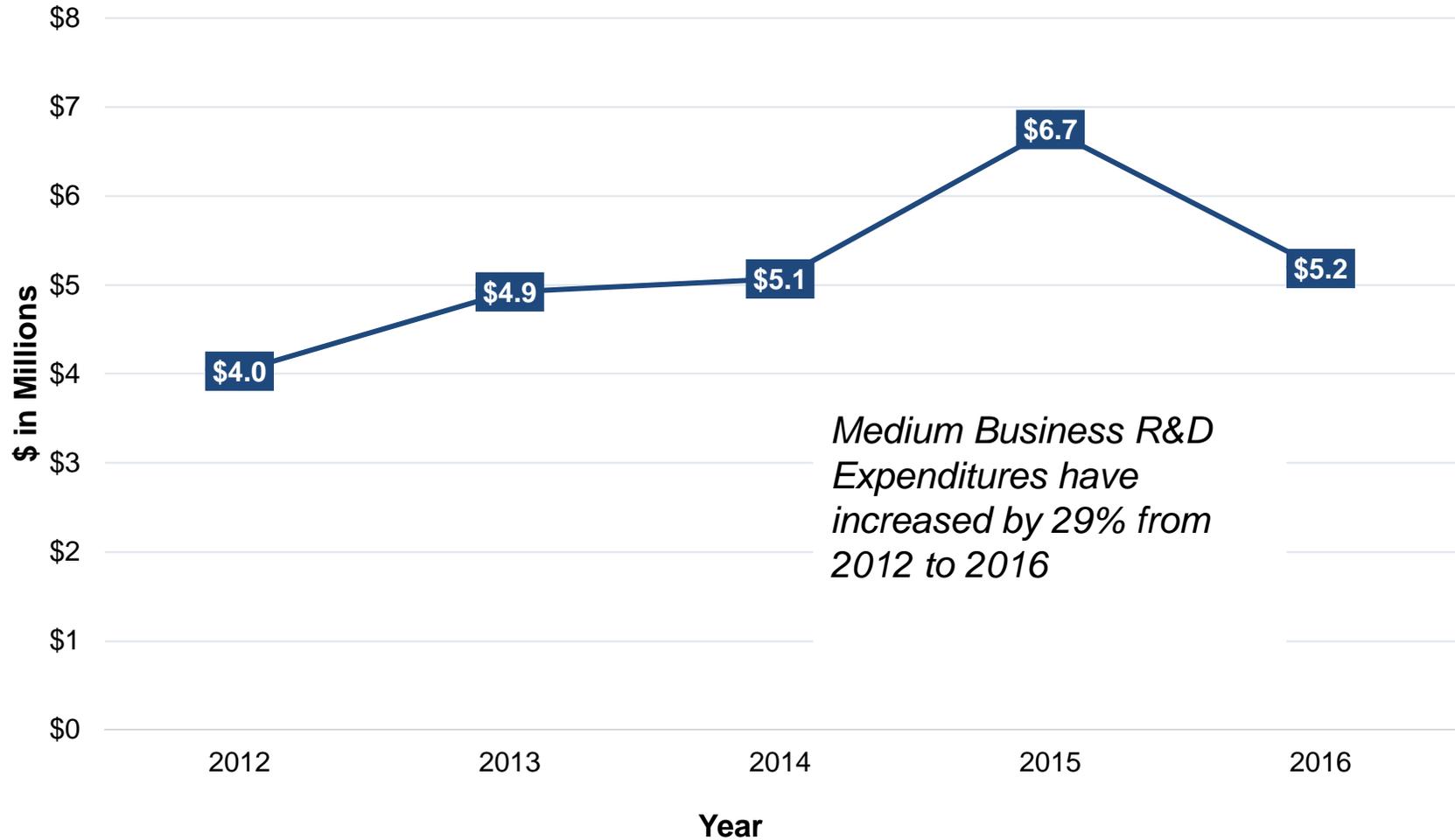
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

18 Respondents



Research and Development

Average Medium Business R&D Expenditures 2012-2016



Q11, B1

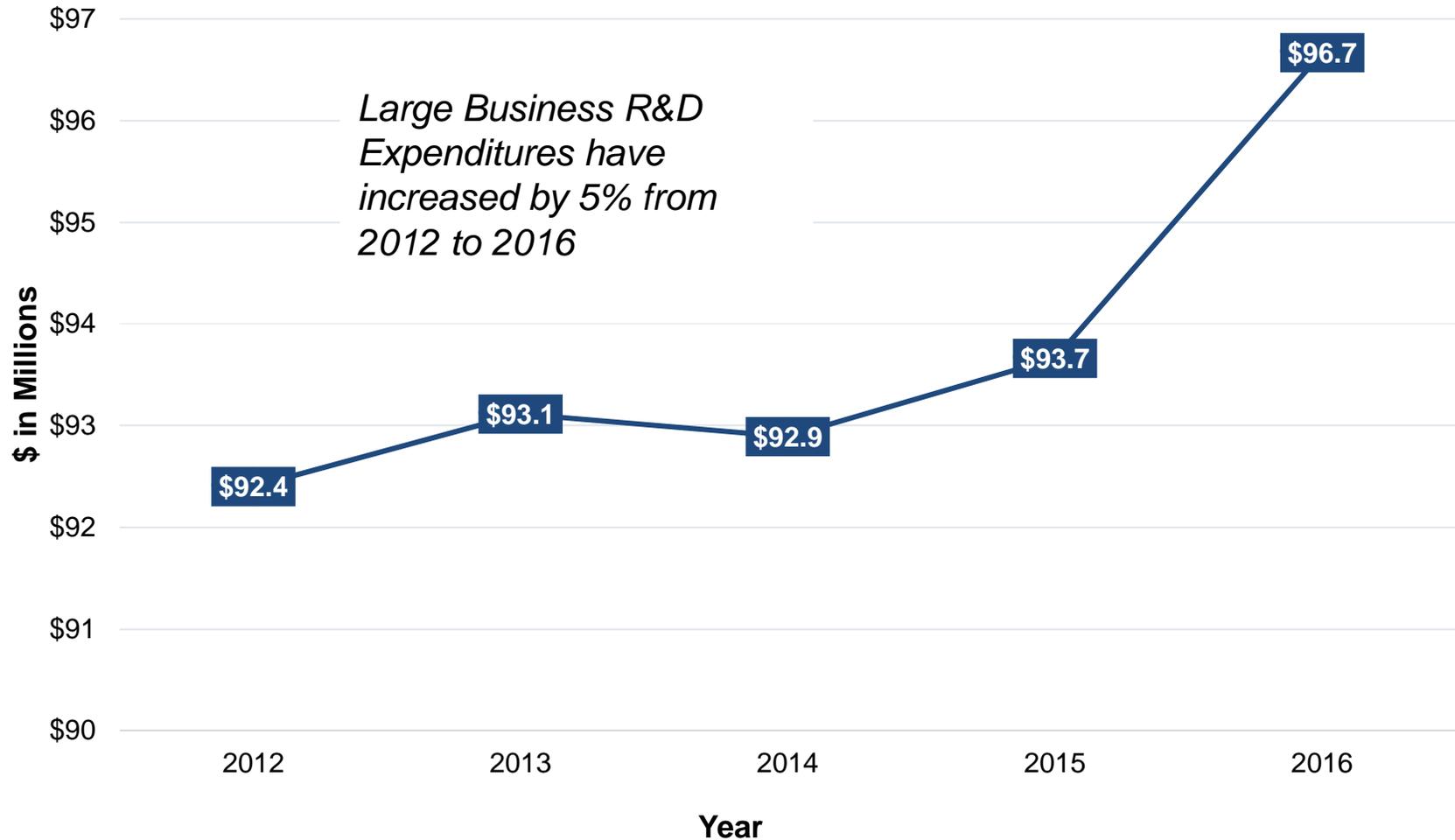
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

