

# Report 4: Prioritized Strategies to Facilitate Adoption and Use of a Future National Secure Data Service by Federal Policy Stakeholders

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## Executive Summary

### Background and Approach

This report provides an overview of the remaining findings of an examination of federal policymakers' data needs and challenges encountered in seeking and using data to inform policy decisions. The Insight, Interpretation, and Innovation Panel (I3P) and internal project team were engaged in multiple [synchronous and asynchronous approaches](#) (e.g., meetings, human-centered design [HCD] survey, workshops) to gather prioritized strategies to facilitate effective communication, adoption, and use of a [future National Secure Data Service \(NSDS\)](#).

### Human-Centered Design System Change Components

Through numerous data collection and engagement activities, our team reflected the complexity of the sociotechnical systems change in the policy context by [developing an iceberg model](#) with three systems layers “above the water” (i.e., Discovery and Navigation, Shared Services and Resources, and Access and Linkage Infrastructure) and three systems layers “below the water” (i.e., Habits and Practices, Data Literacy, and Culture and Leadership).

To bridge the gap between the observed current state and the desired future state, we developed a list of prioritized strategies from I3P insights for each systems layer. A full list of the narrative descriptions for the observed current state, desired future state, prioritized strategies, and demonstrative examples can be found in [Appendix G](#) (“above the water” layers) and [Appendix H](#) (“below the water” layers). The following sections, beginning on the next page, provide narrative summaries about the prioritized strategies for each systems layer.

#### **Discovery and Navigation Prioritized Strategies Overview** ([Jump to Details](#))

I3P members posit centralized services will be enhanced by leveraging data concierge services as a knowledge broker. In particular, they emphasized the value of decentralizing services to be embedded within agencies moving data exploration closer to agency databases to increase efficiency and effectiveness. While these services would be mostly automated through technical tools, the I3P highlighted the value of having trained human experts available for specialized support for queries that require idiosyncratic knowledge of the potentially unique aspects of specific topics. Whether through some type of data exploration tool or human consultations, the I3P also clarified that all data discovery and navigation would be significantly improved through the investment in developing comprehensive data dictionaries that provide a clear inventory and definitions of available data across the federal data ecosystem.

#### **Shared Services and Resources Prioritized Strategies Overview** ([Jump to Details](#))

I3P members acknowledged the importance of communication and collaboration with both internal and external partners to the federal government to better support data exploration, discovery, and access. Externally, these activities include building diverse partnerships with nonprofit and academic organizations. Internally, it includes building communities of practice to promote knowledge exchange and skill development. An example of the type of knowledge exchange that could be offered in these communities of practice could be a searchable repository of data reliability assessments that speak to why and how specific datasets or data elements were previously accessed and the degree to which they were usable or useful for those purposes. This repository could serve a dual purpose of 1) streamlining the process for other data users by saving them the time and effort to determine accessibility, reliability, and usability, and 2) being a source of information to train AI models to improve their efficiency.

### **Access and Linkage Infrastructure Prioritized Strategies Overview ([Jump to Details](#))**

These strategies emphasize the importance of developing government-wide data infrastructure that serves cross-agency evidence building needs. This infrastructure development requires a focus on data integration and interoperability that is lacking in the current environment, making data sharing and linkages challenging. Centralized data governance can also help ensure data are organized, validated, and relevant for policy purposes. It can also improve the readiness of data to be integrated into adjacent data systems and tools to improve searchability. An example of the advantage of this capability might be NSDS becoming a source of data validations and tools to help agencies efficiently prepare data for linkages. The I3P also repeatedly mentioned the need to streamline the data sharing agreement process between agencies, which currently often hinders rapid response to policy questions.

### **Habits and Practices Prioritized Strategies Overview ([Jump to Details](#))**

These strategies emphasize the importance of sandbox environments with dedicated live support that allow for safe and secure prototyping and testing. It was also clarified by I3P members that synthetic data should be used so as not to disturb real-world data. I3P members also repeatedly clarified the need to build healthier habits and practices across the federal data ecosystem for cataloging and validating data. NSDS should also consider similar services available to data users to avoid redundancies and/or to clarify the value add of this large-scale digital transformation on policy processes. As the NSDS arrives to revolutionize the federal data ecosystem, impending systemic shifts highlight that this is not simply about adding a new data service, it may also lead to fundamental changes in the role of other data services.

### **Data Literacy Prioritized Strategies Overview ([Jump to Details](#))**

These strategies emphasize the importance of bridging the gap between policy and evidence by strengthening data literacy skills for both those who ask questions that need to be answered to inform policy decisions (e.g., policymakers and agency leaders) and those who work to answer those questions to provide the evidence needed to inform policy decisions (e.g., data engineers and analysts). While there is always a need to bolster technical and analytical skills, improving data literacy primarily requires that the policy questions asked must first be clearly articulated in a manner that reflects awareness and knowledge of what data are available and relevant to answer policy questions.

Cross-agency relationships were accented as a key mechanism for improving awareness and knowledge of what data are available and useful. As such, the I3P highly recommended the use of issue-based councils (e.g., Federal Interagency Council on Economic Mobility) to allow data experts and users to coalesce and share resources on a common policy topic. The impact of these councils was highlighted when some were recently closed, leading to noticeable declines in knowledge exchange, collaboration, and communication between agencies. Ultimately, engaging congressional staff as champions of data generation and use leads to greater demand for quality, relevant data. Focused questions help analysts know how to appropriately approach their queries of the data and influence future data generation plans to provide evidence that better informs policy decisions.

### **Culture and Leadership Prioritized Strategies Overview ([Jump to Details](#))**

These strategies emphasize the importance of clearly communicating the existence and value of a centralized concierge service to a wide range of data users. The I3P noted it would be critical for NSDS adoption and use to have endorsement and ownership from executive leadership. Consistent messaging needs to promote the benefits of streamlining various data services and needs into one system, and the government-wide value of having more integrated and interoperable data to inform policy decisions. Demonstrating this value to leaders at all

levels, even externally, will be critical in making incremental shifts in culture and leadership to promote better evidence use. At the agency-level, this means having senior agency leaders as champions for integrating NSDS use into organizational processes and roles. Government-wide, this means having the U.S. Office of Management and Budget create operational policies and guidance on communicating and integrating the NSDS efficiently and effectively.

### Complexity of the Policy Inquiry Journey Map

We realized a [better way to display the journey map](#) (first introduced in Report 2) that accurately reflects the policy context and nature of its complexity is by integrating the HCD systems components. According to what we heard from the I3P, the current plans for the future NSDS focus primarily on the Implementation phase of the journey map. All the existing proposed layers of the NSDS model are related to locating, acquiring, preparing, and analyzing the data. However, there is very little attention given to the Planning & Design or Dissemination phases which specifically refer to activities such as refining policy questions, specifying data needs, ensuring data are fit for purpose, and then interpreting and communicating findings in a way that will be relevant and useful for policymaker needs.

Ultimately, overfocusing on only one phase of the journey map for large-scale sociotechnical change in the federal data ecosystem will disable the future NSDS from becoming a useful tool in how policy decisions are informed by relevant and useful data.

### Facilitating NSDS Adoption and Use with Strategic Communications

Throughout all our engagements with the I3P, they expressed enthusiasm and support to see a future NSDS become a helpful tool for systems change in the federal data ecosystem. For this to become a reality, they emphasized the need to first have a champion who would endorse and take ownership of NSDS implementation—for which they nominated the U.S. Office of Management and Budget as the best candidate for central coordination and communication. As agency senior leaders themselves, they and their peers also need to be explicitly equipped to be able to champion the future NSDS for adoption and use at their respective agencies. Borrowing from the Prosci® ADKAR (i.e., Awareness, Desire, Knowledge, Ability, and Reinforcement) model as an organizing framework, [suggested activities or communication strategies](#) were presented as a type of maturity model for large-scale organizational change through five key steps to be brought along the process.

### Conclusion

The future NSDS offers a promising solution to address the general needs for better data discovery, navigation, access, and linkages, but current plans may be insufficient to meet the evidentiary needs for policy and decision making. Most of the currently planned NSDS features and services focus on the systems layers of sociotechnical change that are explicit or “above the water”. However, the systems layers of the federal data ecosystem go beyond what is often visible, making large-scale systems change incredibly complex. While there are many rate-limiting cultural factors to consider that are hidden “below the water” that need to be considered for the future NSDS to be effective, the I3P acknowledged that the NSDS itself should be an agent for culture change. The mere introduction of such a data service for the federal government is already anticipated to significantly improve data discoverability and usability. However, in order for the future NSDS to have its intended effect on the policy process, the services must be able to understand and discern the different roles and responsibilities, needs, and contexts related to policy-related queries to optimize useful and relevant data.

## 1. Introduction

This report provides an overview of the remaining findings of an examination of federal policymakers' data needs and challenges encountered in seeking and using data to inform policy decisions. It expands upon Report 2 and Report 3, which reported findings from key informant interviews (KIIs) with the Insight, Interpretation, and Innovation Panel (I3P). Additional data collection and analysis efforts continued following the KIIs through multiple methods of engagement. Those efforts are reported here with implications for next steps regarding the adoption and use of a future National Secure Data Service (NSDS).

### 1.1. Report Overview

#### 1.1.1. Report Purpose

The purpose of this report is to describe the process of seeking deeper engagement to translate the Insight, Interpretation, & Innovation Panel (I3P) actionable insights into prioritized strategies for NSDS implementation. We expand on the interview findings shared in Report 2 and Report 3 by providing an overview of additional synchronous and asynchronous data collection efforts with the I3P. This report helps to fill a gap among existing National Secure Data Service (NSDS) Demonstration projects by providing a unique focus on policy stakeholder needs at the intersection of complex sociotechnical systems change. A primary example of those needs involves the various issues and topics related to access to and use of the federal data ecosystem<sup>1</sup> to support evidence-based policymaking. Additionally, this report offers a strategic communications plan to help inform an approach to addressing key messaging and communication needs that will facilitate a sustainable transformation.

