# IDA

INSTITUTE FOR DEFENSE ANALYSES

# Obtaining Data, Analytics, and AI Solutions

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**IDA**

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# Executive Summary

The Chief Digital and Artificial Intelligence Office (CDAO) developed the DoD Data, Analytics, and AI Adoption Strategy to accelerate the delivery and adoption of artificial intelligence (AI) and achieve mission impact at scale. The strategy aims to unify the Department's approach to these interrelated technology domains. However, additional guidance is needed to achieve the goals outlined in the strategy. The CDAO tasked IDA with developing this appendix to the strategy in a series of living documents to provide Component leadership, particularly Chief Data Officers, with concise, coaching-style documentation to guide them through the necessary choices for obtaining data, analytics, and AI (D/A/AI) products and services. This document defines the "adopt-buy-create" framework for acquiring products and services and provides a self-assessment questionnaire that managers can use to decide when it is appropriate to adopt, buy, or create a product or service. It concludes with some additional recommendations to consider when obtaining these products and services.

# Obtaining Data, Analytics, and AI Solutions

To advance its data, analytics, and artificial intelligence (AI) ecosystem, the Department of Defense (DoD) must obtain and integrate new technologies. Resource managers must think strategically about *how* they are going to acquire new data, analytics, and AI (D/A/AI) products and services to maximize their overall portfolio of solutions. This appendix is intended to define the "adopt-buy-create" framework and assist resource managers who are obtaining these products. This document provides three key resources:

A. The definition of the "adopt-buy-create" framework;

B. A decision aid for applying the framework and choosing whether to adopt, buy, or create a data, analytics, or AI product;

C. Best practices to minimize risks that resource managers need to be aware of whether they have decided to adopt, buy, or create.

Component leaders, particularly Chief Data and AI Officers, should use these resources to develop their strategic thinking about D/A/AI product acquisition. These are educational aids with some simplifications to highlight key considerations in the decisions needed to obtain these types of products; however, they will not hold in all scenarios. Component leaders can further tailor and codify these practices in their own Component's acquisition workflows, perhaps with decision matrices of their own.

## A. The Adopt-Buy-Create Framework

For D/A/AI products, Components should follow the "adopt-buy-create" framework, established in the DoD Data, Analytics, and AI Adoption Strategy. This framework aligns with the DoD Software Modernization Strategy and is intended to unify the DoD's approach to D/A/AI product acquisition. In this framework, obtaining D/A/AI can occur via adoption, buying, or creating the product with a general preference to adopt, then buy, and lastly create a solution.

## 1. Adopt

*The use of a Joint- or Component-sponsored solution that is already present (or under development) in the DoD ecosystem and sufficiently meets requirements. Adoption can occur with or without a formal agreement (e.g., Military Interdepartmental Purchase Request (MIPR) to another DoD organization) to use or reuse a product, and may require*

*a contract modification but does not require undergoing the processes of establishing a new contract vehicle.*

Adoption of proven solutions can be the fastest and most efficient way to obtain these products. Solutions deployed within the DoD ecosystem have already passed two major hurdles: existing solutions have secured an authorizing official's Authority to Operate (ATO) and these solutions have been integrated successfully into DoD systems. One of the primary disadvantages to adoption of an existing solution is that there may be limited opportunities to influence the product and its future modifications if the adopter is not included in the sustainment team. Such lack of control has the potential to lead to challenges with sustaining and integrating the product into existing systems outside of its original use context. If the new adopter does not have a say or is secondarily prioritized in future updates to the solution, there is a risk that the solution may evolve to be inconsistent with the adoptee's requirements. In addition, adoption may require accepting a product that is sufficient but does not exactly meet all requirements. The Component may need to adapt the solution or adjust its expectations.

## 2. Buy

*The purchase of an already available commercial off-the-shelf (COTS) solution from a single industry vendor. When buying, a new contract must be established if General Service Administration (GSA) or other mass software procurement options are not available.*

If there is no existing Component-sponsored solution, or if the existing solution requires prohibitively expensive or complex alteration to satisfy the requirements, but there are commercially available solutions that will satisfactorily meet the requirements, then consider buying the commercial solution. Purchasing a commercial solution can save time on system development and lessens the inherent risk that a custom-developed new product will not deliver or achieve its functional goals because it has already been proven in a commercial setting. However, the disadvantage is that if the product has not previously received a recognized ATO for the desired government network, the product will likely require an ATO and potentially other integration processes as well. When buying a solution, there should be a clear exit strategy, if the purchased product does not meet the immediate or future needs of the users. It is critical to understand the impact of migrating to another or potentially having to start over with other product options or vendors.