43 Respondents



Research and Development

Average Large Business R&D Expenditures 2012-2016



Q11, B1

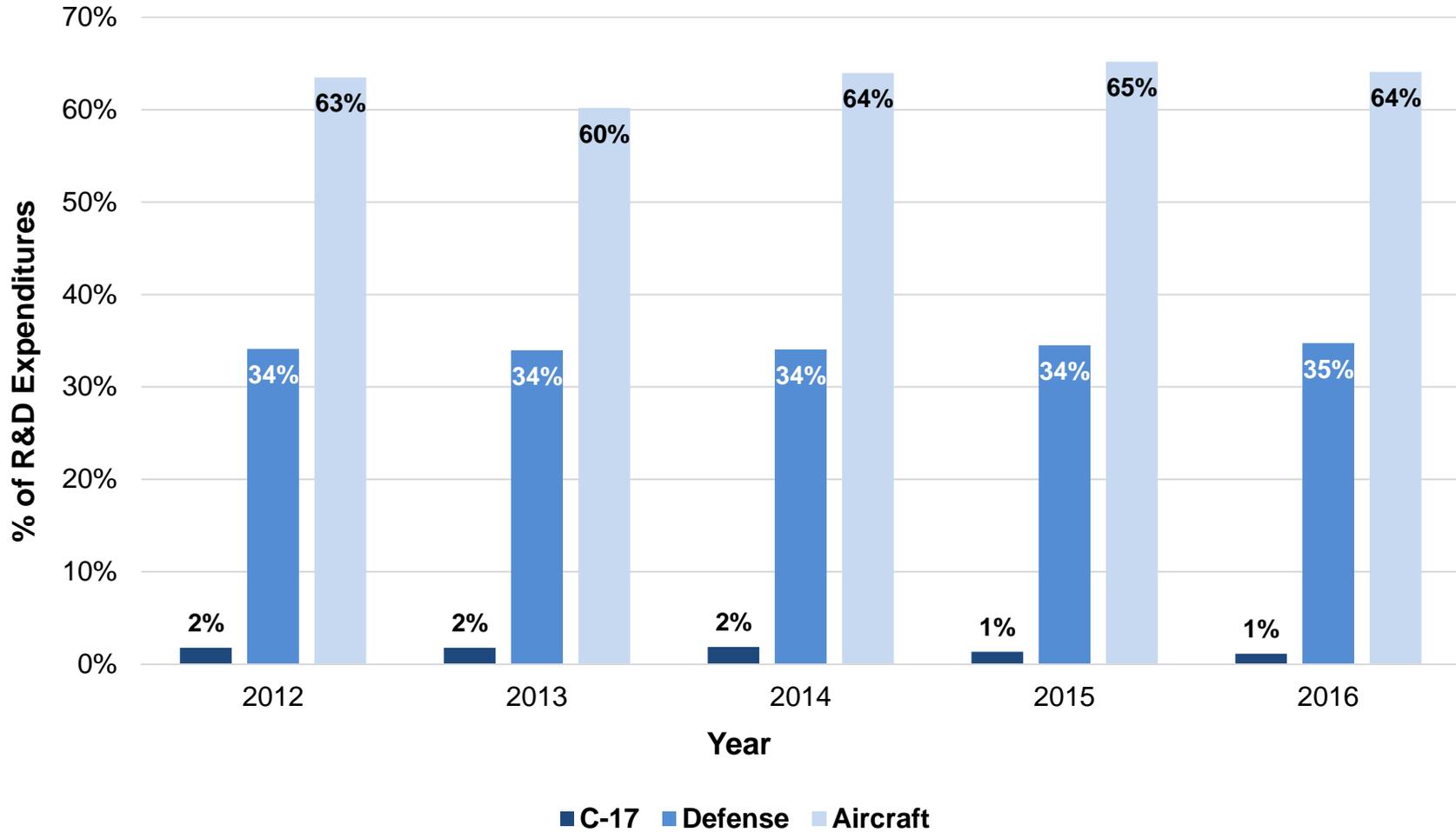
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

43 Respondents



Research and Development

Average Annual R&D Expenditure By Area of Research 2012-2016



Q11, B2-4

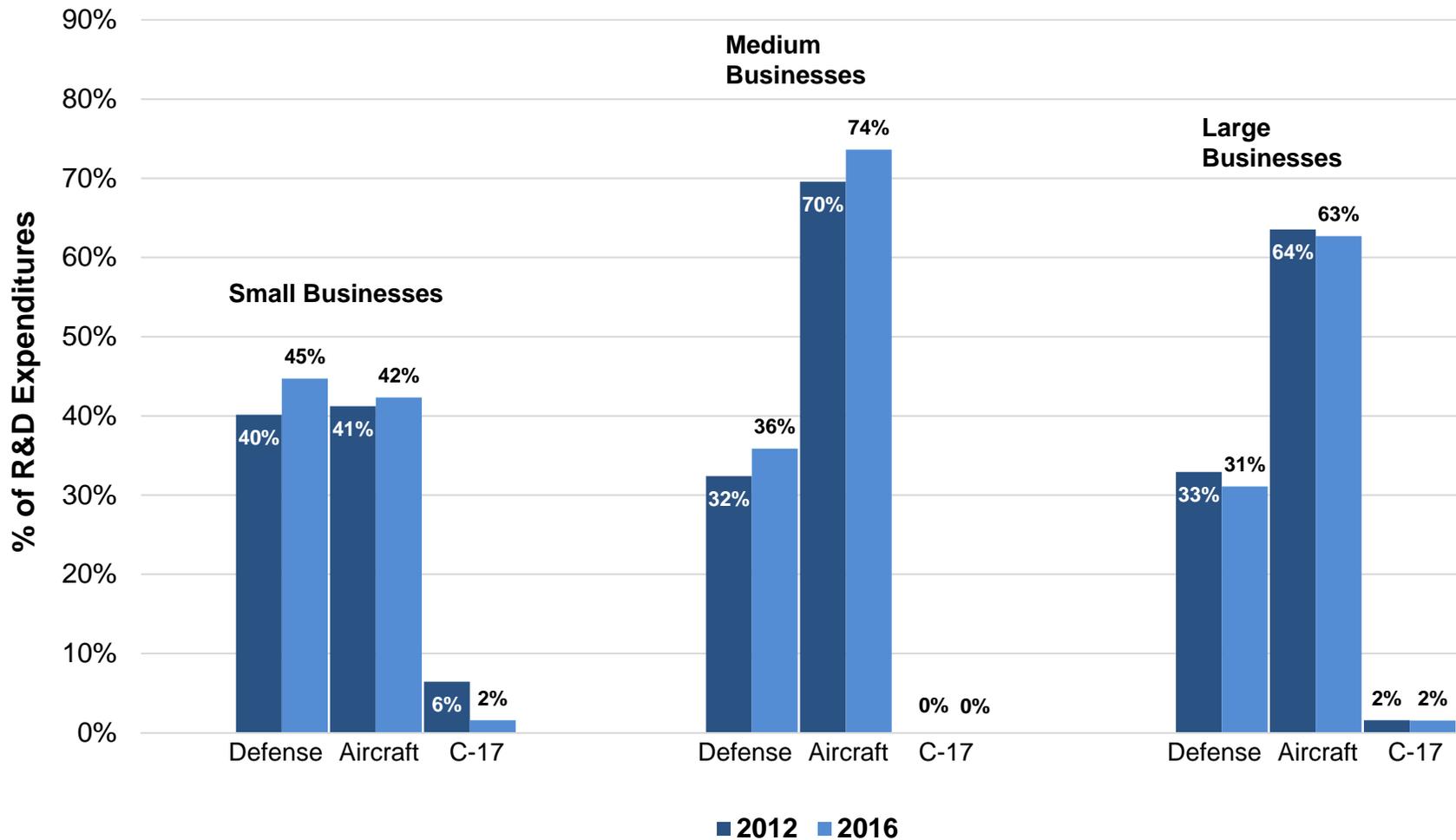
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