#### 1.1.2. Organization of the Report

In Report 2, we reported findings from the I3P key informant interviews (KIIs), a use case, and provided an early rendering of a journey map based on what we learned. In Report 3, we continued reporting on the findings from across the 12 KIIs by surfacing possible solutions that may be explored as a bridge to the future NSDS. In this report, we open with further emphasis on the value of the Human-Centered Design (HCD) approach used for this study and how it yielded critical insights for the future NSDS. We also clarify the importance of strategic communications in facilitating sustainable systems change. We present approaches used to further engage the I3P in synchronous and asynchronous data collection efforts through meetings and surveys to further glean a prioritization of the existing challenges and potential solutions. These new insights provide a foundation for the I3P's recommendations of prioritized strategies.

### 1.2. Using a Human-Centered Design Approach to Identify Prioritized Strategies

In the last two reports, we described how employing an HCD approach helped clarify the key personas, journey maps, and current challenges and potential solutions for users of the federal data ecosystem. Although in Report 2 and Report 3 we reported on the three universal challenges and three universal solutions, respectively, reported across the 12 I3P interviews, these universal themes represent the most frequently reported challenges or solutions. However, frequency may not equate to priority. The additional insights reported here help forefront critical prioritized strategies, as recommended by the I3P.

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<sup>1</sup> Despite emphasis on complex systems throughout this report, it should be clarified that we have (intentionally) not fully accounted for the depth and breadth of the complex federal data ecosystem nor have we included all the factors related to sociotechnical systems change. This complexity would not only be impossible to capture in a brief study, and it was not the focus of this study. Instead, we focused on the areas in need of attention as highlighted by the I3P.

### 1.3. The Role of Strategic Communications in Facilitating Sustainable Change

It is not enough to plan for the “what” of complex systems change—this means, we cannot only plan for the systems, technologies, and tasks and believe “if we build it, they will come.” This fallacy leads to confusion, misinformation, and poor adoption. However, these negative consequences can be mitigated with effective strategic management and communications about the change process and desired outcomes.<sup>2</sup> This report will offer a strategic communications plan to address both the “what” and the “why” of systems change, and subsequently how to clarify the *who*, *when*, *where*, and *how* as well.

## 2. Approach to Deepening Engagement on the Actionable Insights

In addition to 12 KIIs with the I3P members, the panel was also convened for two live, virtual meetings. These meetings allowed the project team opportunities to both receive feedback on preliminary findings from the panel’s perspectives and advance the discussion further to deepen interpretation and translation. The first meeting was held in September 2025, and the second in January 2026. At both meetings, the National Center for Science and Engineering Statistics (NCSES) senior administrators were in attendance and provided opening remarks with acknowledgements of the value offered by I3P insights. Before each of the meetings, a supplement was provided to all I3P members with a digest of the key takeaways from Reports 1-3. Discussion prompts also provided prior to the meeting to facilitate a richer discussion.

Following the first live meeting, the 12 I3P members were asked to participate in an online survey to expand on the discussions from the September meeting. Although the survey data collection window was planned to be open for two weeks and close on October 3, 2025, the federal government was shut down beginning on October 1, 2025, due to failure to pass appropriations legislation for the 2026 fiscal year. Due to the impending shut down and subsequent closure, federal employees among the I3P were unable to access their federal emails. Consequently, we had a low survey response rate. We extended the data collection window to enable those I3P members to respond when the government reopened.

Government closure provided the project team time to refine Reports 2 and 3 by revisiting and reorganizing findings as new information emerged. The approach for each effort to collect, analyze, and interpret data from this comprehensive HCD study is reported in the following sections. The activities are presented chronologically because the sequencing speaks to the developmental nature of our methods and findings, which explains how and why they evolved. Collectively, these efforts led to the production of a focused framework, informed by I3P insights, for the identified systems components and a plan for strategic communications to facilitate adoption and use of the future NSDS.

### 2.1. I3P Actionable Insights Meeting

During the first meeting held in September 2025, preliminary findings from the interviews with the I3P (i.e., contents from Reports 2 and 3) were shared. I3P members were invited to respond with their reactions to these findings. [Appendix A](#) shows the anonymized responses for the prompt, “What were the key takeaways, reactions, aha moments, or parts that were most surprising to you from Reports 1-3?” These responses highlight what from the reported findings resonated with their personal experience and what needed greater attention in the development of the future NSDS.

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<sup>2</sup> <https://www.prosci.com/blog/understanding-why-some-communications-work-and-others-dont>

The majority of this meeting included a facilitated activity and discussion about the prioritization of challenges by producing a 2x2 matrix, which was scored based on level of complexity and level of impact. Of the 21 challenges identified in Report 2, we focused on 12 challenges that aligned with the proposed NSDS layers.<sup>3</sup> These challenges included:

- Identifying and Mapping Relevant Stakeholders
- Congressional Data Literacy Gap
- Limited Information Discovery and Synthesis
- Difficulty Navigating Existing Data Sources
- Questions Limited by Policymaker Data Awareness and Literacy
- Need to Increase Staff Capacity and Skills
- Question Formulation Challenges
- Complexity of Accessing Data
- Interoperability and Metadata Challenges
- Onerous Processes to Access and Share Data
- Data Infrastructure and Integration Issues
- Poor Data Governance and Usability

Using [Mentimeter](#), a web-based meeting facilitation tool, I3P members were asked to score each of the 12 challenges on the two criteria (i.e., complexity and impact) using a 10-point scale for each criterion (i.e., 0 = low complexity or impact; 10 = high complexity or impact). The descriptions shown in Table 1 were provided to I3P members.

**Table 1.** Criteria Descriptions for Complexity vs. Impact of the Challenge

Criteria	Description
<b>Complexity</b>	Complexity is the degree of coordination, number of stakeholders, and amount of systems change required to address the challenge.
<i>High Complexity</i>	Higher complexity requires broad multi-stakeholder alignment, policy or legislative change, high uncertainty, or long time horizons.
<i>Low Complexity</i>	Lower complexity (not simple), still challenging, but involves fewer dependencies, clearer lines of authority, or nearer-term or defined pathways for progress.
<b>Impact</b>	Impact is the degree to which addressing this challenge would create meaningful positive changes for the agency, stakeholders, and the public.
<i>High Impact</i>	Higher impact means tackling this challenge would create broad, systemic change shifting policies, structures, or cultural norms. The benefits would affect multiple agencies, communities, or domains, setting conditions for lasting transformation.
<i>Low Impact</i>	Lower impact means tackling this challenge would still lead to meaningful improvement, but the effects would be narrow or incremental. The benefits may be localized (to a single program, community, or process) or serve as a steppingstone toward broader change.

After all challenges were scored, the full group engaged in a discussion about their thought process during scoring and impressions of the resulting matrix which provided an average score on each dimension. (shown in Figure 1).

<sup>3</sup> There are actually 13 challenges across the three proposed NSDS layers, but due to limitations with the Mentimeter platform, only 12 were included in the activity. Given its external nature, the challenge “Complexity of Aggregating and Coordinating External Data Sources” was excluded.



**Figure 1.** Matrix showing the ranks based on the level of impact and level of complexity for the 12 challenges related to the three proposed NSDS layers.

The top three challenges that, on average, were rated to have the highest level of complexity and impact, and had the highest level of agreement across all I3P participants, were (in descending order): (#10) **Onerous Processes to Access and Share Data**, (#9) **Interoperability and Metadata Challenges**, and (#4) **Difficulty Navigating Existing Data Sources**. While some I3P members amplified the results of the matrix activity, many also highlighted the relational and sequential nature of the challenges. They expressed difficulty with the activity because all of the challenges are of high complexity and impact, and most of the challenges are inextricably linked. In fact, the interdependence among challenges is what makes them so complex. Desiring a better way to capture these intricacies and nuances, the project team planned for in-depth discussions about prioritization through a series of internal workshops while I3P members engaged on the topic asynchronously through a HCD survey.

## 2.2. Human-Centered Design Survey Methods and Analysis

An online HCD survey was administered to the I3P via email on September 22nd using the Qualtrics platform.<sup>4</sup> The full list of questions presented to I3P participants in the survey are shown in [Appendix B](#). I3P members were asked to assess all 13 challenges<sup>5</sup> across the three proposed NSDS layers on level of priority. For each layer, the I3P grouped the four or five challenges aligned with the proposed NSDS layer into higher priority, medium priority, or lower priority groups and then rank ordered the challenges within each group, as appropriate (see [Appendix C](#) for an example rank-order response from an I3P participant).

<sup>4</sup> Because the original data collection window was only intended to be two weeks (closing on October 3rd), the federal government shut down (October 1st - November 12th). The data collection window was extended until December 19th to give I3P members who are federal employees adequate time to respond.

<sup>5</sup> Unlike the matrix activity during the first I3P meeting, the HCD survey included all 13 of the originally identified challenges because there were no limitations in the survey platform to prevent inclusion of all options.

The panelists were also asked to elaborate on their responses by providing open-ended explanations about the nature and dependencies of the higher priority challenges for each layer. At the end of the survey, the I3P members were also asked to select highest priority solutions that might address any or all of the challenges they named as the highest priority in each of the preceding questions. Lastly, I3P were asked to articulate in open-ended responses what they would need in order to effectively communicate the potential value of the future NSDS to their agency.

The rankings of the challenges were all noted for each respondent and average scores were taken for each challenge. Table 2 shows the top two priorities for each of the three proposed layers of the NSDS. All open-ended responses were collated and synthesized manually and also with the assistance of Claude.ai to succinctly summarize I3P insights about the highest priority challenges, interdependencies between the challenges, priority solutions for the select priority challenges, and communication needs.

