Putting Data to Work:
A Guide to Building Longitudinal Data Systems from a Workforce Perspective
# Table of Contents

**About This Guide** .................................................................................................................. 1
  Manual’s Purpose .................................................................................................................. 1

**Introduction** .......................................................................................................................... 3
  What is a Longitudinal Data System? ....................................................................................... 3
  Brief History of SLDS Grants .................................................................................................. 5
  Brief History of WDQI Grants ................................................................................................. 7
  Brief History of Other Related Initiatives .............................................................................. 8
  Final Thoughts ...................................................................................................................... 9

**Chapter 1: Taking Stock** .......................................................................................................... 11
  Take Stock of Leadership Support ......................................................................................... 12
  Take Stock of Laws and Interpretations of Laws ................................................................... 14
  Take Stock of Data Infrastructure .......................................................................................... 17
  Cost/Benefit ........................................................................................................................... 19
  Build Partnerships and Engage Stakeholders ....................................................................... 21
  Develop a Research Agenda .................................................................................................. 26
  Establish a Data Governance Program .................................................................................. 31
  Conclusion .............................................................................................................................. 39

**CHAPTER 3: Designing The System** ..................................................................................... 41
  Explore Phase .......................................................................................................................... 42
  Plan Phase ............................................................................................................................... 45
  Build Phase ............................................................................................................................. 51
  Maintain Phase ...................................................................................................................... 53

**Chapter 4: Data Use** ............................................................................................................... 55
  Step 1: Identify Target Users .................................................................................................. 55
  Step 2: Select the Right Data Product(s) for Target users ...................................................... 57
  Step 3: Design and Produce Data Products ........................................................................... 62
  Step 4: Launch Data Products ............................................................................................... 62
Step 5: Provide Continuous Support to Meet the Needs of Data Users .......................... 63

CHAPTER 5: Sustainability .............................................................................................. 65

Build the Foundation for Sustainability ......................................................................... 65
Plan for Sustainability ..................................................................................................... 67
Continuously Revisit the Sustainability Approach .......................................................... 68
About This Guide

This guide was written by staff members of Social Policy Research Associates (SPR) on behalf of the U.S. Department of Labor, Employment and Training Administration (DOLETA), under the Workforce Data Quality Initiative Technical Assistance project (DOL Task Order #DOLU111A21732). As part of this project, the DOL contracted with SPR to develop a manual that addresses key elements of workforce longitudinal data systems and that highlights the efforts made by states and the tools they found useful.

The opinions expressed herein are those of SPR and not necessarily those of the DOLETA.

Project Managers: Jill Leufgen

Melissa Mack (SPR)

Other Contributors: Mika Clark (SPR)

Deanna Khemani (SPR)

Manual’s Purpose

This manual serves as a tool to help state workforce agency (SWA) staff understand the importance of creating longitudinal data systems (LDS) that link education, workforce, and public welfare information. This guide is funded by the DOLETA. The guide intends to provide useful information for SWA staff undertaking the design and development of a workforce LDS regardless of whether federal funding has been procured. While an attempt has been made to provide the reader with a comprehensive understanding of key policy decisions that are involved, it is also important to acknowledge that SWAs have varying levels of support and technical expertise in this area. Some SWAs may be starting the process from the very beginning, while others have been designing and building support for an LDS initiative for some time. Still others are already active participants in an operational P-20W system (pre-K through workforce participation LDS). Regardless of where an SWA is in its development of an LDS that, at a minimum, links education and workforce information, the authors hope this guide will help drive meaningful discussions about design and implementation of such an initiative. This guide introduces important topics related to LDSs, offers state examples, and directs the reader to other available resources related to LDS design and implementation.
Because state LDS efforts vary considerably in terms of the elements already in place, this guide cannot assume that any particular element or feature exists in the reader’s state. We therefore chose to describe a “model system” and explain how all of its elements may be constructed from the ground up. For this reason, it is up to readers to decide how the information, recommendations, and examples of innovative practices contained in this guide apply to the unique situation in their state.

**Acknowledgements**

Gathering information and designing this manual on workforce LDSs has been a rewarding experience. Many people generously contributed their knowledge, skills, and time to the effort. First off, we would like to thank the state-level staff who shared their experiences with us. We especially want to thank Lorece Stanton, Workforce Analyst at the Division of Strategic Planning and Performance, Office of Policy Development and Research at DOLETA, for her valuable contributions and support of this project. The insights and comments provided by federal and state staff have added greatly to the content in this guide.

**Manual Overview**

To help with synthesizing the information presented, the manual is broken down into six separate sections.

- The Introduction provides a brief introduction to the history of education and workforce LDS projects and sets the context for further discussions about how to create a workforce LDS.

- Chapter 1 encourages readers to assess the value of developing an LDS and asks readers to examine the political and regulatory environment in which their state workforce LDS will operate. This chapter also examines the need for SWA staff to leverage staff and monetary resources when creating their LDS.

- Chapter 2 addresses the nontechnical aspects of developing a workforce LDS. This chapter discusses the importance of obtaining stakeholder and partner buy-in for the initiative, developing a key set of research questions to guide the effort, and creating a data governance program to guide the development and implementation of the LDS.