152 Respondents



Research and Development

Average R&D Expenditure By Area of Research and Company Size 2012-2016



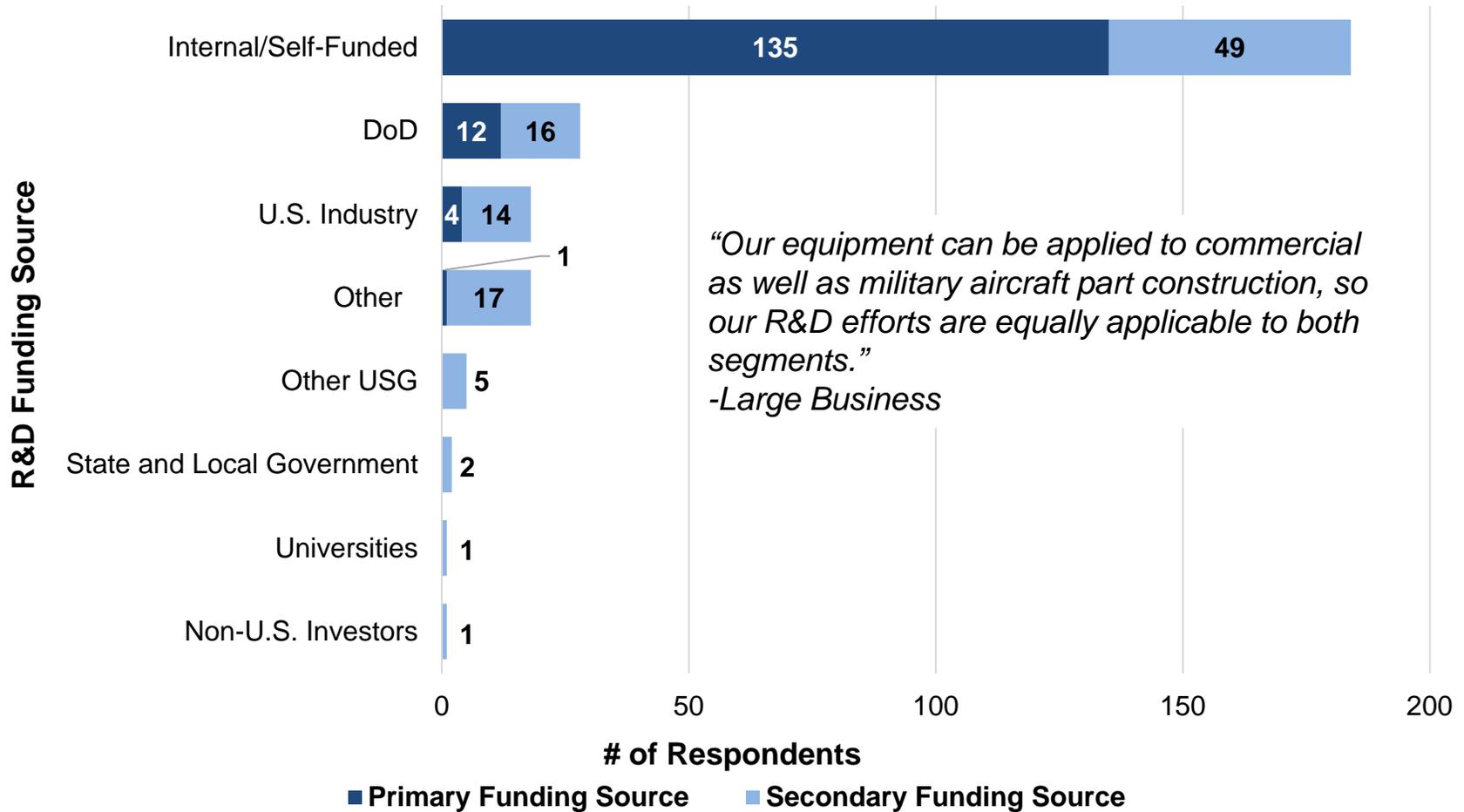
Q11, B2-4

152 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Research and Development Top R&D Funding Sources 2012-2016