**Table 2.** Top Two Challenges by Proposed NSDS Layer, Ranked by I3P in the HCD Survey

Proposed NSDS Layer	Top Two Priority Challenges
<b>Discovery and Navigation</b>	<ul style="list-style-type: none"> <li>• Limited information discovery and synthesis</li> <li>• Difficulty navigating existing data sources</li> </ul>
<b>Shared Services and Resources</b>	<ul style="list-style-type: none"> <li>• Complexity of accessing data</li> <li>• Questions limited by policymaker data awareness and literacy</li> </ul>
<b>Access and Linkage Infrastructure</b>	<ul style="list-style-type: none"> <li>• Poorly defined data governance and usability responsibilities</li> <li>• Complexity of aggregating and coordinating external data sources</li> </ul>

### 2.3. Internal Project Team Framework Development Workshops

After the first live I3P meeting, it was clear that the proposed systems change by introducing a future NSDS included myriad sociotechnical factors—some explicit, some implicit. During the federal government shutdown, the project team met for a two-part workshop (i.e., on October 6th and 13th, 2025) to model the depth and breadth of this complex systems change. During the first session of the workshop, the team worked together to arrive at the most appropriate type of model or framework to characterize the complexity of systems change through the NSDS. The goal of framework development was to come up with a model that appropriately depicted the architecture for the magnitude, complexity, and nuances of sociotechnical change in the federal data ecosystem.

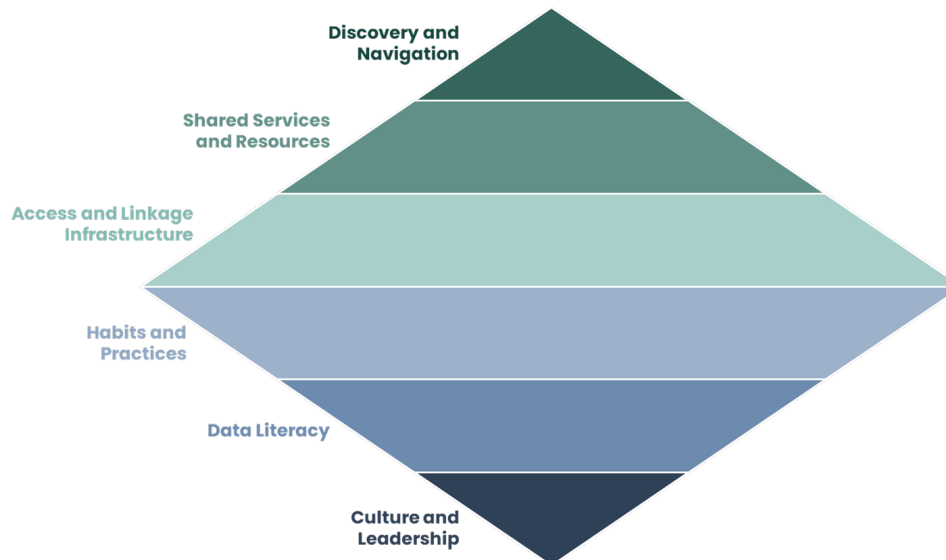
As a result of the first workshop, the team determined that the [iceberg model](#)<sup>6</sup> was the best type of framework to bring a holistic systems thinking perspective. What is “above the water” are the explicit events of a system and what is hiding “below the water” are implicit patterns, structures, and mental models that underlie those events. [Appendix D](#) shows a schematic representation of a generic iceberg model which shows the imagery and definitions of each layer, which are:

- **Events** - discrete, observable behaviors and actions that describe the system
- **Patterns & Trends** - factors that describe consistent or prolonged activities/behaviors
- **Underlying Structures** - Factors that shape events, reinforce patterns, and influence system efficiency
- **Mental Models** - Factors that shape underlying culture and beliefs, fuel the structures, and influence system effectiveness

<sup>6</sup> The original cultural iceberg model was developed by [Hall \(1976\)](#) to describe how underlying, unconscious cultural causes complicate systems change beyond the immediate and obvious events. A traditional iceberg model shows a dichotomy between what is “above the water” (visible) versus what is “below the water” (hidden).

In the second internal team workshop, we mapped all 21 existing identified challenges across the iceberg model. In addition to the 13 challenges that were mapped to the proposed NSDS layers, eight of the previously identified challenges were categorized as “external cultural and environmental factors” that influence but are not directly related to the NSDS. Initially, we placed each of the 21 challenges either just “above the water” (explicit) or “below the water” (implicit), and then we created further groupings within those two divisions to create thematic layers. The result for the context of this study was six systems layers—three layers “above the water” and three “below the water” (shown in Figure 2 below).

What resulted from this exercise was some reorganization of the challenges previously identified by the I3P. Of the 13 challenges that were originally mapped to the proposed NSDS layers in Report 2, four were moved to “below the water”. While they were not originally included in the I3P HCD survey, during the iceberg framework development workshops, we recognized that the “external cultural and environmental” challenges were primarily the factors that are hiding underneath the water. All of the original eight challenges in this group started “below the water”, but three were subsequently moved to “above the water”. This resulted in 12 challenges “above the water” and nine challenges “below the water”.



**Figure 2.** Schematic of the Renamed Systems Layers Specific to Sociotechnical Change for the Federal Data Ecosystem

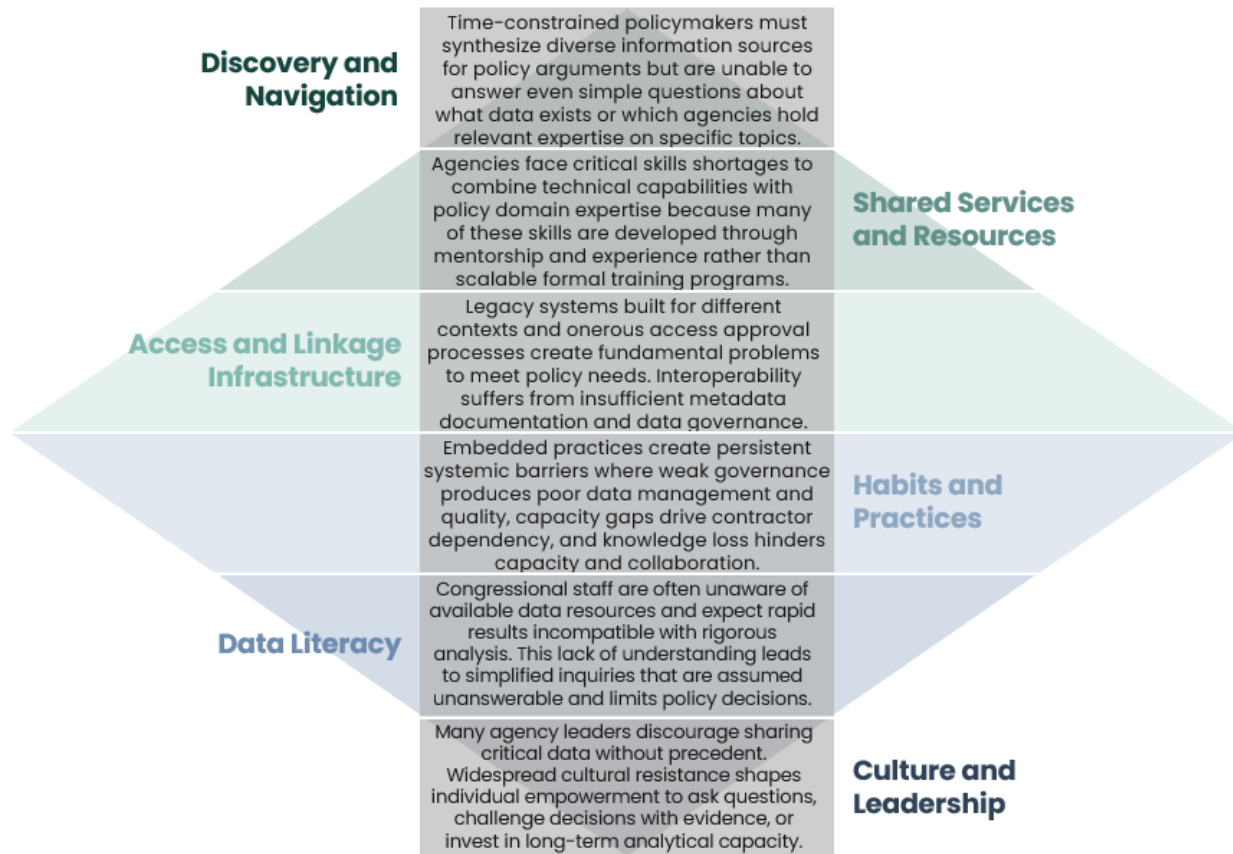
“Above the water”, the explicit events were the already proposed functional layers of the future NSDS: **Discovery and Navigation**, **Shared Services and Resources**, and **Access and Linkage Infrastructure**. There was repeated emphasis from the I3P that the implicit cultural and environmental factors must not be neglected because of the dependencies they pose on the other challenges that are explicitly “above the water”. More implicitly hidden “below the water” are the systems layers: **Habits and Practices**, **Data Literacy**, and **Culture and Leadership**. While plans are already in place to build the technical systems aligned with the three main functional areas of the NSDS, the I3P repeatedly expressed that the layers “below the water” represent rate-limiting factors that will moderate adoption and use of the NSDS. These factors, while more implicit and often more complicated, are equally important to consider when building an effective and sustainable data concierge service to serve policy purposes.

### 2.4. I3P Wrap Up Meeting

During the second meeting, findings from across the survey responses (n=8) and internal project team discussions were shared with all I3P members and NCSES senior administrators. Draft frameworks and language about the observed current state, priority solutions, desired future state, and strategic communications plan were provided. During the meeting, we solicited I3P feedback and demonstrative examples of the priority solutions for each layer. The I3P continued to provide key insights on how best to frame immediate priorities and hidden nuances to be useful to the builders of the future NSDS. During the meeting, there were 19 proposed clarifications or additions to the draft language and 25 examples provided by the I3P.

### 3. Describing the Complexity of Sociotechnical Systems Change

After renaming the generic systems layers of the iceberg model with systems layer names aligned with the policy context, **statements about the observed current state** were crafted to describe the nature of complexity for sociotechnical systems change in the policy context (see Figure 3 below). While these systems layers could be relevant to any large-scale data systems transformation, the narrative descriptions reflect the unique federal policy context related to the challenges observed in the current state that map to each layer (shown in [Appendix E](#)). Similarly, insights from across interviews, surveys, and meetings with the I3P were used to craft narrative descriptions for the desired future state. [Appendix F](#) shows how the identified priority solutions for the future state were mapped across all six systems layers.