## 3. Create

*The development of a new government-off-the-shelf (GOTS) capability in-house with government or contractor labor. This approach requires developing a custom-made solution that does not yet exist or integrating products from open-source software or several independent service vendors.*

If the application is unique to the DoD or if no commercial solution exists, then a custom GOTS solution must be created. Creation, while often still requiring a contract with an industry partner who will develop the product, ensures that the solution is custom-made to address the specific problem. The DoD frequently faces unique data, analytic, and deployment environment problems that industry is not incentivized to focus on and has no ready-made solutions. For example, AI solutions for DoD-specific hardware will not be available in COTS products. In these cases, the DoD may be the only entity ever to encounter the problem and/or have unique access to the data necessary to develop a solution. The DoD, often in conjunction with contractors, must then custom-develop a product with the desired requirements. However, custom D/A/AI product development has a high inherent risk of failure,[1] so particular care should be taken to understand the associated risks if the product is not delivered, non-functional, or otherwise fails to address the mission requirements.

## B. When to Adopt, Buy, or Create

Choosing how to obtain a product, particularly deciding whether to adopt, buy, or create, is a form of an outsourcing decision. Figure 1 provides a comparison of the characteristics, advantages, and disadvantages of these acquisition method. While creating affords the most DoD control over the product, adopting or buying an existing solution is likely to be less burdensome on staff and on other resources. Resource managers can use the following decision aid as a guide for evaluating the tradeoffs between these three methods of obtaining a product.

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[1] The Standish Group International, Inc.'s CHAOS (2021); Gartner (2019); PMI Global Project Management Survey (2017).
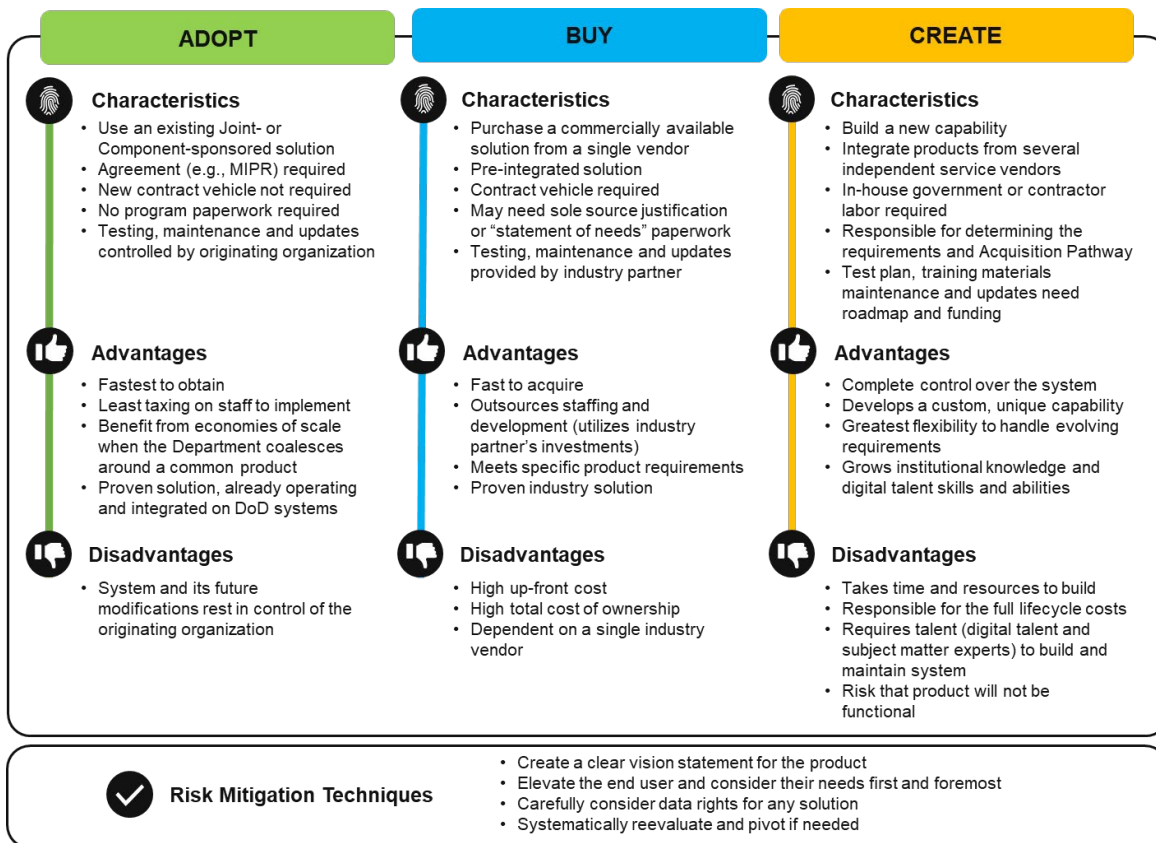
**Figure 1. Comparison of the Adopt-Buy-Create Framework**