- Chapter 3 addresses key technical features of developing a workforce LDS, including identifying what type of hardware and system architecture to use. This chapter also addresses important components related to data security and confidentiality.
• Chapter 4 discusses how the data in the LDS can be accessed and by whom. The emphasis in this chapter is on products and reports that can be generated from the LDS.

• Chapter 5 discusses the need for SWA staff to communicate the benefits of their LDS to others, in order to maintain current funding and secure future commitments to sustain the LDS moving forward.
Introduction

Program administrators have long collected information about customers of public education and workforce programs, but it has rarely been maintained and linked across programs and management information systems (MIS) for defined purposes. Today, as new technological capabilities allow users to store, aggregate, and collect data, data integration and data quality have gained importance in the eyes of program administrators, legislators, and the public. The concept of “Big Data”—still relatively new among government stakeholders—is an acknowledgement that private companies and government entities have the capacity to collect more information about the benefits, services, and outcomes of individual participants than ever before and to use this information to make predictions and informed decisions that can lead to better employment outcomes, funding decisions, program design, and delivery options. In fact, The White House recently signaled the importance of this issue, commissioning the President’s Council of Advisors on Science and Technology to prepare a report on big data and privacy.¹ In the public workforce system, the recent passage of the Workforce Investment and Opportunity Act (WIOA), the successor to the Workforce Investment Act (WIA), is putting extra emphasis on data integration and data quality as means to program improvements.

Developing state LDS initiatives for the public workforce system gives program staff, administrators, and policymakers the ability to make decisions based on huge volumes of data across multiple and disparate systems and to analyze important patterns and trends in the data at both an individual and aggregate level. Ultimately, the hope is that LDS funding will help improve education and workforce outcomes for job seekers and improve the competitiveness of U.S. businesses.

What is a Longitudinal Data System?

The concept of the LDS originated with the Department of Education’s Student Longitudinal Data System (SLDS) grants.

¹ Executive Office of the President, Big Data: Seizing Opportunities, Preserving Values (May 2014).
**LDS Defined**

The National Forum on Education Statistics “Traveling through Time” series defines an LDS as “a data system that

- collects and maintains detailed, high-quality, student- and staff-level data;
- links these data across entities and over time, providing a complete academic and performance history for each student; and
- makes these data accessible through reporting and analysis tools.”

If an education LDS initiative is underway in a state, the SWA may be asked to integrate its program, benefit, and labor market information datasets into the state LDS in order to improve the longitudinal aspect of the LDS and create a holistic picture for individuals over time, from early childhood to employment. There are many terms used within the education and workforce community to describe these initiatives. One of the most common terms is P-20W system, which describes a system that links individual participant data from early childhood programs, K-12 education, postsecondary education, and workforce outcomes. Such systems are designed to allow executives and administrators to make informed decisions about program funding and program design in order to improve outcomes for participants and customers of the programs being studied—students, job seekers and other individuals accessing public services, and businesses. Because not every state has a P-20W system or approach, this manual will use the term LDS to refer to SWA efforts at creating longitudinal data systems, whether they are exclusively workforce focused or cover the whole education-to-workforce spectrum.

**LDS Purpose**

The primary purpose of developing an LDS is to collect key pieces of information about individuals over time, and to connect and aggregate those pieces of information in order to analyze the impact of programs and services on individuals. Acquiring the ability to analyze performance at the individual level will help educators, workforce practitioners, and

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3 A P-20W data system collects preschool through post-secondary student information, while linking workforce program and employment information to track and measure longitudinal labor and employment outcomes.
policymakers at the local and state levels improve policies, eventually leading to improved outcomes for all.⁴

An LDS is more than just a data warehouse. Simply having a data warehouse, while a valuable LDS component, does not mean that a state has an LDS. An LDS is defined less by the type of system(s) used to store data and more by the type of individual-level data maintained in the systems, how comprehensive those data are, whether the data spans many years, and how they are made available for research and analysis.⁵ An LDS is not a single-shot effort: it takes time, resources, ongoing maintenance, and especially partners to ensure that the LDS collects data, maintains its system(s), governs access, and ultimately assists states in addressing key policy questions for improved program management and performance.

**Brief History of SLDS Grants**

To date, over $750 million in federal funds have been distributed to build LDSs in forty-seven states and territories. Of this, the Department of Education has awarded approximately $720 million in grants; the Department of Labor, newer to the effort to support LDS creation, has awarded approximately $30 million.

Since 2005, the Institute of Education Sciences (IES) Statewide Longitudinal Data Systems (SLDS) grant program has awarded ninety-eight grants to forty-seven states, the District of Columbia, Puerto Rico, and the Virgin Islands, totaling more than $400 million (together with an additional $250 million as a result of the American Recovery and Reinvestment Act). These funds have helped accelerate the progress made by states to design, develop, implement, and expand K–12 data collection and reporting systems into P–20W longitudinal data systems that link early childhood education, K-12, and postsecondary data with workforce and public welfare data.⁶

**SLDS Purpose and Funding Objectives**

The primary objective of the SLDS grants is to help states create systems that link individual student-level data in order to enhance the ability of states to efficiently and accurately manage, analyze, and use education data for improved program services and outcomes. According to the IES, “The SLDSs should help states, districts, schools, educators, and other stakeholders to make data-informed decisions to improve student learning and outcomes; as well as to facilitate research to increase student achievement and close achievement gaps.”