**Figure 3.** Translating the iceberg model to describe systems change complexity for the federal data ecosystem.

## 4. Human-Centered Design Sociotechnical System Change Components

The culmination of our interactions with the I3P has led to **mapping the human-centered design systems components** of sociotechnical change in the federal data ecosystem. To describe the change process, we recognized a need to bridge the gap between the observed current state and the desired future state with prioritized strategies for each systems layer (see Figure 4). The I3P provided insights that allowed us to curate a priority set of strategies that will be the path to help move each systems layer from the observed current state toward the desired future state. Additionally, they offered demonstrative examples of these prioritized strategies from across different levels of government and private sectors. A full list of the narrative descriptions for the observed current state, prioritized strategies, desired future state, and demonstrative examples can be found in [Appendix G](#) (“above the water” layers) and [Appendix H](#) (“below the water” layers).



**Figure 4.** Structure of Human-Centered Design Systems Components

While these examples are not exhaustive, they represent examples that are salient and prominent to the I3P given their experiences and roles. Their emphasis and awareness of select examples mentioned could represent initiatives that are effective or show promising potential, well-communicated, or have involved I3P members in development and/or implementation. Each of the examples provided have processes and/or products that may be helpful for builders of the future NSDS to observe and possibly replicate. The following sections provide an overview of the prioritized strategies across each systems layer.

### 4.1. Strategies to Enhance Existing Plans for the Proposed NSDS Layers

This section provides an overview of the prioritized strategies identified by the I3P related to the systems layers that are “above the water,” which tended to be more technical in nature. Because of a focus on the technical aspects of these layers, the complexity of the policy context might not be fully accounted for in the initial implementation of the proposed NSDS.

#### 4.1.1. Discovery and Navigation Prioritized Strategies

The prioritized strategies for the Discovery and Navigation systems layer include:

- Position data concierge as a knowledge broker and partner
- Embed concierge services within agencies
- Make human experts available for special support
- Build comprehensive data dictionaries that provide an inventory and definitions of available data

I3P members posit centralized services will be enhanced by leveraging data concierge services as a knowledge broker. In particular, they emphasized the value of decentralizing services to be embedded within agencies moving data exploration closer to agency databases to increase efficiency and effectiveness. While these services would be mostly automated through technical tools, the I3P highlighted the value of having trained human experts available for specialized support for queries that require idiosyncratic knowledge of the potentially unique aspects of

specific topics. Whether through some type of data exploration tool or human consultations, the I3P also clarified that all data discovery and navigation would be significantly improved through the investment in developing comprehensive data dictionaries that provide a clear inventory and definitions of available data across the federal data ecosystem.

Select demonstrative examples of these prioritized strategies provided by the I3P include:

- [National Archive of Criminal Justice Data](#) (University of Michigan)
- [Data Governance Transformation Project](#) (Massive Data Institute)
- [Community Data Platform](#) (mySidewalk)
- [World Bank Open Data](#) (World Bank Group)
- Proprietary and open access longitudinal data across the research, development, and innovation enterprise (e.g., [Clarivate](#), [OpenAlex](#))

#### **4.1.2. Shared Services and Resources Prioritized Strategies**

The prioritized strategies for the Shared Services and Resources systems layer include:

- Incorporate advanced tools for locating and disaggregating relevant data
- Identify accessible staff and partners, including from nonprofit and academic organizations, to support exploration, discovery, and access
- Build communities of practice and councils to promote knowledge exchange

I3P members acknowledged the importance of communication and collaboration with both internal and external partners to the federal government to better support data exploration, discovery, and access. Externally, these activities include building diverse partnerships with nonprofit and academic organizations. Internally, it includes building communities of practice to promote knowledge exchange and skill development. An example of the type of knowledge exchange that could be offered in these communities of practice could be a searchable repository of data reliability assessments that speak to why and how specific datasets or data elements were previously accessed and the degree to which they were usable or useful for those purposes. This repository could serve a dual purpose of 1) streamlining the process for other data users by saving them the time and effort to determine accessibility, reliability, and usability, and 2) being a source of information to train AI models to improve their efficiency.

Select demonstrative examples of these prioritized strategies provided by the I3P include:

- [Microsoft](#) or [Marriott](#) and other corporate organizations
- [Secure Query Service](#) (Massive Data Institute)
- [KYStats](#) (Kentucky Center for Statistics)
- [Analyst's Guide](#) and [Resources](#) to Federal Spending Data (USASpending.gov)
- State and local longitudinal data systems (e.g., Allegheny County [Children, Youth, and Families](#), DC [Education Through Employment Pathways](#), [Ohio Education Research Center](#), Virginia [Longitudinal Data System](#))

#### **4.1.3. Access and Linkage Infrastructure Prioritized Strategies**

The prioritized strategies for the Access and Linkage Infrastructure systems layer include:

- Develop an infrastructure that serves cross-agency evidence building needs
- Ensure data are validated, focused, and relevant
- Improve readiness of data to be integrated and used by AI tools
- Streamline the process of obtaining data sharing agreements between agencies

These strategies emphasize the importance of developing government-wide data infrastructure that serves cross-agency evidence building needs. This infrastructure development requires a focus on data integration and interoperability that is lacking in the current environment, making data sharing and linkages challenging. Centralized data governance can also help ensure data are organized, validated, and relevant for policy purposes. It can also improve the readiness of data to be integrated into adjacent data systems and tools to improve searchability. An example of the advantage of this capability might be NSDS becoming a source of data validations and tools to help agencies efficiently prepare data for linkages. The I3P also repeatedly mentioned the need to streamline the data sharing agreement process between agencies, which currently often hinders rapid response to policy questions.

Select demonstrative examples of these prioritized strategies provided by the I3P include:

- [Reference Architecture](#) and [Disclosure Avoidance Redaction Tool](#) (Community of Innovation)
- [Data Sources and Linking](#) (USASpending.gov)
- [Data Concierge Service](#) (Harvard FAS Informatics Group)
- [Equitable Value Explorer](#) (Gates Foundation)

## 4.2. Strategies to Address Rate-Limiting Factors for Effective Adoption and Use

This section provides an overview of the prioritized strategies identified by the I3P related to the systems layers that are “below the water”. Despite thoughtful plans for the proposed NSDS model, these strategies may help the “below the water” systems layers be more visible.

### 4.2.1. Habits and Practices Prioritized Strategies

The prioritized strategies for the Habits and Practices systems layer include:

- Offer safe sandbox with dedicated live support for rapid prototyping and testing with synthetic data
- Build robust data catalogs and validation processes

These strategies emphasize the importance of sandbox environments with dedicated live support that allow for safe and secure prototyping and testing. It was also clarified by I3P members that synthetic data should be used so as not to disturb real-world data. I3P members also repeatedly clarified the need to build healthier habits and practices across the federal data ecosystem for cataloging and validating data. NSDS should also consider similar services available to data users to avoid redundancies and/or to clarify the value add of this large-scale digital transformation on policy processes. As the NSDS arrives to revolutionize the federal data ecosystem, impending systemic shifts highlight that this is not simply about adding a new data service, it may also lead to fundamental changes in the role of other data services.

Select demonstrative examples of these prioritized strategies provided by the I3P include:

- [Administrative Data Research UK](#) (UK Research and Innovation)
- [Learning Agenda Toolkit](#) (Grant Thornton/Office of Evaluation Science)
- [Creating a Learning Agenda for Systems Change](#) (Public Health Learning Network)

### 4.2.2. Data Literacy Prioritized Strategies

The prioritized strategies for the Data Literacy systems layer include:

- Bridge the gap between policy and evidence
- Focus on congressional engagement as champions
- Enhance skills in formulating clear and feasible policy questions
- Establish issue-based councils for cross-agency collaboration and coordination

These strategies emphasize the importance of bridging the gap between policy and evidence by strengthening data literacy skills for both those who ask questions that need to be answered to inform policy decisions (e.g., policymakers and agency leaders) and those who work to answer those questions to provide the evidence needed to inform policy decisions (e.g., data engineers and analysts). While there is always a need to bolster technical and analytical skills, improving data literacy primarily requires that the policy questions asked must first be clearly articulated in a manner that reflects awareness and knowledge of what data are available and relevant to answer policy questions.

Cross-agency relationships were accented as a key mechanism for improving awareness and knowledge of what data are available and useful. As such, the I3P highly recommended the use of issue-based councils (e.g., Federal Interagency Council on Economic Mobility) to allow data experts and users to coalesce and share resources on a common policy topic. The impact of these councils was highlighted when some were recently closed, leading to noticeable declines in knowledge exchange, collaboration, and communication between agencies. Ultimately, engaging congressional staff as champions of data generation and use leads to greater demand for quality, relevant data. Focused questions help analysts know how to appropriately approach their queries of the data and influence future data generation plans to provide evidence that better informs policy decisions.

Select demonstrative examples of these prioritized strategies provided by the I3P include:

- [Data Skills for Congress](#) (USAFacts/UC Berkeley)
- [Data Literacy for Leaders](#) (Public Service Leadership Institute)
- [Data Literacy Workshop Series](#) (Academic Senate for California Community Colleges)
- [Federal Interagency Council on Economic Mobility](#) (HHS ASPE)

#### **4.2.3. Culture and Leadership Prioritized Strategies**

The prioritized strategies for the Culture and Leadership systems layer include:

- Communicate clearly the awareness and value to range of users
- Endorsement and ownership from top-down to promote systems-wide culture change

These strategies emphasize the importance of clearly communicating the existence and value of a centralized concierge service to a wide range of data users. The I3P noted it would be critical for NSDS adoption and use to have endorsement and ownership from executive leadership. Consistent messaging needs to promote the benefits of streamlining various data services and needs into one system, and the government-wide value of having more integrated and interoperable data to inform policy decisions. Demonstrating this value to leaders at all levels, even externally, will be critical in making incremental shifts in culture and leadership to promote better evidence use. At the agency-level, this means having senior agency leaders as champions for integrating NSDS use into organizational processes and roles. Government-wide, this means having the U.S. Office of Management and Budget create operational policies and guidance on communicating and integrating the NSDS efficiently and effectively.