The following self-assessment is intended to be an educational decision aid, highlighting some of the key questions to consider and to gauge their relative importance. This framework may not hold in every scenario. For example, a program interested in adding computer vision to an existing hardware platform is likely constrained to working through the hardware's prime contractor. There may be other constraints that effectively make the decision to adopt, buy, or create. However, when leaders are unclear how to proceed for a general D/A/AI product, this decision aid should help illuminate a path forward to obtaining the solution.

There are five key decision factors that should be considered:

- **Team** – The size, ability, available time, and expected longevity of the staffing of the digital talent on the team, as well as the strength of other team members required to obtain (e.g., contracting and legal teams) and support the product in the long term (e.g., technical experts, cyber, and testing and evaluation teams);

- **Objectives** – The clarity, stability, uniqueness, and responsiveness to the user's evolving needs regarding minimum acceptable and desired production performance requirements;

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- **Fit –** The amount of control needed over the product, and how well the product can fit into existing processes and infrastructure;

- **Schedule** – The time it will take to get to a proof of concept, to generate user value with a minimum viable product, to get appropriate authorizations and approvals, and ultimately to product deployment;

- **Cost** – The type and stability of the funding source as well as the price to a purchase or develop a product and its total cost of ownership, including labor, data rights, and compute costs for the product's sustainment and maintenance.

Choosing whether to adopt, buy, or create depends on the resourcing and the relative importance of these key decision factors to the product. The self-assessment questionnaire in Table 1 can help evaluate which factors are the most important for a given use case. After completing the questionnaire for your use case, evaluate the responses for each of the key factors. Add one for every "yes," add one half for every "partial," and add zero for any "no" response. Count the totals in each of the five categories. Representative diagrams of the totals from the questionnaire for each method are shown in Figure 2. In Table 2, compute the self-assessment results. Compare the totals for each of the categories, and add points to adopt, buy, or create based on the summation criteria (e.g., if the cost total is above three, add one to "buy"). The preferred method for obtaining a solution is the one with the most points at the end of this tabulation.

**Table 1. Self-Assessment of Key Decision Factors**

**Consideration #1: Team** – *Multiple "yes" answers in this section suggest that your digital talent and balanced team can support creating a solution.*

|  | Yes | Partial | No |
|---|---|---|---|
| Have we (government and contractor digital talent) built something similar in the past? | ☐ | ☐ | ☐ |
| Do we have the skills to build (integrate separate components) and maintain (provide updates and bug fixes) the system? | ☐ | ☐ | ☐ |
| Do we expect continued support for our existing staffing levels? | ☐ | ☐ | ☐ |
| Will this be used to train or develop our staff in an area in which we are strategically trying to grow? | ☐ | ☐ | ☐ |

_____ Yes + 0.5 x _____ Partial

Team Total: _____

**Consideration #2: Objectives** – *Multiple "yes" answers in this section suggest that you have specific, standard requirements that can be best served by adopting or buying a solution.*

|  | Yes | Partial | No |
|---|---|---|---|
| Is the same solution needed for entities outside of the DoD? | ☐ | ☐ | ☐ |
| Is the same solution needed by other groups within the DoD? | ☐ | ☐ | ☐ |
| Do we have clear minimum acceptable and desired performance level requirements for the desired solution? | ☐ | ☐ | ☐ |
| Do we expect this to be the operational product rather than a proof-of-concept? | ☐ | ☐ | ☐ |

**____ Yes + 0.5 x ____ Partial**

**Objectives Total: _____**

**Consideration #3: Fit** – *Multiple "yes" answers in this section suggest that the need for this solution to fit your systems can best be served by either adopting or creating a solution.*

|  | Yes | Partial | No |
|---|---|---|---|
| Is there a trusted existing Joint- or Component-sponsored solution? | ☐ | ☐ | ☐ |
| Do we expect future projects will be built from this project? | ☐ | ☐ | ☐ |
| Do we expect that in the future we will need to extensively modify or customize the solution? | ☐ | ☐ | ☐ |
| Is the solution expected to be shared with other Components? | ☐ | ☐ | ☐ |