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⁵ Ibid, p.27.

To meet this primary goal, the IES established three funding priorities for SLDS grants:

- To design, develop, and implement a statewide, longitudinal data system with data from kindergarten through grade 12 (K-12)
- To develop and link early childhood data with the state’s K-12 data system
- To develop and link postsecondary and/or workforce data with the state’s K-12 data system

In order to ensure that state workforce agencies were well positioned to link their datasets with state education LDSs, the DOL launched its own workforce longitudinal initiative in 2009.

**Technical Assistance Opportunities**

In addition to its state-level grants, SLDS funding provides for many services and resources to assist education agencies and their partners with SLDS-related work. Best practices, lessons learned, and nonproprietary products/solutions developed by recipients of these grants are disseminated to aid state and local education agencies. To help states achieve their goal of linking individual-level data for program improvement, the following entities have been tasked with developing and/or providing technical assistance and training to states; all of them have many publicly available resources that SWAs may access:

- **National Forum on Education Statistics:** The Forum develops data standards and best practice recommendations, and provides helpful advice on the collection, maintenance, and use of elementary and secondary education data.⁷ The Forum’s membership is comprised of educational staff that represent the local, state, and federal government as well as public interest groups. Because of their broad expertise, these staff work together to address problems, develop resources, and identify best practices. These individuals are also uniquely positioned to consider “new approaches to improving data collection, quality, privacy, and utility while remaining sensitive to privacy concerns and administrative burden.” Visit [http://nces.ed.gov/forum/about.asp](http://nces.ed.gov/forum/about.asp) for more information.

- **Privacy Technical Assistance Center (PTAC):** The Department of Education established PTAC as a “one-stop” resource for education stakeholders to learn about responsible

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stewardship of data, including data privacy, confidentiality, and security practices. PTAC continues to develop resources, including training materials, to help states address issues and concerns related to privacy and confidentiality as outlined in the Federal Education Rights and Privacy Act (FERPA). Visit http://ptac.ed.gov/ for more information.

- Effective Practices Conferences: The NCES also sponsors conferences including MIS, STATS-DC, and the SLDS P-20W Best Practice Conference. These conferences provide opportunities for state and local education and workforce staff to share proven practices and lessons learned, and to engage with colleagues from other states about longitudinal data systems. The conferences also provide an opportunity for federal government and national nonprofit organizations to share information. The primary intent of these conferences is to give states an opportunity to engage and build relationships with one another, in order to build effective and useful P-20W longitudinal data systems. Visit http://nces.ed.gov/whatsnew/conferences/edci/index.asp for more information.

- In addition, IES also convened national experts to serve as part of the State Support Team (SST), established to help states meet their primary SLDS objectives and priorities. SST members provide assistance with technical design, stakeholder engagement, project management, data governance, early childhood initiatives, K-12 systems, postsecondary systems, workforce data, and other areas critical to SLDS efforts. States can request support for SLDS projects from the SST. Visit http://nces.ed.gov/programs/slds/techassistance.asp for more information.

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8 http://ptac.ed.gov/About.
Brief History of WDQI Grants

In 2009, the DOL funded the Workforce Data Quality Initiative (WDQI) grants to support the efforts of SWAs to link workforce data, including labor market information (LMI), program services, and wage records, with state educational efforts to create state longitudinal data systems. As of this publication, three rounds of grants have been awarded, to a total of twenty-nine states. The funding level for the WDQI grants is approximately $1 million; SLDS grants, by contrast, range from approximately $6.9 million to $22 million.

**WDQI Purpose and Funding Objectives**

WDQI supports the development of, or enhancements to, longitudinal administrative databases that integrate multiple sources of workforce data and create linkages to education data in order to expand the scope and depth of possible research. These linkages are intended to help states better understand how to create school-to-career pipelines. The WDQI also emphasizes promoting improvements in workforce programs, as well as increasing the accessibility of performance data to multiple workforce system participants—including job seekers and

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**State Highlight: Rhode Island**

*Rhode Island’s DataHUB lays the ground for policy and social change*

Rhode Island’s DataHUB contains data stories that answer key questions about the health, juvenile justice, and education systems and the effect each has on the state. In a recent data story, researchers looked at the effect of chronic absenteeism in high school on postsecondary enrollment and success. The research showed that 20 percent of students in the high-school class of 2009 who graduated in four years were chronically absent in high school. The analysis showed that one-fifth of the state’s graduates missed at least three-and-a-half months of high school prior to graduating, while students from the class of 2009 who dropped out were chronically absent in high school. The researchers found a strong link between absenteeism and lower postsecondary persistence and success. In response, high schools agreed to add high-school attendance rates to all high-school transcripts. Note: the average student missed 3.5 months and not all students who dropped out were chronically absent, but a majority of 85% were. This seemingly small change helps colleges to identify students who may be in need of additional services and help in order to ensure they are successful at the postsecondary level. Currently, the majority of data stories posted to Rhode Island’s DataHUB are education-related, but the first of several workforce stories is now published. 