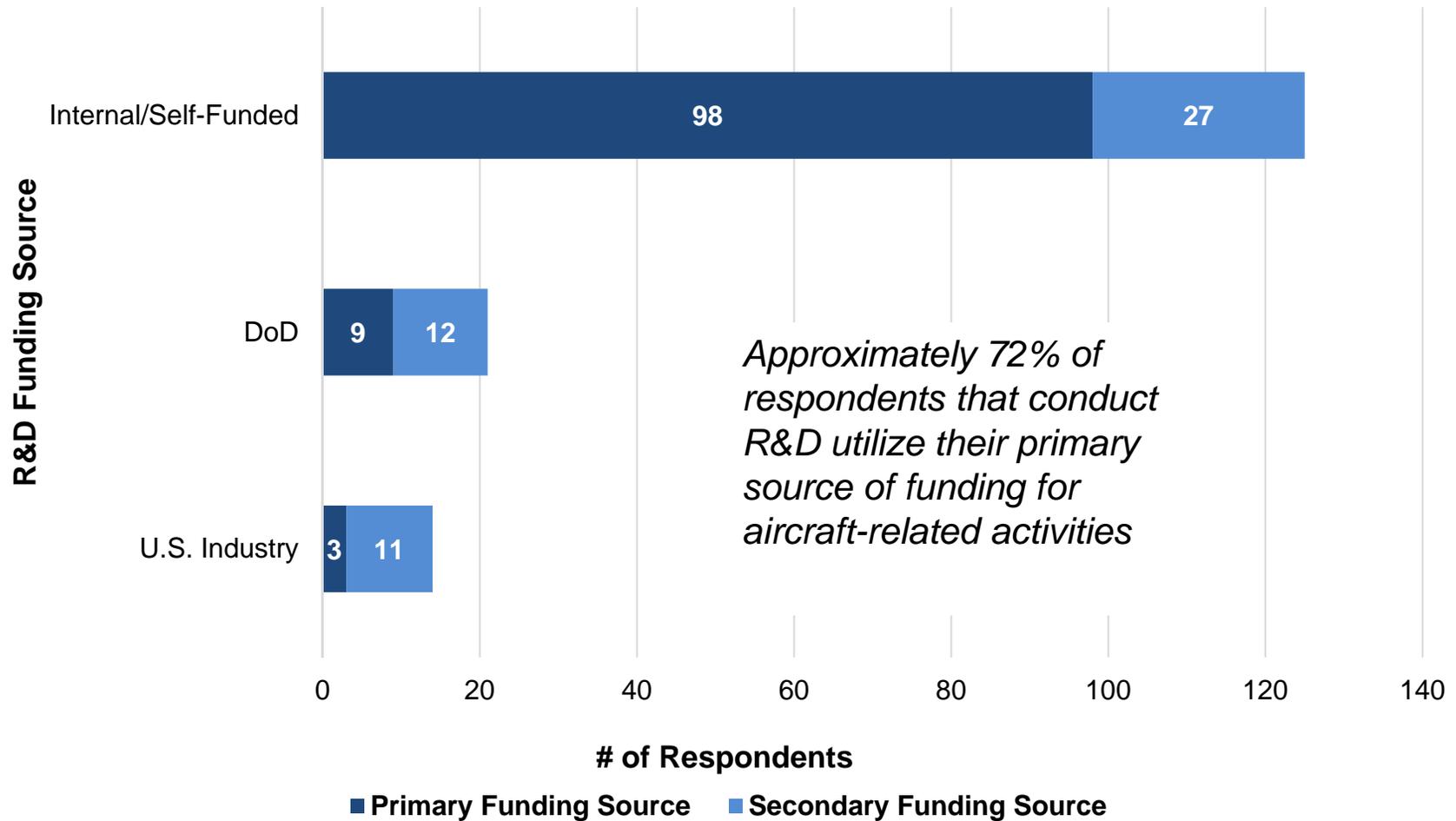
Q11, C1

Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

152 Respondents



Research and Development Top Aircraft-Related R&D Funding Sources 2012-2016



Q11, C1

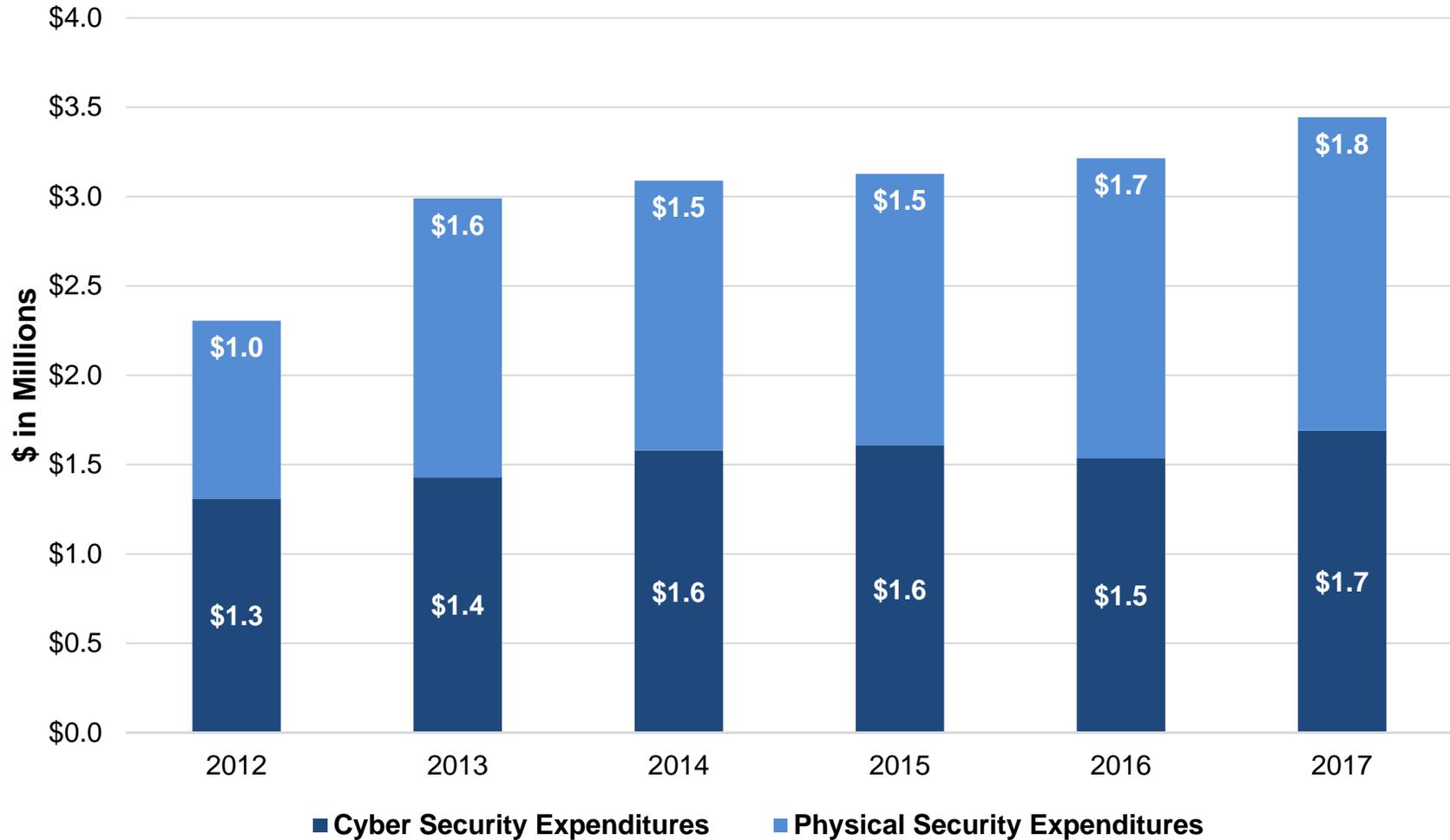
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

152 Respondents



Security Expenditures

Average Aircraft-Related Physical and Cyber Security Expenditures



Q12, A

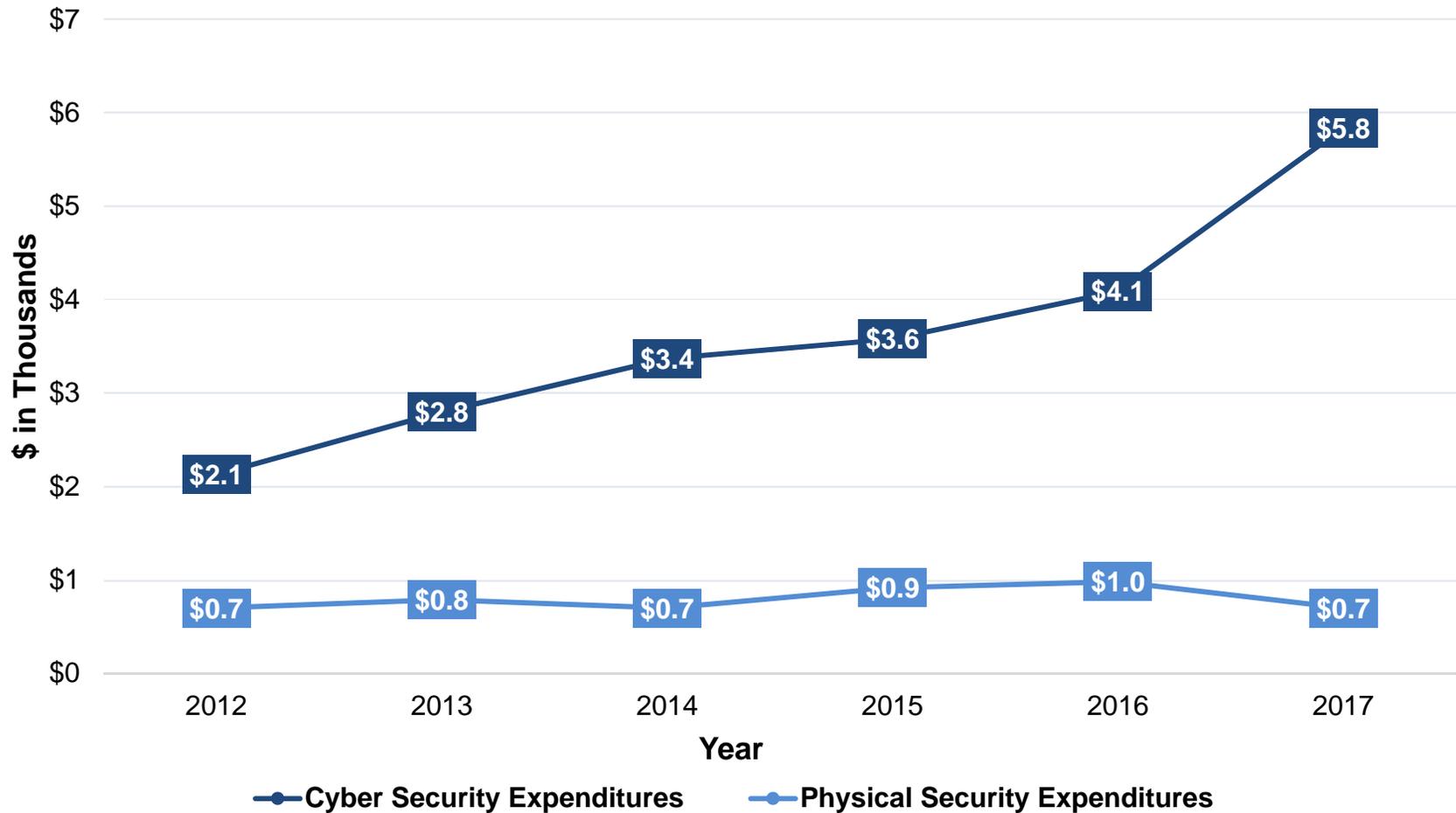
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Security Expenditures