**____ Yes + 0.5 x ____ Partial**

**Fit Total: _____**

**Consideration #4: Schedule** – *Multiple "yes" answers in this section suggest that your schedule constraints can best be served by adopting or buying a solution.*

|  | Yes | Partial | No |
|---|---|---|---|
| Do we have a clear time requirement when a solution is needed? | ☐ | ☐ | ☐ |
| Do we need a fully operational solution quickly? | ☐ | ☐ | ☐ |
| Is there a large amount of uncertainty in the schedule estimate because this is our first attempt at addressing the problem? | ☐ | ☐ | ☐ |

| | Yes | Partial | No |
|---|---|---|---|
| Is it problematic to wait for a solution because there are no alternatives or work-arounds to use in the meantime? | ☐ | ☐ | ☐ |

**____ Yes + 0.5 x ____ Partial**

**Schedule Total: _____**

**Consideration #5: Cost** – *Multiple "yes" answers in this section suggest that you have the budget to support either buying or creating a solution, although having budgetary resources does not rule out adopting a solution.*

| | Yes | Partial | No |
|---|---|---|---|
| Do we have the budget to pay the up-front-cost of purchasing a solution? | ☐ | ☐ | ☐ |
| Do we have the budget to cover the total cost of ownership (life-cycle costs including labor for the sustainment, maintenance, modification, and customization) of the solution? | ☐ | ☐ | ☐ |
| Do we have the budget to cover the cost of purchasing the data rights for testing and maintaining the solution? | ☐ | ☐ | ☐ |
| Do we have the budget to pay any fees associated with breaking a contract and starting a new one if it becomes clear that we need to obtain a different solution? | ☐ | ☐ | ☐ |

**____ Yes + 0.5 x ____ Partial**
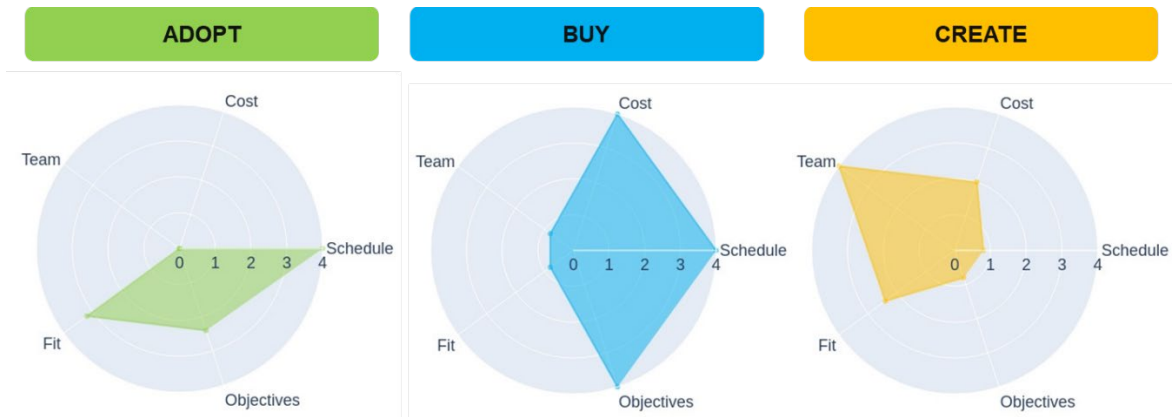
**Cost Total: _____**

**Figure 2. Representative Responses to the Self-Assessment Questionnaire**

**Table 2. Self-Assessment Results**

|  | Adopt | Buy | Create |
|---|---|---|---|
| **Consideration #1: Team Total = _____**<br><br>*Add 1 to Adopt if total is less than 2.*<br>*Add 1 to Buy if total is 2 or more.*<br>*Add 1 to Create if total is 3 or more.* |  |  |  |
| **Consideration #2: Objectives Total = _____**<br><br>*Add 1 to Adopt if total is 2 or more.*<br>*Add 1 to Buy if total is 3 or more.*<br>*Add 1 to Create if total is less than 2.* |  |  |  |
| **Consideration #3: Fit Total = _____**<br><br>*Add 1 to Adopt if total is 3 or more.*<br>*Add 1 to Buy if total is less than 2.*<br>*Add 1 to Create if total is 2 or more.* |  |  |  |
| **Consideration #4: Schedule Total = _____**<br><br>*Add 1 to Adopt if total is 2 or more.*<br>*Add 1 to Buy if total is 3 or more.*<br>*Add 1 to Create if total is less than 2.* |  |  |  |
| **Consideration #5: Cost Total = _____**<br><br>*Add 1 to Adopt.*<br>*Add 1 to Buy if total is 3 or more.*<br>*Add 1 to Create if total is 2 or more.* |  |  |  |
| **Totals** | **Adopt**<br>_____ | **Buy**<br>_____ | **Create**<br>_____ |

## C. Acquisition Best Practices

**Include adopt, buy, create decisions in the acquisition workflow.** Establish processes in the acquisition workflow to assess the adopt, buy, or create decision for any D/A/AI product the Component is looking to obtain. Utilize this decision aid directly or as inspiration during market research to establish tailored metrics (e.g., a decision matrix) to weigh the costs and benefits of different acquisition methods.