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[http://ridatahub.org/]
employers, program staff, and administrators. The WDQI is a companion initiative to the Department of Education’s SLDS grants, described above.

In brief, the primary goal for WDQI grantees is to improve employment outcomes for workers by using longitudinal education and workforce data to inform policy and program design. The DOL established the following five objectives for WDQI grants:9

1. Develop or improve state workforce longitudinal data systems to include data from Unemployment Insurance (UI) wage records, UI benefit claims, training and employment services (such as Workforce Investment Act, Wagner-Peyser, Trade Adjustment Assistance, veterans, adult education and literacy, and disability programs), and other data sources like the Federal Employment Data Exchange System

2. Enable workforce data to be matched with education data, ultimately creating longitudinal data systems with individual-level information from pre-K through postsecondary schooling all the way through entry and sustained participation in workforce and employment services systems

3. Improve the quality and breadth of the data in workforce data systems

4. Use longitudinal data to provide useful information about program operations and analyze the performance of education and employment and training programs

5. Provide user-friendly information to consumers to help them select the training and education programs that best suit their needs

**Technical Assistance Opportunities**

In addition to state-level grants, WDQI funding provides for individual-level and cross-grantee technical assistance through a DOL-funded contractor. Each WDQI grantee is assigned a coach as well as a Federal Project Officer. The coaches conduct bimonthly conference calls with their grantee(s) to strategize about designing, implementing, and improving their SLDS

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Click on the image above or go to [www.wdqi.org](http://www.wdqi.org) to view the website.
initiatives. In addition to the individual-level calls, grantees are invited to participate in cross-grantee conference calls, topical webinars, and ad hoc working groups, and to post information and questions to a shared workspace at http://wdqi.org that is open to the wider workforce community. To further encourage collaboration between education and workforce agencies, WDQI grantees are invited to the SLDS P-20W Best Practice Conference referenced above, where special technical assistance sessions are conducted for state workforce staff.

**Brief History of other Related Initiatives**

In addition to the SLDS and WDQI grants, the Department of Education (ED) has funded a number of other related initiatives.

- **Race to the Top (RTTT):** Race to the Top is a competitive grant program to encourage states that are implementing significant reforms in the four education areas described in the American Recovery and Reinvestment Act of 2009 (ARRA): enhancing standards and assessments, improving the collection and use of data, increasing teacher effectiveness and achieving equity in teacher distribution, and turning around struggling schools. There have been three phases of funding for Race to the Top grant awards. The winners of these grants will ensure that effective reforms are initiated and will serve as examples for states and local school districts throughout the country that are interested in transforming their own school systems. Visit www2.ed.gov/programs/racetothetop/index.html for more information.

- **Race to the Top Early Learning Challenge (RTTT-ELC):** The purpose of the Race to the Top Early Learning Challenge program is to improve the quality of early learning and development programs and services and to close the achievement gap for children with high needs. A competitive grant competition, the RTTT-ELC supports state efforts to design and implement integrated systems of high-quality early learning and development programs and services and to increase the number of children with high needs enrolled in those programs and services. The primary goal for these grants is to make sure that more children, especially children with high needs who may be at-risk, enter kindergarten ready to succeed. Visit www2.ed.gov/programs/racetothetop-earlylearningchallenge/index.html for more information.

- **Common Education Data Standards (CEDS):** The Common Education Data Standards project is a national, collaborative effort to develop voluntary data standards for a key set of education data elements, in order to streamline the exchange, comparison, and understanding of data within and across P-20 institutions and sectors. The CEDS applies not only to education programs, but also to workforce components. Visit https://ceds.ed.gov/ for more information.
There are close relationships among funding for SLDS, Race to the Top, and WDQI. Staff within state education and workforce agencies are charged, by both federal agencies—ED and DOL—to collaborate and coordinate their efforts to link datasets and to create longitudinal systems that allow for meaningful review and analysis. While funding levels for SLDS initiatives are much higher than those for WDQI, education and workforce agencies are urged to coordinate their efforts and to look for opportunities to collaborate across state agencies and programs. It is very easy to allow the funding to drive isolated efforts on the part of state education and workforce staff, but it is imperative that state staff find ways to collaborate in order to maximize the available resources—both staff time and technology upgrades—needed to achieve an operational and useful LDS.
Chapter 1: Taking Stock

Longitudinal data and their analysis can help states make more-informed policy decisions about education and workforce funding, programming, and accountability. Before implementing a workforce longitudinal data system, the state workforce agency is well advised to assess longitudinal data system efforts already underway, especially those related to education, the labor market, and the social safety net. For example, most states have a State Longitudinal Data System (SLDS) grant to build a P-20 data system. Undertaking a process designed to reveal the “lay of the land”—that is, gathering information about factors in the state that are relevant to building and operating an LDS (such as whether the state has an operational P-20 or P-20W system)—is likely to have a profound effect on whether and how the SWA decides to go forward with its effort.