Select demonstrative examples of these prioritized strategies provided by the I3P include:

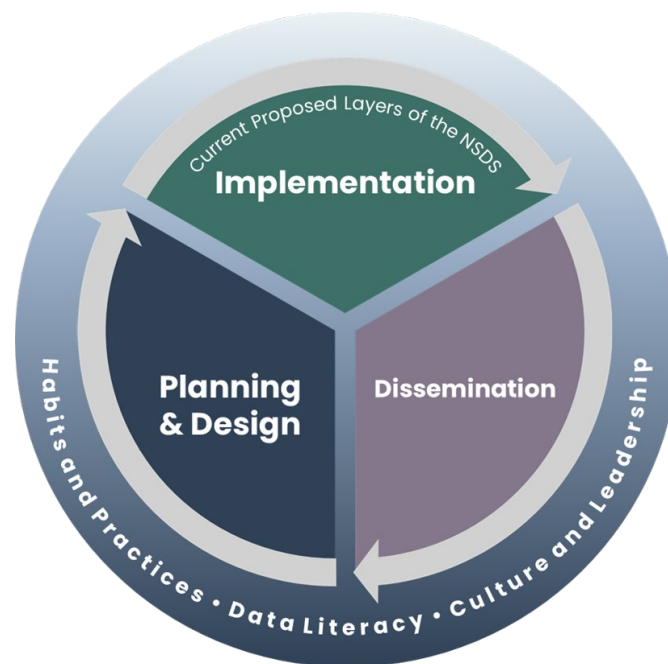
- Connect [Gold Standard Science](#) and other standards of scientific rigor to the business of evidence-building
- Technology adoption cohorts (e.g., [TECH Clean California](#), [SBA](#), [NIST](#))
- [JEDx](#) (U.S. Chamber of Commerce)
- Stories of data failures leading to public demand (e.g., [UPWARD](#) in California, [CMS Blue Button](#), IRS [Direct File](#), Census [Differential Privacy](#))

## 5. Understanding the Complexity of the Policy Inquiry Journey Map

In Report 2, we shared a journey map that reflects the journey to and through the federal data ecosystem (see [Appendix I](#) to recall the Journey Map). The journey map describes the scientific inquiry process, which generally includes three phases: **Planning & Design** (e.g., clarify the request and scope requirements), **Implementation** (e.g., acquire and prepare data), and **Dissemination** (e.g., fulfill the request and communicate insights).

While this journey map is generically applicable to any inquiry process, the complexity of inquiries made for policy purposes adds nuances and context to the journey map that were not previously shown in Reports 2 or 3. According to what we heard from the I3P, the current plans for the future NSDS focus primarily on the Implementation phase of the journey map. All the existing proposed layers of the NSDS model are related to locating, acquiring, preparing, and analyzing the data. However, there is very little attention given to the Planning & Design or Dissemination phases which specifically refer to activities such as refining policy questions, specifying data needs, ensuring data are fit for purpose, and then interpreting and communicating findings in a way that will be relevant and useful for policymaker needs.

As such, we realized a better way to display the journey map that accurately reflects the policy context and nature of its complexity is by integrating the HCD systems components. In Figure 5 below, this graphic shows the original journey map inverted to signal that, according to current NSDS plans, the Implementation phase is “above the water” while the Planning & Design and Dissemination phases are “below the water”. Surrounding all phases of the journey map, even around Implementation, are implicit cultural contexts and factors that will influence and serve as interdependencies for successful implementation of the future NSDS. The nuances of the “below the water” phases of the journey map are covered in the preceding sections and greatly affect the journey through the Implementation phase that is “above the water”.



**Figure 5.** Relationship Between the Journey Map for Policy Inquiry and the Human-Centered Design Systems Components

Figure 5 also depicts the layers “below the water” as being concentrated around the first and third phases of the inquiry journey map, indicating there is more to consider in navigating the rate-limiting factors that will affect the ability of a future NSDS to provide effective services to inform policy decisions. Ultimately, overfocusing on only one phase of the journey map for large-scale sociotechnical change in the federal data ecosystem will disable the future NSDS from becoming a useful tool in how policy decisions are informed by relevant and useful data.

## 6. Facilitating NSDS Adoption and Use with Strategic Communications

Throughout all our engagements with the I3P, they expressed enthusiasm and support to see a future NSDS become a helpful tool for systems change in the federal data ecosystem. For this to become a reality, they emphasized the need to first have a champion who would endorse and take ownership of NSDS implementation—for which they nominated the U.S. Office of Management and Budget as the best candidate for central coordination and communication. As agency senior leaders themselves, they and their peers also need to be explicitly equipped to be able to champion the future NSDS for adoption and use at their respective agencies.

Borrowing from the Prosci® ADKAR model<sup>7</sup>, effective strategic communications can be presented as a type of maturity model for large-scale organizational change through five key steps to be brought along and bought-in to the process. In [Appendix J](#), the proposed strategic communications plan is shown with descriptions for each step in this adaptation of the ADKAR model. Table 3 also provides a full list of activities or communication suggestions offered by the I3P under each step in the AKDAR model.

**Table 3.** Suggested Activities and Communication Strategies

ADKAR Step	Suggested Activities or Communication Strategies
<b>Awareness</b>	<ul style="list-style-type: none"> <li>• Develop a flagship, bipartisan pilot use case<sup>8</sup> that demonstrates the functionality of the NSDS (e.g., including use cases at the state and local government levels).</li> <li>• Publicize the process, results, and policy impact widely to establish the NSDS as a state-of-the-art solution to navigate and access data.</li> <li>• Lead communications with emerging or early adoption use cases, not architecture, based on identified priority questions from diverse policy users.</li> </ul>
<b>Desire</b>	<ul style="list-style-type: none"> <li>• Clarify the value proposition by adopting proactive framing of NSDS as a navigation and concierge service that helps users find, access, and use data for policy purposes.</li> <li>• Emphasize the problems the NSDS will address and provide practical, question-specific demonstrations of what the NSDS will enable policy stakeholders to answer.</li> </ul>
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• Build evidence of cross-agency infrastructure value by demonstrating how NSDS serves interagency evidence-building needs.</li> <li>• Show real examples of problems that can and cannot be solved with coordination and implementable solutions.</li> </ul>
<b>Ability</b>	<ul style="list-style-type: none"> <li>• Equip and deploy distributed, local champions at each agency to facilitate adoption.</li> <li>• Enable hands-on experiences through low-barrier sandboxes and experimental environments for training.</li> </ul>
<b>Reinforcement</b>	<ul style="list-style-type: none"> <li>• Provide clear, authoritative operational guidance in collaboration with OMB.</li> </ul>

<sup>7</sup> <https://www.prosci.com/methodology/adkar>

<sup>8</sup> A [pilot use case](#) allows a complex digital transformation project to be tested for feasibility and scalability. Observed pain points can be used to inform refinements while successes may be communicated as promise and value of the NSDS.

## 7. Conclusions

The challenges observed in the current state necessitate major change in the federal data ecosystem to make data access and use more efficient and effective to support policy needs. The future NSDS offers a promising solution to address the general needs for better data discovery, navigation, access, and linkages, but current plans may be insufficient to meet the evidentiary needs for policy and decision making. Most of the currently planned NSDS features and services focus on the systems layers of sociotechnical change that are explicit or “above the water”. However, the systems layers of the federal data ecosystem go beyond what is often visible, making large-scale systems change incredibly complex. The I3P prioritized 19 strategies that will help facilitate the transition from the observed current state to a more desirable future state across each systems layer. Additionally, they highlighted 25 examples that may be useful in operationalizing the prioritized strategies.

While there are many rate-limiting cultural factors to consider that are hidden “below the water” that need to be considered for the future NSDS to be effective, the I3P acknowledged that the NSDS itself should be an agent for culture change. The mere introduction of such a data service for the federal government is already anticipated to significantly improve data discoverability and usability. However, in order for the future NSDS to have its intended effect on the policy process, the services must be able to understand and discern the different roles and responsibilities, needs, and contexts related to policy-related queries to optimize useful and relevant data.

## 8. Next Steps and Timeline

Our analysis and synthesis highlights that the future NSDS presents a complex sociotechnical change for the federal data ecosystem, albeit needed. It is important to understand the journeys of realistic users and purposes through complex change management. Through engagement with the I3P, our project continues to offer critical insights and promising strategies to facilitate adoption and use of the future NSDS across and through all levels of government with special attention to the policy context.

## 9. Appendices

### Appendix A: I3P Reactions to Reports 1-3

The following are anonymized responses from the I3P during the September 2025 meeting for the prompt, "What were the key takeaways, reactions, aha moments, or parts that were most surprising to you from Reports 1-3?"

I had not seen before the "Guiding Principles for Successful NSDS Implementation and Use" - very helpful  
It is surprising to me that the NSDS sees the current systematic challenges as Out-Of-Scope for the future NSDS. It seems clear that the NSDS should lead in confronting institutional norms.

Helpful to see the consistency across respondents in terms of the challenges and issues highlighted

I think that culture-change *\*will\** need to be a part of NSDS efforts.

I'm surprised no social (either organizational or individual) solution themes emerged for the access and linkage infrastructure. I think there is a relationship aspect needed to make that work.

Surprised that an expedited and established data access and sharing agreements for the government do not yet exist after 6 years of the Evidence Act

Data lineage is a powerful way to demonstrate data value to other agencies and helps them identify data they might like to use

The shared solutions were a real aha!

Was glad to see the need for standardized/easily used data agreements as a universal solution

Key challenges in the planning & design phase are around identification and discovery! Important solutions have to do with improving inventories and identifying relevant data. I really appreciated the focus on policymakers and the implied importance of bridging the gap between information collected by the executive branch and the need for it to inform policy making

Ultimately, these issues boil down to inertia in organizational culture more than any sort of technical or statistical challenge.