Average Small Business Cyber and Physical Security Expenditures



Q12, A

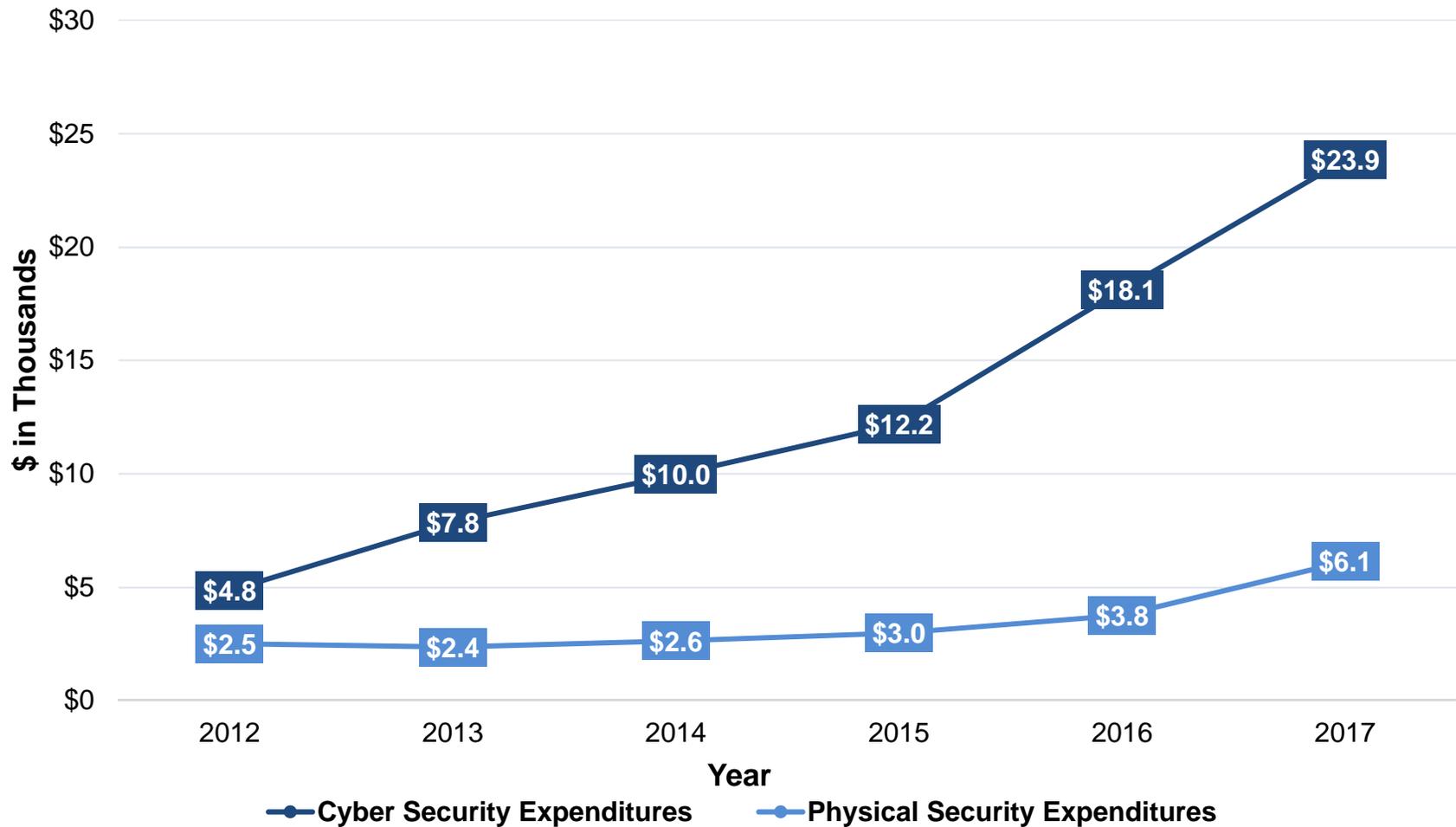
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

130 Respondents



Security Expenditures

Average Medium Business Cyber and Physical Security Expenditures



Q12, A

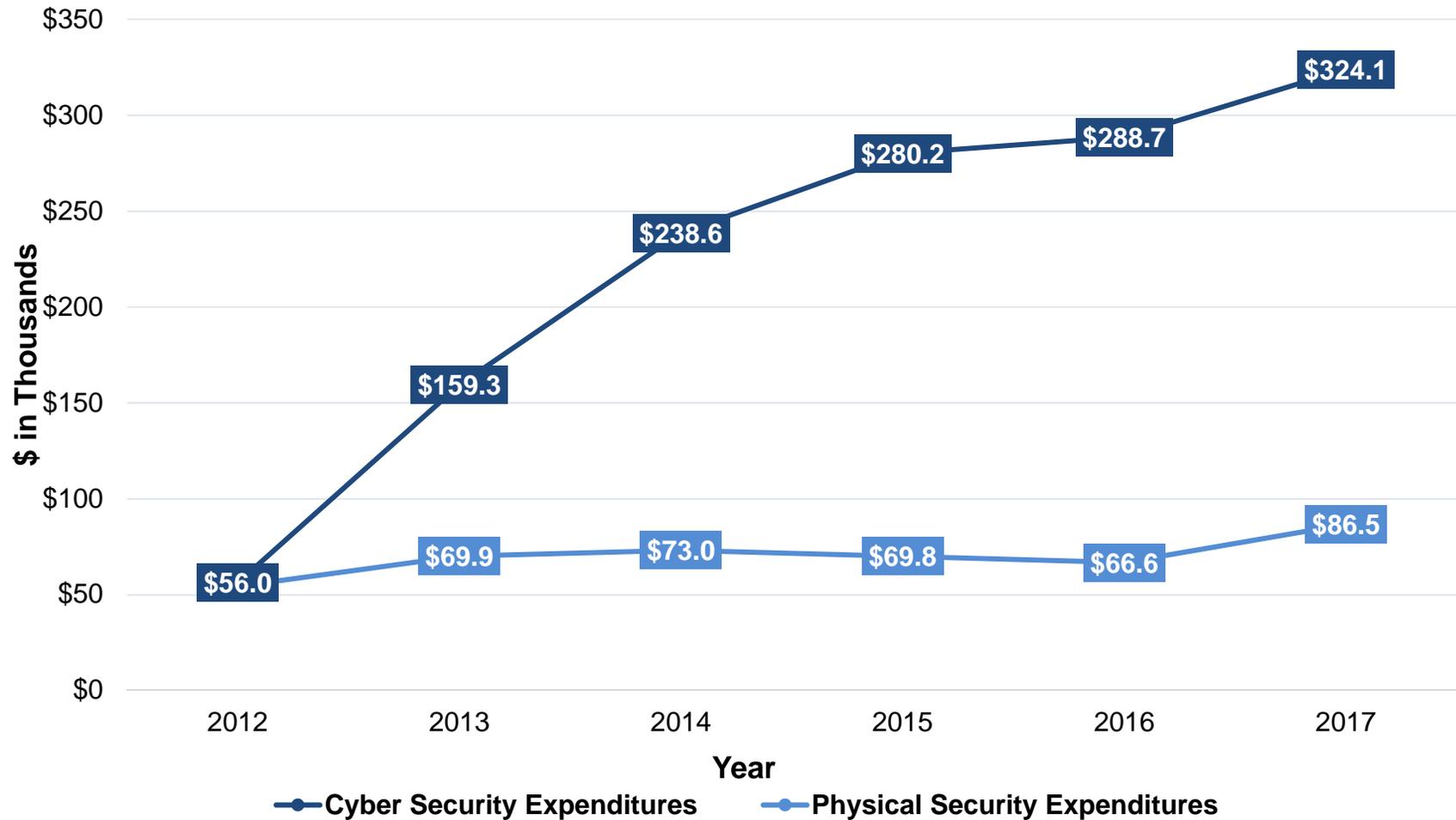
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