There are several reasons to conduct an investigation of existing longitudinal data-collection and data-analysis efforts and other types of state-level projects outside the SWA:

- To understand the utility of longitudinal workforce data in cross-domain contexts, such as among agencies, grant streams, and populations being served
- To avoid duplication of effort if other agencies or departments have developed a vision for a P-20W system
- To align with existing data-collection projects in order to leverage architecture, governance, staff expertise, partnerships, research agendas, and funding and sustainability efforts
- To understand legal, political, economic, or other factors that may impact building and sustaining a longitudinal data system

Gaining as detailed an understanding as possible of the LDS-relevant landscape in the state will help clarify many of the necessary next steps. The SWA can bring the results of such an inquiry to any work that it has already done to envision or build a system, thereby continuously improving the system as it develops. Thus, while there may be a foundational stocktaking process, taking note of pertinent contexts should be an ongoing activity of project managers and governance leaders. Contexts are always shifting, with administration or other staff changes, new or lost technological capacity, reverses in legal interpretation, even changes in the ability of agency staff to negotiate and maintain trusting relationships with key partners.

Another important aspect to an inquiry into state contexts is a willingness to make reality-based decisions rather than fighting for a predetermined and ideal solution—in other words, not permitting the perfect to be the enemy of the good. For example, Virginia’s accomplished longitudinal data system uses a federated model (described in more detail in chapter 2), not
necessarily because it was the model of choice, but because the state’s privacy laws necessitate that approach.

Taking stock of existing efforts also helps to clarify the projected costs and benefits of the proposed LDS project. Given the many possible roadblocks, building an LDS can be costly, time-intensive, and frustrating, and the SWA needs to be confident that building a new one or even doing what it takes to connect to an existing one is worth the effort.

Should the state landscape and the feasibility or cost-benefit analysis all suggest that the team move forward with its effort, much of the necessary information and understanding will have been gathered in the inquiry process. Thus, taking stock of the current landscape is also groundwork for a more official launch of a WDQI or general LDS project.

In the sections that follow, we will explore key areas of interest for a stocktaking process and discuss the implications of findings that might occur at this stage. We will also point out some of the primary variations that an SWA is likely to find, based on the circumstances of the WDQI grantee community.

**Take Stock Of Leadership Support**

Executive-level leadership support can be an essential component of an SWA’s success at launching, using, and ultimately maintaining a workforce LDS or P-20W longitudinal data system. One of the first things to find out when taking stock is where state-level leadership stands on using data to support the state’s education and workforce systems. In addition, the SWA will want to find out where, if anywhere, state-level leadership stands on longitudinal data systems in particular.

Executive-level leaders are likely to influence the functioning of a P-20W system.
These leaders may include:

- Governor, governor’s policy advisor, or other member of the cabinet
- Education and workforce legislative committees
- Secretary/commissioner of labor
- Secretary/commissioner of commerce or economic development
- Secretary/commissioner of health and human services
- Secretary/commissioner of higher education
- Chancellor of the state’s university system
- Leadership representing community colleges and private colleges and universities
- State superintendent of schools
- Leadership representing early childhood education
All of these executive-level leaders are potential allies for an LDS or P-20W effort. Because the capacity of the SWA to leverage support by attracting the attention of sympathetic leaders could have major impacts on the project, it is important that the SWA identify both its most likely supporters and those resistant to the project.

**Governor and Governor’s Office**

The governor and her cabinet can be very influential in pushing forward LDS efforts in the state. If the governor sees value in data-driven decision-making and accountability, he might become a champion of workforce and other LDS efforts. Numerous governors have championed data-driven governance, buoying workforce and education LDS efforts. In addition to finding out where these leaders stand on the use of longitudinal data systems to inform state governance, there are other aspects of executive-level leadership that can inform the SWA’s data system project—in particular, whether the state has an explicit policy agenda regarding its education and workforce systems. Have policy and research questions been articulated at the state level, and is anyone tasked with implementing them? Most governors establish a gubernatorial agenda for their term in office, and education and the economy are not uncommon target issues. Understanding whether these agendas exist, and which aspects a statewide LDS might be able to support, is foundational information.

For example, in 2010 then-governor of Virginia Bob McConnell moved oversight of WIA programs to the Virginia Community College System (VCCS); part of McConnell’s campaign platform emphasized the importance of the workforce system, and his office advocated for VCCS to be a primary partner in the creation of a state LDS.

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**Data-Driven State Government**

In 2007, Maryland’s Governor Martin O’Malley brought to state government the same data-driven approach to management that he had used as mayor of Baltimore. He implemented StateStat, a method in which state managers meet biweekly with the governor and his executive staff to report on and answer questions about agency performance and priority initiatives. He also established a delivery unit focused on sixteen state strategic goals, and created an open data portal to allow the public to access the datasets on which management decisions were made.
**Legislature**

Similarly, elected legislators (as well as national congressional representatives) may have issues that they have committed to working on during their time in office. Legislation can profoundly influence the nature or progress of an LDS or P-20W. Some of the ways in which it can do this include:

1. **Accountability Mandates**: Legislatures may implement statutes that mandate that government-funded programs be held accountable for spending and outcomes. Because an LDS can be a system accountability tool, such laws can support the progress of an LDS project. Programs like WIA, Wagner-Peyser, and Rapid Reemployment-like UI programs may fall under such a mandate. The SWA can make the case that a workforce LDS can support accountability in the state.