Surprised that I don't see standardized Data Categorization and recommendations on low-cost accessible Data Catalogs as part of the technical solutions. A demo of Catalog for governance would go far.

## Appendix B: I3P HCD Survey

Thank you for taking the time to participate in this human-centered design survey. Our goal for this activity is to work toward prioritizing the challenges that emerged from key informant interviews with our Insight, Interpretation, and Innovation Panel (I3P) members. We also plan to collect additional actionable insights about feasible solutions to address the priority challenges.

This survey should take about 15-20 minutes to complete. If necessary, you can leave and come back to finish where you left off. You may find this reference guide useful throughout the survey. Clicking on the link (and others throughout the survey) will bring up the reference guide as a Google document in a separate window. Note: There are multiple tabs on the left-hand margin which you can use to access relevant information for different parts of the survey.

As a reminder, no personally identifiable information will be collected as part of this survey. That means that your responses will be completely anonymous and will not be able to be traced back to you. Should you have any questions or concerns about this study or experience any issues with participating fully or completing this survey, please do not hesitate to reach out.

1. The 12 challenges that emerged from I3P interviewees were mapped to one of the three proposed layers of the future NSDS (e.g., Data Discovery and Navigation, Shared Services and Resources, Access Linkage and Infrastructure).

For the **Data Discovery and Navigation** layer, the following 4 challenges were identified as being related to this layer. For more information about each of the challenges in this layer, please feel free to use this reference which provides the challenge themes with full descriptions. Please sort these challenges within this layer on the left by dragging and dropping them into the higher, medium, or lower prioritization buckets on the right.

Note: While all may seem like high priorities you **MUST** put at least one challenge in each bucket, which means you should try your best to disperse the challenges across priority levels. Within each priority level, if you sorted more than one challenge in there, you can also further rank-order them to show prioritization within a bucket.

2. For the challenges you sorted into the **Higher Priority** bucket for the **Data Discovery and Navigation** layer, what additional details would you give to the builders of the future NSDS 1.0 to address the challenge(s)?
3. What other dependencies need to be addressed (e.g., other challenges previously identified or ones not previously identified that need to be solved) in order to address the **Higher Priority** challenges that you identified for the **Data Discovery and Navigation** layer?
4. The 12 challenges that emerged from I3P interviewees were mapped to one of the three proposed layers of the future NSDS (e.g., Data Discovery and Navigation, Shared Services and Resources, Access Linkage and Infrastructure).

For the **Shared Services and Resources** layer, the following 4 challenges were identified as being related to this layer. For more information about each of the challenges in this layer, please feel free to use this reference which provides the challenge themes with full descriptions. Please sort these challenges within this layer on the left by dragging and dropping them into the higher, medium, or lower prioritization buckets on the right.

Note: While all may seem like high priorities you MUST put at least one challenge in each bucket, which means you should try your best to disperse the challenges across priority levels. Within each priority level, if you sorted more than one challenge in there, you can also further rank-order them to show prioritization within a bucket.

5. For the challenges you sorted into the **Higher Priority** bucket for the **Shared Services and Resources** layer, what additional details would you give to the builders of the future NSDS 1.0 to address the challenge(s)?
6. What other dependencies need to be addressed (e.g., other challenges previously identified or ones not previously identified that need to be solved) in order to address the **Higher Priority** challenges that you identified for the **Shared Services and Resources** layer?
7. The 12 challenges that emerged from I3P interviewees were mapped to one of the three proposed layers of the future NSDS (e.g., Data Discovery and Navigation, Shared Services and Resources, Access Linkage and Infrastructure).

For the **Access and Linkage Infrastructure** layer, the following 4 challenges were identified as being related to this layer. For more information about each of the challenges in this layer, please feel free to use this reference which provides the challenge themes with full descriptions. Please sort these challenges within this layer on the left by dragging and dropping them into the higher, medium, or lower prioritization buckets on the right.

Note: While all may seem like high priorities you MUST put at least one challenge in each bucket, which means you should try your best to disperse the challenges across priority levels. Within each priority level, if you sorted more than one challenge in there, you can also further rank-order them to show prioritization within a bucket.

8. For the challenges you sorted into the **Higher Priority** bucket for the **Access and Linkage Infrastructure** layer, what additional details would you give to the builders of the future NSDS 1.0 to address the challenge(s)?
9. What other dependencies need to be addressed (e.g., other challenges previously identified or ones not previously identified that need to be solved) in order to address the **Higher Priority** challenges that you identified for the **Access and Linkage Infrastructure** layer?
10. Which, if any, solution themes listed in this reference guide (also in Report 3) resonate with you as you think about the higher priority challenges you identified in the previous questions for each layer?
11. What would you need to effectively communicate the potential value of the NSDS 1.0 for your agency?
12. Optional: Please feel free to share any additional thoughts you have about using data for federal policy purposes.

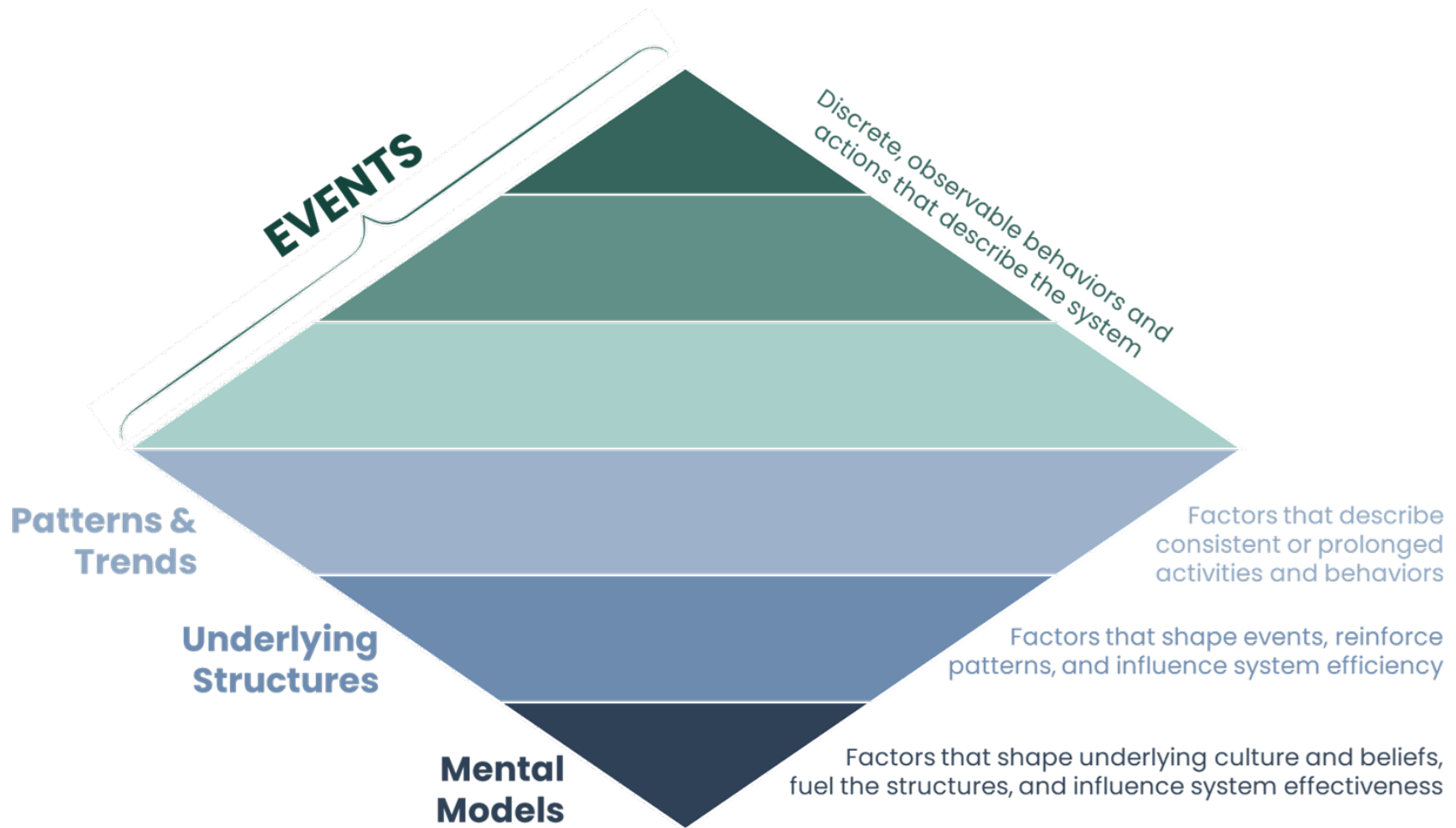
Note: Data do not have to be federal data. They include data of all types including but limited to other systems and enclaves that house non-federal data (e.g., state/local/tribal government, private or commercial data systems).

Thank you for completing this survey. Your responses have been successfully submitted. Your responses are greatly appreciated and will contribute meaningfully to our understanding of the priorities and actionable insights that can inform the design and build of the future NSDS 1.0.