132 Respondents



Security Expenditures

Average Large Business Cyber and Physical Security Expenditures



Q12, A

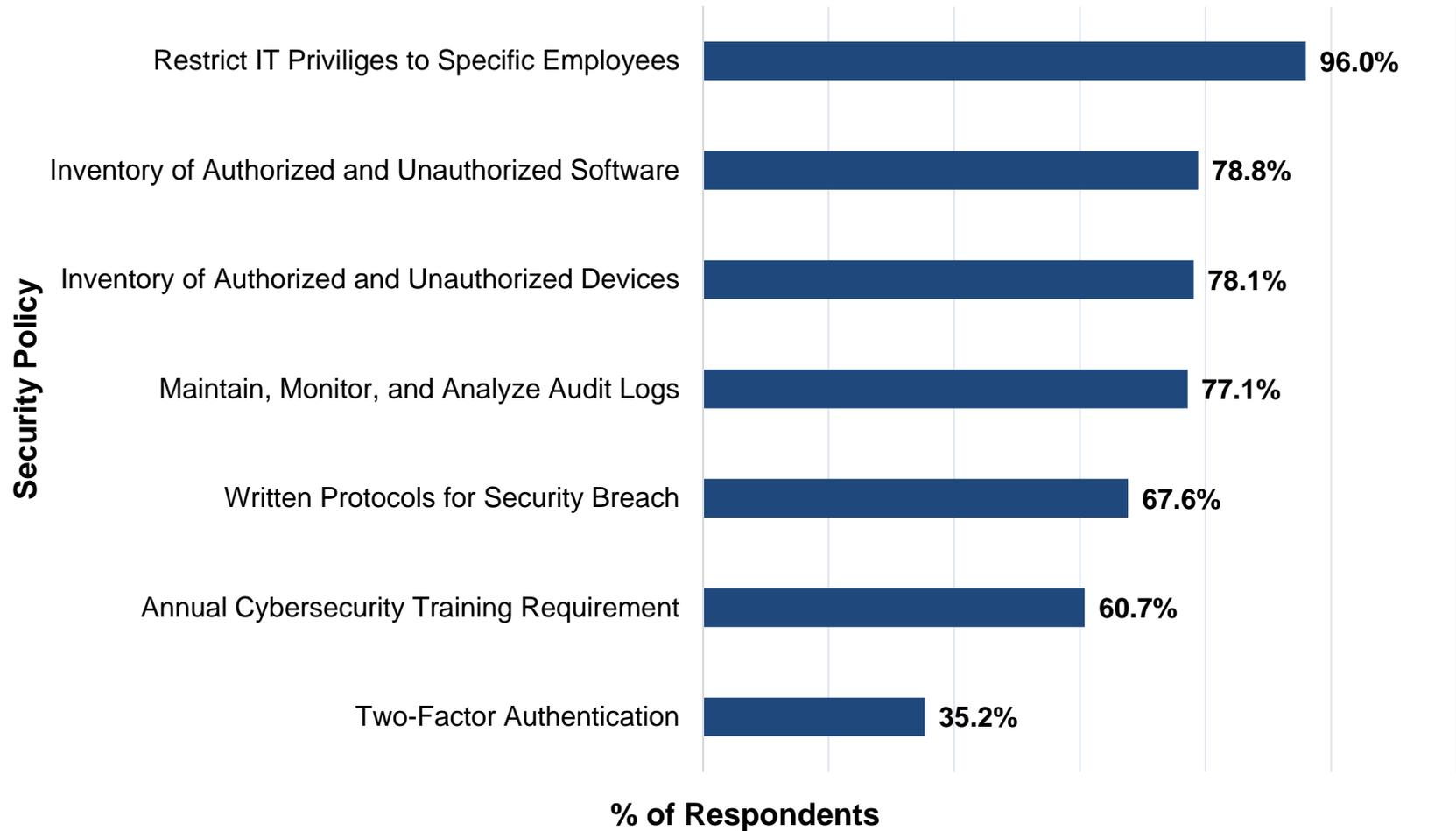
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

158 Respondents



Cyber Security Policies

Cyber Security Policies in Place for All Respondents



Q12, B

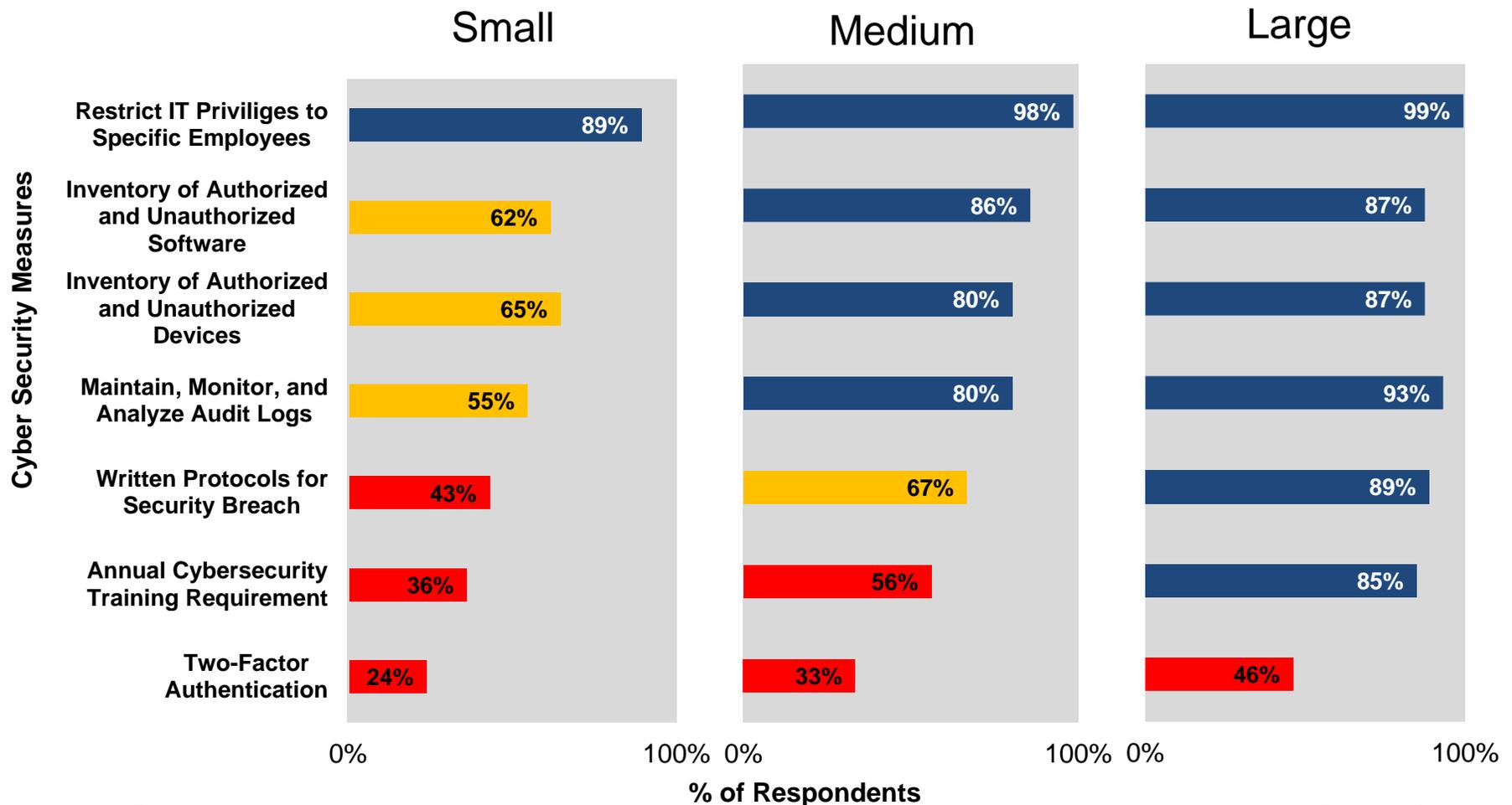
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Cyber Security Policies