2. **Privacy Laws**: The legislature may pass privacy laws, augmenting the federal laws that will be discussed next, that may make it easier or more difficult to share data.

3. **Legislative Funding**: The legislature may also contribute to the sustainability of the workforce LDS by allocating funds from the state general fund or other areas of the budget to support the system. An LDS can be expensive to build and maintain. Thus, legislative funding (especially recurring funding) can be an important contributor to long-term project sustainability.

**Interagency and Intra-agency Leadership**

It almost goes without saying that the stance that the secretary or commissioner of the SWA takes toward an LDS effort will impact its success. Typically, state agency leaders have authority to set agenda priorities and allocate budgetary and staff resources to projects that align with those priorities. Division directors, especially those that will house or populate the LDS, are also important—in some cases, serving as gatekeepers of potentially shareable data.

Agencies beyond the SWA, such as education, commerce (which in some cases may be the SWA), health and human services, and corrections are all potential partners for a workforce LDS or P-20W. In some states, workforce and education agencies have a history of project collaboration, data sharing or other kinds of partnerships. Existing collaborative working relationships between agencies are a boon to workforce LDS start-up and maintenance. Even in a state with no workforce LDS, there may be a history of data sharing for particular initiatives or projects. On the other hand, agencies may have a history of working in silos, with little collaboration and sharing. It is important for the project team to understand its situation in regards to partnership, so that it can either leverage existing collaborative relationships or design thoughtful strategy for how to approach other agencies as partners for the LDS.
Another type of agency-related leadership to take stock of are data governance groups. States that have been sharing data among agencies or with outside researchers may have existing data governance groups in place to oversee how data are shared. (For more on what data governance is, see chapter 2, Developing the Strategy.) These may be intra-agency or interagency groups. Members of the workforce LDS project team may already participate in one or more of these groups if they exist. This is especially likely if data from the SWA are shared for specific project purposes or as part of an operational P-20W system. Governance groups can provide a source of partners and procedures to leverage in building an LDS and it is important to identify them during a scan of the LDS-relevant landscape.

Ultimately, knowing where state-level leaders and groups stand on using longitudinal data and analysis to support state policy can help the SWA strategize about how best to cultivate that leadership for ongoing or eventual support.

**Take Stock of Laws and Interpretations of Laws**

In this section, we will consider the federal laws governing collection, use, storage, and destruction of education and workforce data. Taking stock of the state legal context entails learning how the state interprets the privacy and confidentiality mandates of these laws, as well as understanding the culture of the SWA and proposed partners regarding data sharing. In addition, we will briefly describe data-sharing agreements and the ways in which such agreements can impact an LDS.

Understanding how the state regulates the collection and sharing of data will help the agency understand what data can be shared and used, how data can be shared and used, and which parties need to come together to discuss data sharing across agencies. For example, states building a P-20W system may seek to link data from numerous sources of early childhood, K-12, and postsecondary education data; of workforce program participation and benefits data; and of other program participation data. There are numerous laws governing if or how those data may be shared. Such data come from federal, state, local, and nonprofit programs serving adult students and trainees, job seekers and employers, and youth, from preschool programs to colleges and universities.

There are three primary types of legislation that govern the sharing of these data:

- **Federal laws related to the privacy of early childhood education records**: Such laws are numerous and typically connected to the funding source of the institution administering the programs. Principal sources of funds for early childhood education and care are the Department of Health and Human Services (through the Head Start Act and the Child Care and Development Block Grant Act of 1990) and the Department of Education (in
particular, under Parts B and C of the Individuals with Disabilities Education Act and Title I of the Elementary and Secondary Education Act). 10

- **Family Educational Rights and Privacy Act (FERPA):** The Family Educational Rights Act of 1974 is a federal law designed to protect the privacy of student educational records. FERPA applies to all schools that receive funding from the U.S. Department of Education, including all public schools. FERPA gives parents access to their child's education records and some control over the disclosure of information from those records. It is this latter aspect that has the most relevance for SWAs seeking to access education data on students of their state’s K-20 system. Although the legislation is focused on securing the privacy of students' personally identifiable information (PII), it does provide for several exceptions to the general proscription on data sharing. See the text box below, FERPA Exceptions, for more information about these exceptions.

- **Social Security Act (SSA) and Federal Unemployment Tax Act (FUTA):** SSA requires states to maintain the confidentiality of Unemployment Compensation (UC) information, but also contains provisions that confidential UC information may be shared if recipients have certain safeguards in place. 11

In addition to the primary laws governing the sharing of PII for the purposes of research and evaluation, federal agencies may also regulate the way that data may be used. For example, the DOL maintains rules associated with cross-state data sharing for the Wage Record Interchange System (WRIS) and WRIS 2. At the state level, states may have laws with additional provisions for or stricter interpretations of the federal laws just described.