**Create a solid product vision statement.** While this guide focuses on how to obtain a D/A/AI product, there are important decisions that must be made before that stage, such as determining whether the product is necessary and what it should do. Develop a solid vision statement for the product that identifies the root problem or need, the end users, and its desired end state. State the expected benefit, particularly how it will enhance the agency's mission, and identify any other secondary benefits or impacts. Lastly, establish measurable metrics for success of the product. Refine the product vision throughout the development process.

**Elevate the end user.** Particular care should be given to identifying and involving the end users of the system throughout the process. Their needs should drive the definition of the requirements. They will also be best able to illuminate issues with customer adoption and identify the essential issues that need to be addressed. Components should establish procedures that integrate these users in the acquisition process and allow for product changes as end users provide lessons learned.

**Minimize the inherent risk of D/A/AI solutions.** The majority of D/A/AI projects fail or are never adopted. These projects commonly fail when the data needed is unavailable or has quality problems that cannot be overcome, the domain and its documented or implicit business rules have not been fully understood, the team does not have the right talent, the team is attempting to operationalize a proof-of-concept design without fully automating its data pipeline, the team has overpromised or done insufficient analysis of the program life-cycle costs, or for numerous other reasons.[2] Because there is an inherent risk of failure, establish processes to ensure appropriate project scoping and feasibility, seek to reuse or repurpose existing solutions, and build in the ability to reassess and pivot the project if necessary. Involve technical staff in evaluating any proposed solution.

**When appropriate, use what the Department already has.** Components should put procedures in place to facilitate discovery of existing solutions internally and, whenever possible, externally within other Components and prioritize their adoption when they are sufficient to meet other users' needs. Leadership should provide guidance on honoring reciprocal ATOs (if or when an ATO can be used from another organization), or streamline

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[2] Ibid; International Data Corporation's AI Strategies View (2020); Harvard Business Review Study (2016); Quanthub (2020); NewVantage's Data and AI Executive Summary (2023).

processes to achieve their ATO when a product has already been authorized in a different organization.

**Secure sufficient data rights to ensure the sustainability of the solution.** Technical staff and product maintainers should critically consider the data needed for developing, testing, operating, maintaining, and updating the product. Care should be taken during all stages of procurement to explicitly document the data rights. For example, in the contract proposals, require offerors to assert all restrictions of technical data, data labels, and software up front. Evaluate the impacts of these restrictions and challenge prohibitive ones prior to signing a contract,[3] and request and consider proposals that contain different cost estimates for different levels of data access. Seek partnerships with other Components to share the burden of solution costs and to maximize data rights across the enterprise.

**Expect and account for change.** Components should have clear processes in place for reassessing projects. In the absence of specific reassessment criteria, establish fixed points in time to reevaluate not only the proposed approach and progress, but also whether the problem itself has changed, whether the desired solution requirements changed, and whether the project trajectory suggests that it will ultimately succeed. There is no guarantee for success with D/A/AI products, but Components should experiment with them. Building periodic reassessments and conditions for reassessment will help ensure that the solution is updated to address the key challenges users are facing. Ensure that the contract and design plan have sufficient flexibility to accommodate for the evolution of mission realities.

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[3] The DAF-MIT AI Accelerator's "Artificial Intelligence Acquisition Guidebook" (2022) and the Defense Acquisition University provide these and other recommended best practices for data rights contracting.

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The Chief Digital and Artificial Intelligence Office (CDAO) developed the DoD Data, Analytics, and AI Adoption Strategy to accelerate the delivery and adoption of artificial intelligence (AI) and achieve mission impact at scale. The strategy aims to unify the Department's approach to these interrelated technology domains. However, additional guidance is needed to achieve the goals outlined in the strategy. The CDAO tasked IDA with developing this document which will serve as an appendix to the strategy and provide help for Component leadership, particularly Chief Data Officers, with concise, coaching-style documentation to guide them through the choices that have to be made in their organization to obtain data, analytics, and AI (D/A/AI) products. This document defines the "adopt-buy-create" framework for acquiring products and provides a self-assessment questionnaire that managers can use to decide when it is appropriate to adopt, buy, or create a product. It concludes with some additional recommendations to consider when obtaining these products.

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