Cyber Security Policies in Place By Company Size



Q12, B

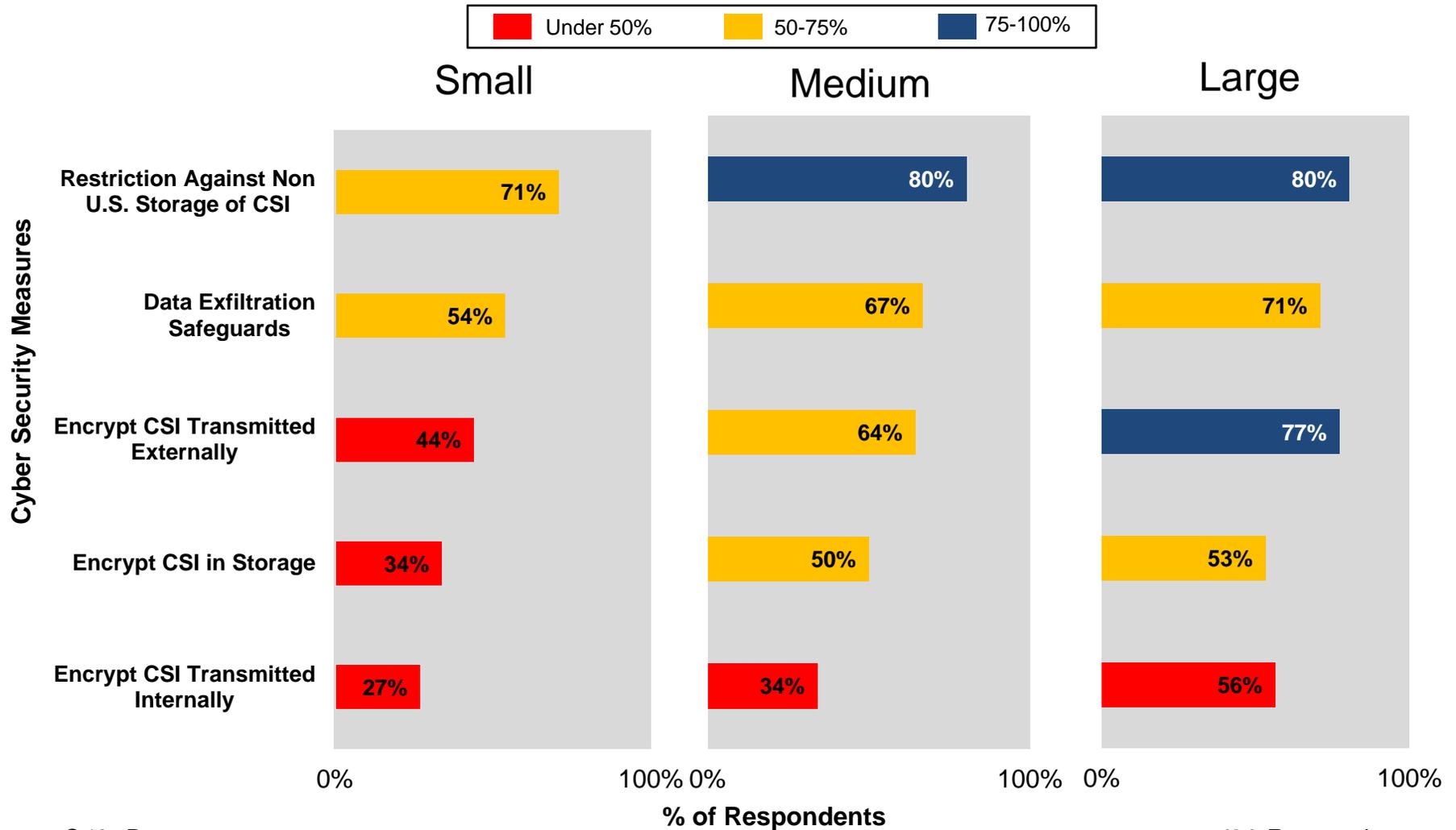
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Cyber Security Policies

Cyber Security Policies in Place By Company Size



Q12, B

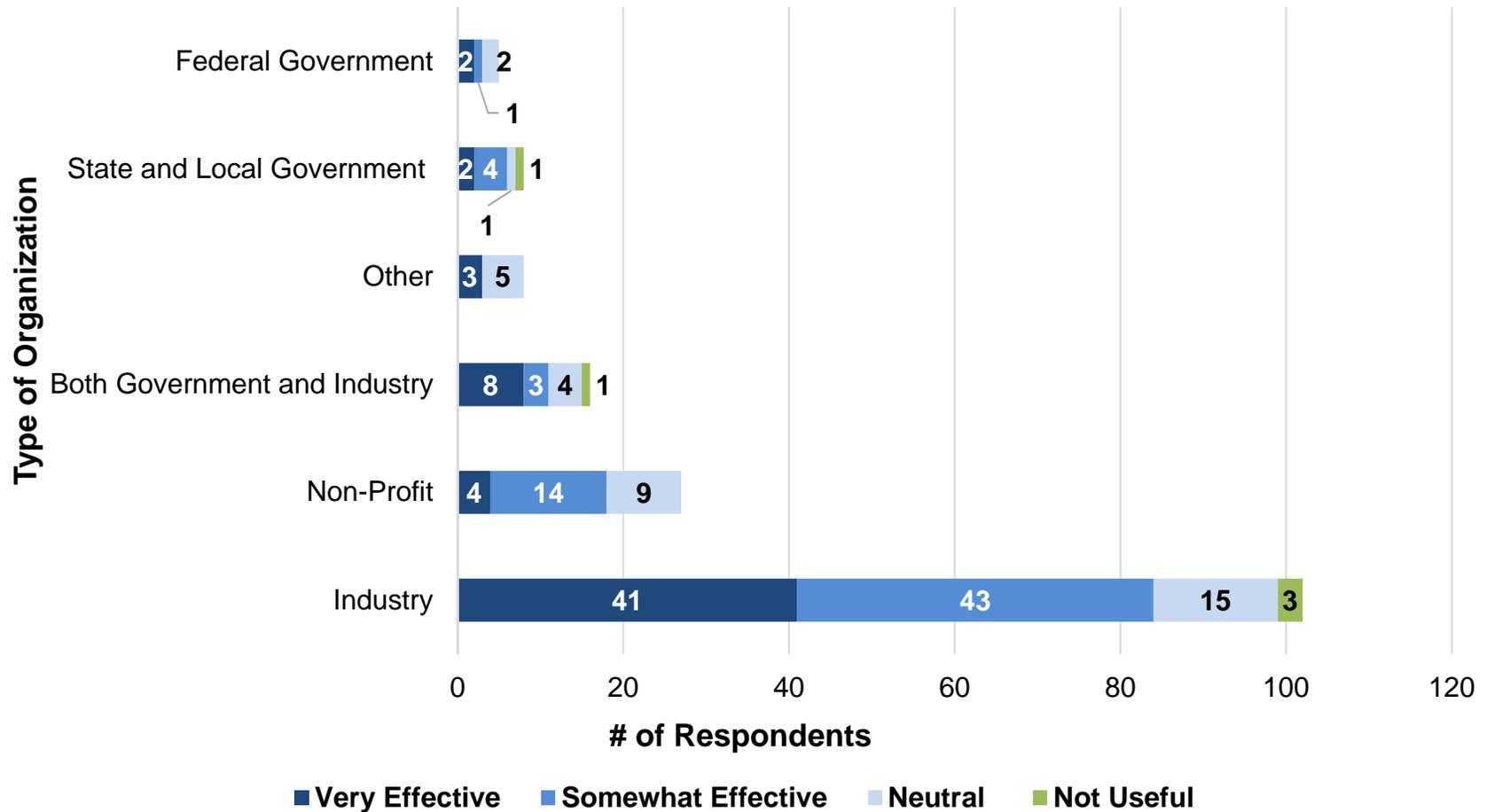
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Outreach and Assistance