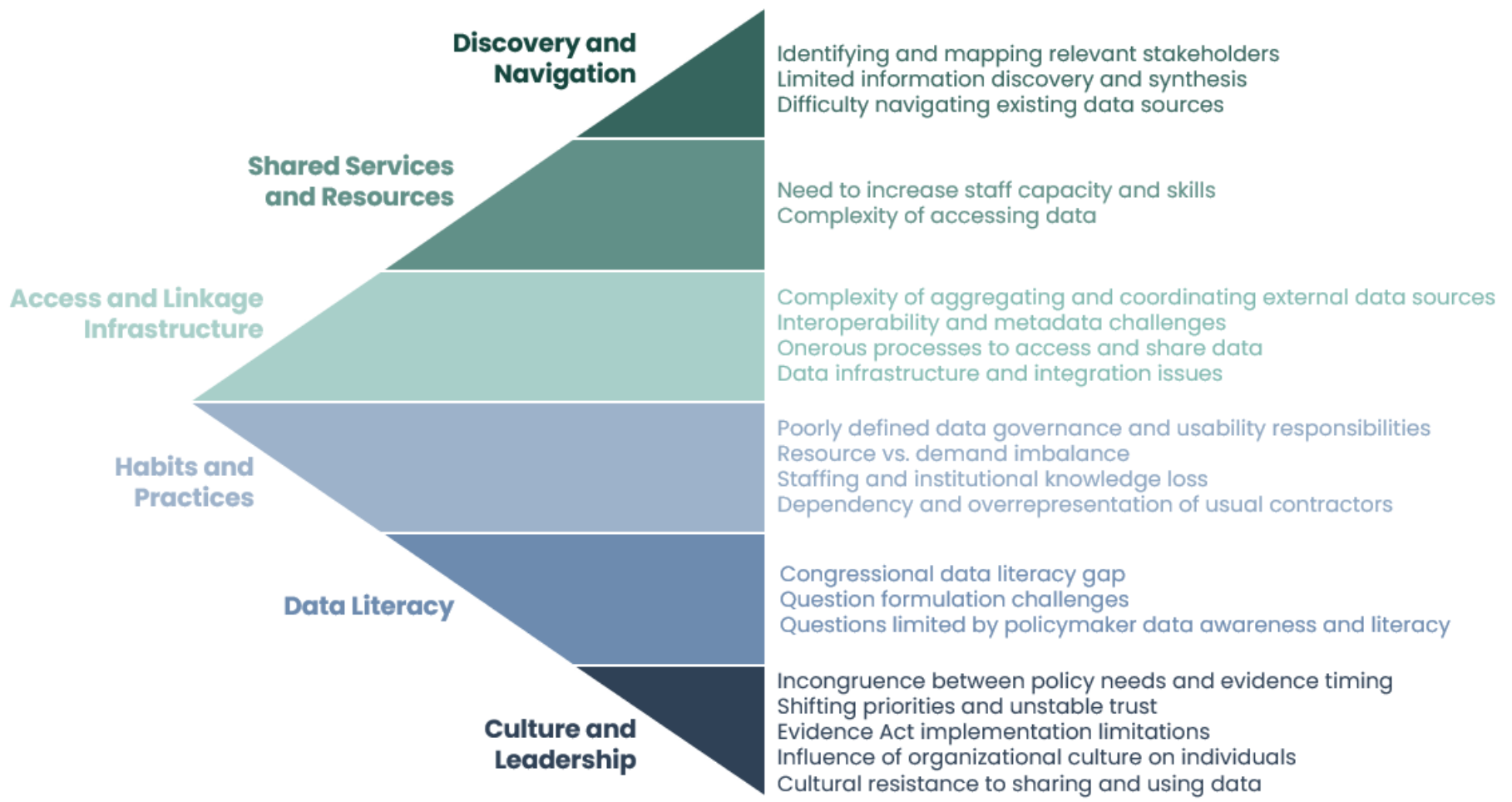
## Appendix C: Example I3P Response for Discovery and Navigation Priority Challenges

<b>Higher Priority</b>	
Limited Information Discovery and Synthesis	<b>1</b>
Difficulty Navigating Existing Data Sources	<b>2</b>
<b>Medium Priority</b>	
Congressional Data Literacy Gap	<b>1</b>
<b>Lower Priority</b>	
Identifying and Mapping Relevant Stakeholders	<b>1</b>

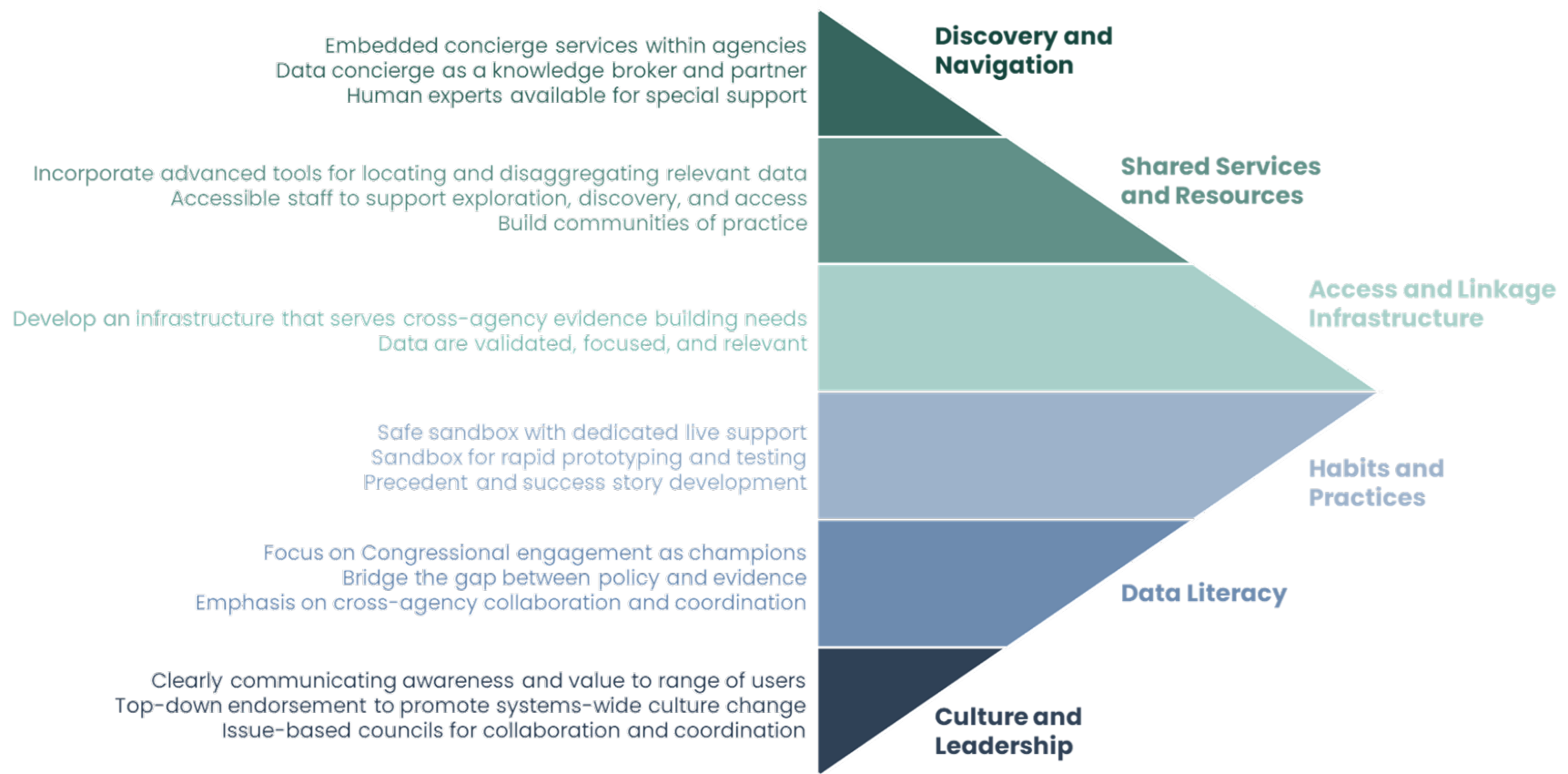
### Appendix D: Schematic Drawing of the Generic Systems Layers of the Iceberg Model



Appendix E: Current State Priority Challenges Mapped to the Systems Layers



## Appendix F: Future State Priority Solutions Mapped to the Systems Layers



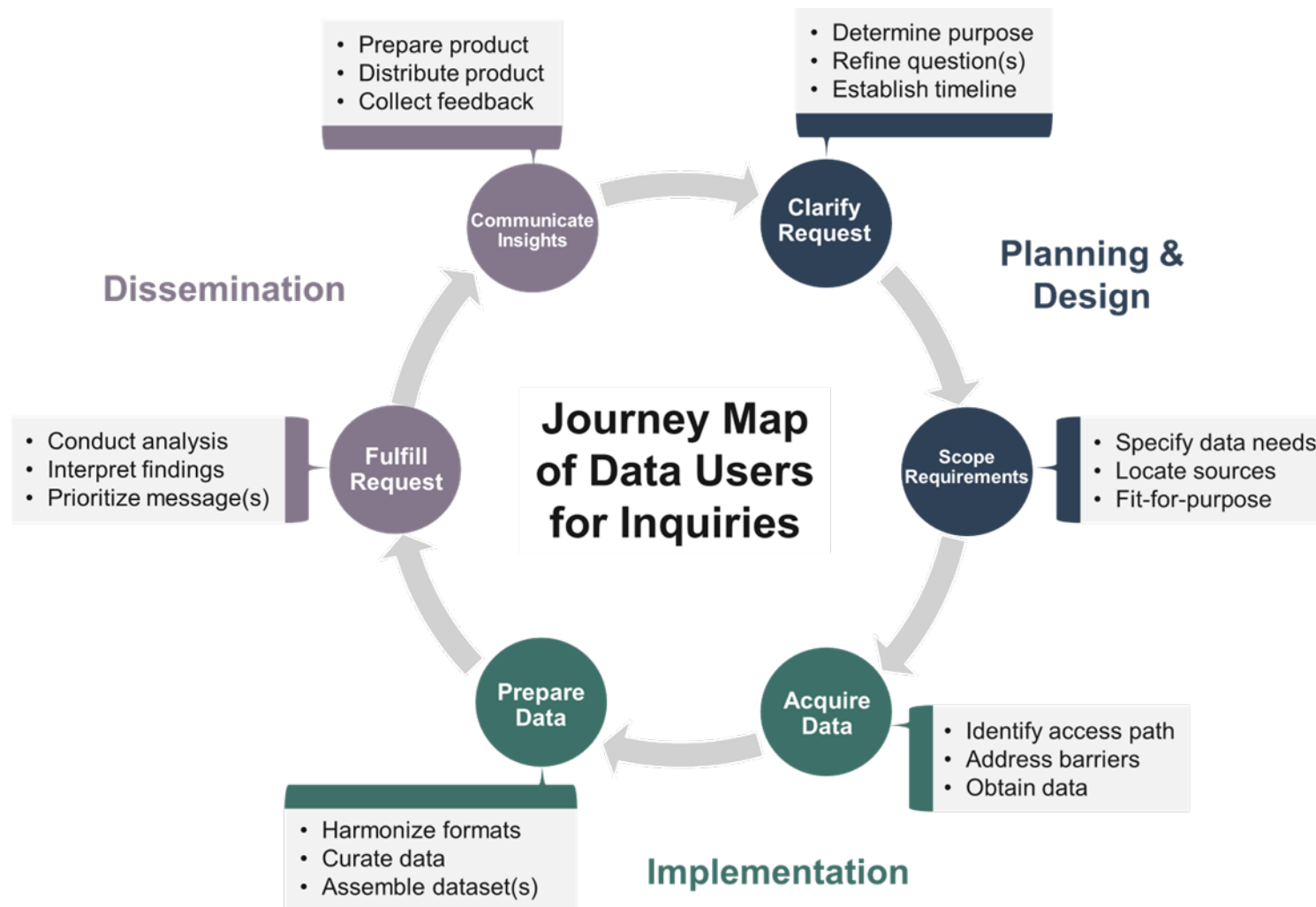
## Appendix G: Identified Systems Components for Adoption and Use (“Above the Water”)