State agencies may also have rules about whether and how they can share data within or across agencies. For example, a state may not have legislation about how UI data can or cannot be shared beyond that established by the SSA, but the agency that maintains UI data may place additional limitations on its use.

Ultimately, states interpret laws differently, and different state agencies within a state may interpret the same laws in different ways. For this reason, privacy- and confidentiality-related legislation and state interpretation of it can be one of the primary challenges SWAs face in their efforts to build longitudinal systems that incorporate the entire spectrum of individual participation in state educational systems and the labor force. Thus, a process of taking stock of the state landscape must prioritize understanding state interpretation(s) of the laws that govern the privacy and confidentiality of LDS-relevant data.


**FERPA Exceptions**

**Studies**

1. The disclosure of PII from student education records must be for, or on behalf of, an educational agency or institution, in order to:
   a. Develop, validate, or administer predictive tests
   b. Administer student aid programs
   c. Improve instruction

2. An educational agency or institution may disclose PII from education records, and a “FERPA-permitted entity” may redisclose PII only if:
   a. The disclosing educational entity enters into a written agreement with the organization
   b. The study does not permit identification of individual parents and students by anyone other than representatives of the organization with legitimate interests in the information
   c. The information is destroyed when no longer needed for the study purposes

Legal References: 34 CFR §99.31(a)(6).

Other Notes: FERPA requires educational agencies and institutions to record all disclosures of PII from education records to organizations made under the studies exception (§99.32)

**Audit or Evaluation**

1. The disclosure of PII from education records must be to:
   a. Audit or evaluate a federal- or state-supported education program
   b. Enforce or comply with federal legal requirements related to the program

2. The receiving entity must be a state or local educational authority or other FERPA-permitted entity or must be an authorized representative of a state or local educational authority or other FERPA-permitted entity.

3. The party disclosing the PII from education records:
   a. Must enter into a written agreement to designate anyone other than its employee as its authorized representative (each new audit, evaluation, or enforcement effort requires an agreement); and
   b. Is responsible for using reasonable methods to ensure to the greatest extent practicable that the authorized representative:
      i. Uses the PII only for the authorized purpose
      ii. Protects the PII from further unauthorized disclosures or other uses
      iii. Destroys the PII when no longer needed for the authorized purpose and in accordance with any specified time period set forth in a written agreement.

4. State and local educational authorities and other FERPA-permitted entities may redisclose the PII on behalf of the educational agency or institution only when:
   a. The disclosure meets the requirements of an exception to consent in §99.31

   b. Either the educational agency or institution or other FERPA-permitted entity has complied with the recordkeeping requirements

5. Authorized representatives of the FERPA-permitted entities may redisclose the PII only when expressly

authorized to do so in the parties’ written agreement (assuming that redisclosure by the authorized representative on behalf of the FERPA-permitted entity would be permissible under FERPA).

Legal references: 34 CFR §99.31(a)(3) and §99.35.

Other Notes

- FERPA requires educational agencies and institutions to record all disclosures of PII from education records made under the audit or evaluation exception (§99.32).

- State and local educational authorities (and other FERPA-permitted entities listed in §99.31(a)(3)) redisclosing PII on behalf of the educational agency or institution must record disclosures according to the requirements in §99.32(b)(2).

Take Stock of Data Infrastructure

The inquiry into existing technical efforts and capacity is the last aspect of context stocktaking explored in this chapter, but by no means the least. The SWA will want to ask three key questions to garner a full understanding of the state’s existing data infrastructure:

1. What data systems already exist in the SWA?
2. What data systems already exist in the proposed partner agencies?
3. Are SWA data and data from proposed partner agencies already being shared and, if so, to what degree?

We offer the following sample questions for each primary area of inquiry.  

What Does the SWA Data System Look Like?

- Does the SWA have a data-collection system? Is it a legacy system? Is it web-based?
- How does the SWA collect data (e.g., via paper, mainframe, web, smart card)? How often are data collected and updated? How granular are the data (individual- or aggregate-level)?
- Does the system(s) use SSNs? Unique identifiers? Can they be used to match records across databases? In which databases are these identifiers used as the primary identification?
- Are the data linked across years? If so, starting when?
- Does the SWA have a central data warehouse or do programs store data in individual silos?
- What infrastructure and technology supports the system (servers, software, etc.)?
- What parts of the system are run in-house? By a vendor? By a university or other research center?
- How are data secured?

What do the Data Systems of Proposed Partners Look Like?

- What data-collection system does each proposed partner maintain? How are the systems structured?
- Who (which division and/or staff) is responsible for maintaining the data?
- Are the data available at the individual student/participant- or “unit record”-level?
- Are data from proposed partners currently used in tracking individual students/participants over time and, if so, for what purposes?
- What other data sources is the data source in question already being matched with, and what other data sources could it be matched with?
Is Data Shared Between the SWA Proposed Partners?