Effectiveness of Assistance from Outside Organizations



Q13, B

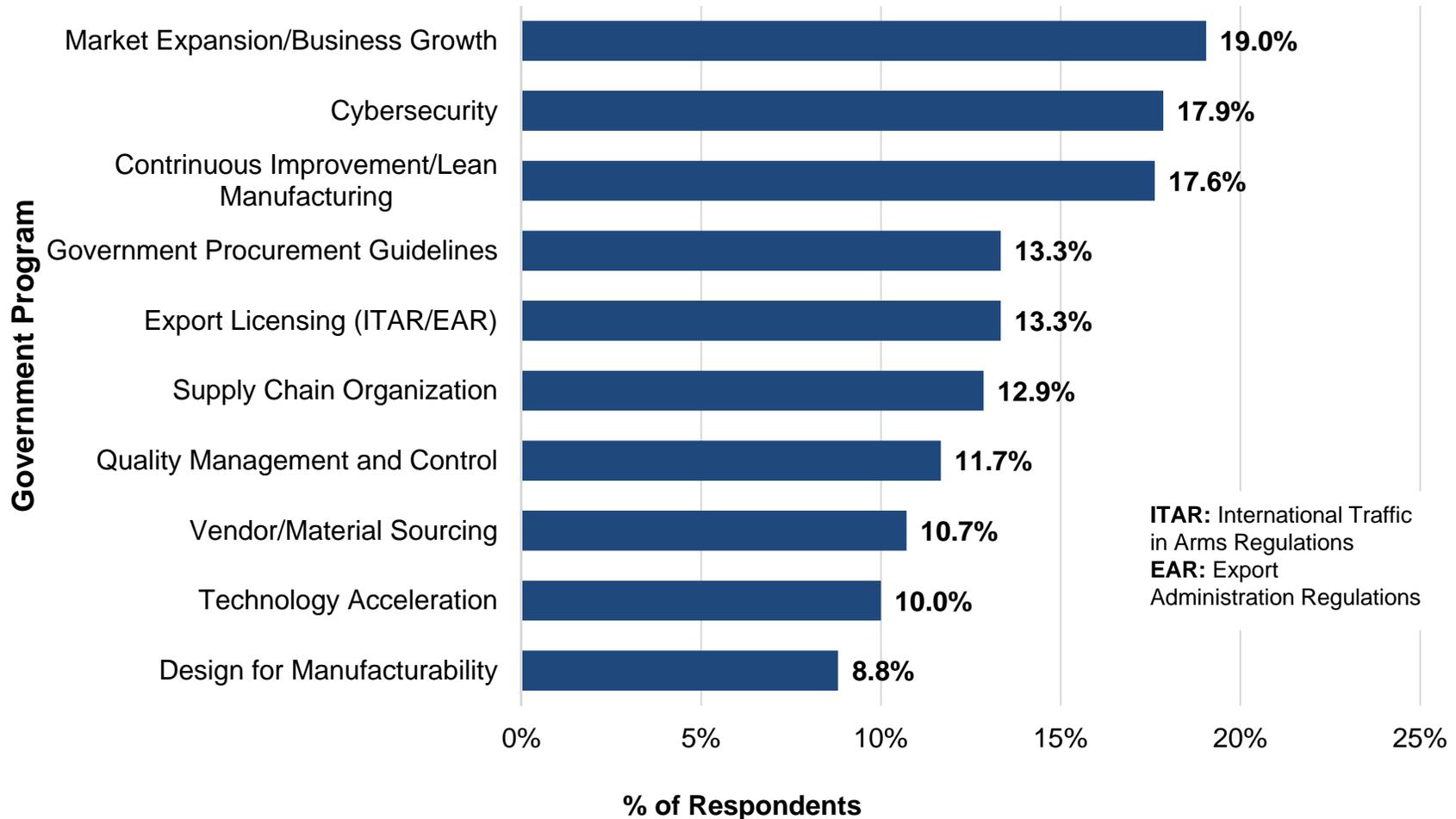
Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



Outreach and Government Programs

Top 10 Government Programs selected by Organization's Interest



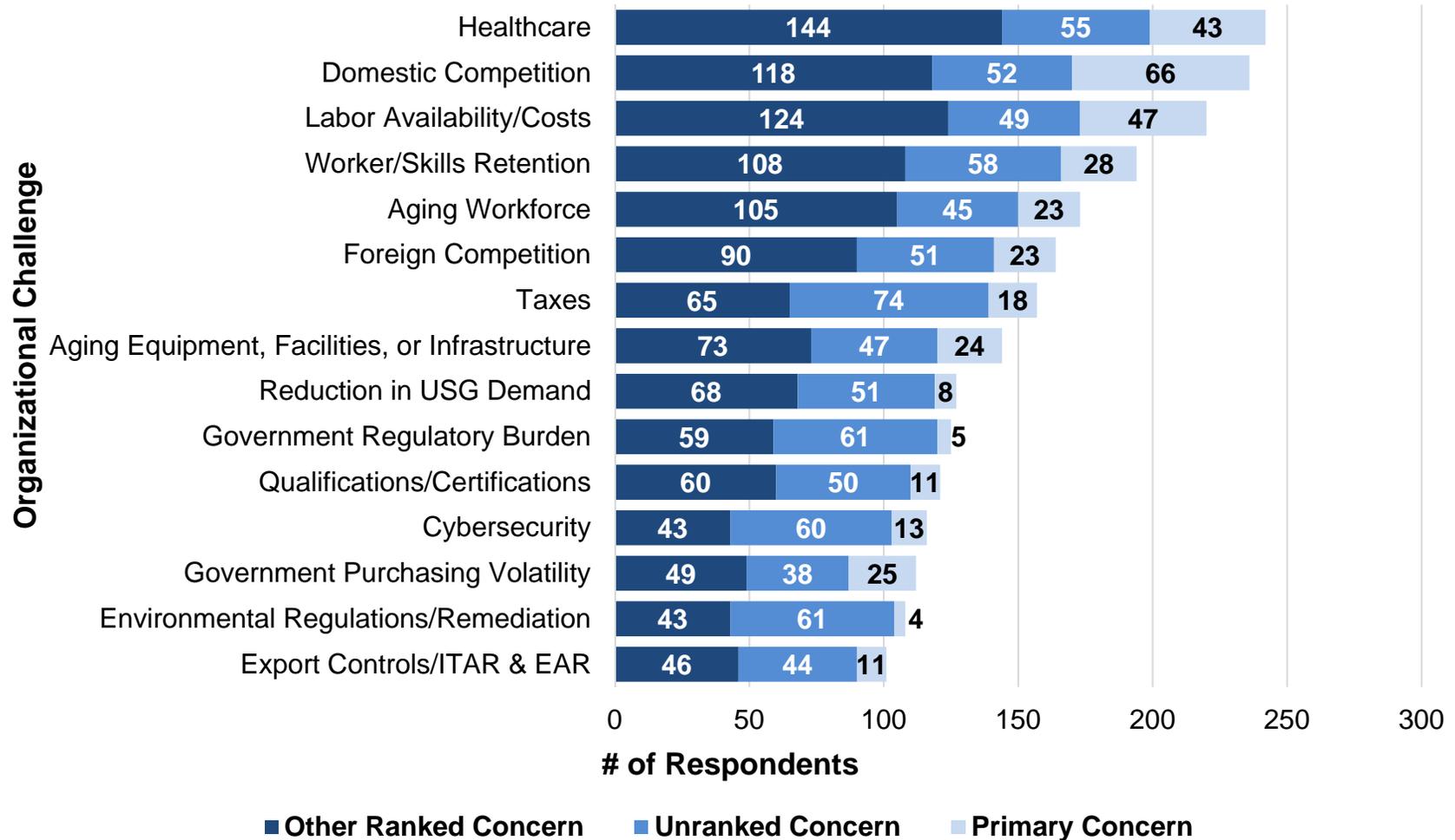
Q13, C

420 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED



Organizational Challenges Top 15 Organizational Challenges



Q14

Source: U.S. Department of Commerce, Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED

420 Respondents



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Sharma, William Helfrich

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Washington, D.C. 20230
<http://www.bis.doc.gov/DIB>

Source: U.S. Department of Commerce,
Bureau of Industry and Security, Office of Technology Evaluation. UNCLASSIFIED