Systems Layer	Observed Current State	Prioritized Strategies	Desired Future State	Demonstrative Examples
<b>Discovery and Navigation</b>	Time-constrained policymakers must synthesize diverse information sources for policy arguments but are unable to answer even simple questions about what data exists or which agencies hold relevant expertise on specific topics.	<ul style="list-style-type: none"> <li>● Position data concierge as a knowledge broker and partner</li> <li>● Embed concierge services within agencies</li> <li>● Make human experts available for special support</li> <li>● Build comprehensive data dictionaries that provide an inventory and definitions of available data</li> </ul>	A combination of easily navigable data systems and an option to engage with a human expert, when needed, for additional support. Efficient, user-friendly tools adopted to help identify and access data that are fit for policy purposes.	<ul style="list-style-type: none"> <li>● <a href="#">National Archive of Criminal Justice Data</a> (University of Michigan)</li> <li>● <a href="#">Data Governance Transformation Project</a> (Massive Data Institute)</li> <li>● <a href="#">Community Data Platform</a> (mySidewalk)</li> <li>● <a href="#">World Bank Open Data</a> (World Bank Group)</li> <li>● Proprietary and open access longitudinal data across the research, development, and innovation enterprise (e.g., <a href="#">Clarivate</a>, <a href="#">OpenAlex</a>)</li> </ul>
<b>Shared Services and Resources</b>	Agencies face critical skills shortages to combine technical capabilities with policy domain expertise because many of these skills are developed through mentorship and experience rather than scalable formal training programs.	<ul style="list-style-type: none"> <li>● Incorporate advanced tools for locating and disaggregating relevant data</li> <li>● Identify accessible staff and partners, including from nonprofit and academic organizations, to support exploration, discovery, and access</li> <li>● Build communities of practice to promote knowledge exchange</li> </ul>	Collaborative interagency communities of practice with broad representation, including decision makers and front-line data users, identify use cases and prototype solutions to address data availability and access issues.	<ul style="list-style-type: none"> <li>● <a href="#">Microsoft</a> or <a href="#">Marriott</a> and other corporate organizations</li> <li>● <a href="#">Secure Query Service</a> (Massive Data Institute)</li> <li>● <a href="#">KYStats</a> (Kentucky Center for Statistics)</li> <li>● <a href="#">Analyst’s Guide</a> and <a href="#">Resources</a> to Federal Spending Data (USASpending.gov)</li> <li>● State and local longitudinal data systems (e.g., Allegheny County <a href="#">Children, Youth, and Families</a>, DC <a href="#">Education Through Employment Pathways</a>, <a href="#">Ohio Education Research Center</a>, Virginia <a href="#">Longitudinal Data System</a>)</li> </ul>
<b>Access and Linkage Infrastructure</b>	Legacy systems built for different contexts and onerous access approval processes create fundamental problems to meet policy needs. Interoperability suffers from insufficient metadata documentation and data governance.	<ul style="list-style-type: none"> <li>● Develop an infrastructure that serves cross-agency evidence building needs</li> <li>● Ensure data are validated, focused, and relevant</li> <li>● Improve readiness of data to be integrated and used by AI tools</li> <li>● Streamline the process of obtaining data sharing agreements between agencies</li> </ul>	Data users for federal policy purposes, with a wide-range of skills, have tools and examples on how to access and link authoritative data. Existing sandbox environments are used to identify streamlined pathways for secure data access and use.	<ul style="list-style-type: none"> <li>● <a href="#">Reference Architecture</a> and <a href="#">Disclosure Avoidance Redaction Tool</a> (Community of Innovation)</li> <li>● <a href="#">Data Sources and Linking</a> (USASpending.gov)</li> <li>● <a href="#">Data Concierge Service</a> (Harvard FAS Informatics Group)</li> <li>● <a href="#">Equitable Value Explorer</a> (Gates Foundation)</li> </ul>

## Appendix H: Identified Systems Components for Adoption and Use (“Below the Water”)

Systems Layer	Observed Current State	Prioritized Strategies	Desired Future State	Demonstrative Examples
<b>Habits and Practices</b>	Embedded practices create persistent systemic barriers where weak governance produces poor data management and quality, capacity gaps drive contractor dependency, and knowledge loss hinders capacity and collaboration.	<ul style="list-style-type: none"> <li>• Offer safe sandbox with dedicated live support for rapid prototyping and testing with synthetic data</li> <li>• Build robust data catalogs and validation processes</li> </ul>	Communities of practices are in place to enhance communication and collaboration between system users and builders. These efforts will result in standardized definitions to improve data governance and interoperability.	<ul style="list-style-type: none"> <li>• <a href="#">Administrative Data Research UK</a> (UK Research and Innovation)</li> <li>• <a href="#">Learning Agenda Toolkit</a> (Grant Thornton/Office of Evaluation Science)</li> <li>• <a href="#">Creating a Learning Agenda for Systems Change</a> (Public Health Learning Network)</li> </ul>
<b>Data Literacy</b>	Congressional staff are often unaware of available data resources and expect rapid results incompatible with rigorous analysis. This lack of understanding leads to simplified inquiries that are assumed unanswerable and limits policy decisions.	<ul style="list-style-type: none"> <li>• Bridge the gap between policy and evidence</li> <li>• Focus on congressional engagement as champions</li> <li>• Enhance skills in formulating clear and feasible policy questions</li> <li>• Establish issue-based councils for cross-agency collaboration and coordination</li> </ul>	Seamless coordination and communication between agencies and congressional staff to improve question formulation and data exploration to support timely answers for a specific policy issue. Better formulated questions will enable more rigorous data analyses and utilization.	<ul style="list-style-type: none"> <li>• <a href="#">Data Skills for Congress</a> (USAFacts/UC Berkeley)</li> <li>• <a href="#">Data Literacy for Leaders</a> (Public Service Leadership Institute)</li> <li>• <a href="#">Data Literacy Workshop Series</a> (Academic Senate for California Community Colleges)</li> <li>• <a href="#">Federal Interagency Council on Economic Mobility</a> (HHS ASPE)</li> </ul>
<b>Culture and Leadership</b>	Many agency leaders discourage sharing critical data without precedent. Widespread cultural resistance shapes individual empowerment to ask questions, challenge decisions with evidence, or invest in long-term analytical capacity.	<ul style="list-style-type: none"> <li>• Communicate clearly the awareness and value to range of users</li> <li>• Endorsement and ownership from top-down to promote systems-wide culture change</li> </ul>	Collaborative change enablement approach incorporates effective communication about the value of NSDS for secure and accessible data use. Champions for diffuse NSDS use will embed and expand implementation and adoption.	<ul style="list-style-type: none"> <li>• Connect <a href="#">Gold Standard Science</a> and other standards of scientific rigor to the business of evidence-building</li> <li>• Technology adoption cohorts (e.g., <a href="#">TECH Clean California</a>, <a href="#">SBA</a>, <a href="#">NIST</a>)</li> <li>• <a href="#">JEDx</a> (U.S. Chamber of Commerce)</li> <li>• Stories of data failures leading to public demand (e.g., <a href="#">UPWARD</a> in California, <a href="#">CMS Blue Button</a>, IRS <a href="#">Direct File</a>, Census <a href="#">Differential Privacy</a>)</li> </ul>

## Appendix I: Recalling the Journey Map Cycle



## Appendix J: Strategic Communications Plan Proposed by the I3P

This strategic communications plan draws from the Prosci® ADKAR model<sup>9</sup> to strengthen understanding, capacity, and sustainability of complex digital transformations.

### Awareness

Develop a flagship, bipartisan pilot use case that demonstrates the functionality of the NSDS. Publicize the process, results, and policy impact widely to establish the NSDS as a state-of-the-art solution to navigate and access data. Lead communications with emerging or early adoption use cases, not architecture, based on identified priority questions from diverse policy users.

### Desire

Clarify the value proposition by adopting proactive framing of NSDS as a navigation and concierge service that helps users find, access, and use data for policy purposes. Emphasize the problems the NSDS will address and provide practical, question-specific demonstrations of what the NSDS will enable policy stakeholders to answer.

### Knowledge

Build evidence of cross-agency infrastructure value by demonstrating how NSDS serves interagency evidence-building needs. Show real examples of problems that can and cannot be solved with coordination and implementable solutions.

### Ability

Equip and deploy distributed, local champions at each agency to facilitate adoption. Enable hands-on experiences through low-barrier sandboxes and experimental environments for training.

### Reinforcement

Provide clear, authoritative operational guidance in collaboration with OMB.

<sup>9</sup> <https://www.prosci.com/methodology/adkar>