- Are there other LDS (specifically, education LDS) efforts in the state? In which agencies do they sit?
- Are there interagency data-sharing agreements or arrangements in place, including agreements with other states?
- Are workforce data integrated with early childhood, K-12, postsecondary, social services, or other data outside of workforce systems? If so, how often is a match-rate analysis conducted? How good is the match rate?
- Are the different systems interoperable?
- Are the data linked across state borders?
- What data are shared? How are these data shared?
- How are data matched?
- If data sharing across agencies is not yet happening, is it possible?
- Is there a state research center or agency that already collects and/or analyzes data from multiple sources? If so, what agencies contribute data to that body?

Cost/Benefit

A review of the data system infrastructure will yield much of the information necessary to make a cost assessment. Cost assessments are difficult to write about from a general perspective, as cost will be impacted by what already exists in a state, by the capabilities the SWA wants from an LDS, and by whether it plans to use a vendor or to build the system with its own staff or contractors. Most systems are likely to cost more than one million dollars, but many states have spent much more than that.¹⁴

Development is only the first part of the overall cost of building an LDS. The SWA also will need to estimate the cost of ongoing maintenance of hardware, software, and staff. Research suggests that operating costs run approximately 20 percent of the initial development cost, per year.15

A thorough review of the leadership, legal, and technical landscape, and an assessment of the cost will prepare the SWA to ask one of the most important questions about creating an LDS: Is it worth it? In order to answer that question, the SWA team undertaking the process of taking

15 Ibid.
stock may need to remind itself why it wants to have an LDS in the first place. One way to do so is to combine the results of two elements of the stocktaking process: the policy questions of interest to state-level leadership and the combination of data elements needed in order to answer them.

For this, we share a model matrix developed for the Department of Health and Human Services as part of its project on “Developing Data-Driven Capabilities to Support Policy Decisions”¹⁶, showing key questions.

<table>
<thead>
<tr>
<th>Name of Data Source</th>
<th>How important are the data?</th>
<th>What do the data represent?</th>
<th>How helpful are the data?</th>
<th>How will the data be acquired?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Five to ten key questions that can be answered with this data source</td>
<td>Sample or universe</td>
<td>Periodicity of data collection</td>
<td>Contact information</td>
</tr>
<tr>
<td></td>
<td>What is the main purpose of this data source? What policy questions can it be used to answer?</td>
<td>Where do the observations in the dataset come from (e.g., all public hospitals or all persons covered by Medicaid)?</td>
<td>Are the data collected on a regular basis? How frequently?</td>
<td>What organization is responsible for collecting and managing the data? Are specific contact names, phone number, email addresses, and websites available?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unit(s) of analysis</td>
<td>Access and usability of data</td>
<td>Are the data publicly available? Is a data use agreement or assurance of confidentiality required? What is the lead-time needed to obtain the data?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Confidence in validity of data</td>
<td>Are there any limitations or concerns that people familiar with the dataset may have? To what extent are the data generalized?</td>
</tr>
</tbody>
</table>

If the team decides that the effort is, indeed, worth making, it is ready to move on to the topic of our next chapter, developing the strategy.
Chapter 2: Developing the Strategy

When the need for a workforce LDS is clear and staff is in place to oversee and manage the work, it is time to identify and select partners to help champion the project and ensure its success. For a public workforce agency to be successful in establishing an LDS that links education and workforce data there are a number of tasks that must be accomplished. Many of these tasks involve technical components and capabilities (i.e., system architecture, database design, and management), some of which are addressed later in the manual. This section of the manual focuses on the nontechnical components that help states progress in establishing a successful LDS. These include building partnerships and engaging stakeholders, developing a research agenda, and creating a data governance program. If overlooked, these nontechnical components can affect support for the project, the project’s scope and design, and the ability to maintain funding for the system and its future development.

Build Partnerships and Engage Stakeholders

Engaging a wide variety of stakeholders within and outside the SWA is one of the key drivers of a successful LDS. It is important that the staff involved represent various roles within the SWA and partner organizations, including senior-level executives, policy and program managers, and information technology. Each staff type has a role to play in the implementation of the LDS. Other state agencies with which to build partnerships include social services, motor vehicles, K-12, community colleges, and universities. (Messaging to the general public is important as well; see chapters 4 and 5). Building partnerships is like planting a garden:

- Prepare the ground by developing the vision for the LDS within your own SWA at the executive level and among agency staff
- Sow the seeds and allow them to take root by identifying and selecting partners that will support the LDS vision and mission
- Nurture the plants by conducting focus groups and committee meetings to solicit feedback on the LDS design and governance
- Harvest the fruits and vegetables by coordinating linkages with other stakeholders to make informed decisions regarding strategic planning for LDS advancement

Anyone who has spent time in a garden knows it takes hard work, dedication, and a bit of luck from Mother Nature to bring a bountiful harvest to the table. Building an effective LDS requires considerable time and attention to selecting the right partners and building relationships among these partners to support the SWA’s efforts—and having some luck along the way. The importance of planning and building support, both internally and externally, cannot be
overstated. Time spent up front planning and engaging SWA staff, state partners, and other stakeholders will pay dividends on the back-end, in creating and operating the LDS. Partner involvement and stakeholder engagement is a two-step process whereby SWA LDS project management staff not only elicits support internally, but also seeks outside stakeholder support.

**Solicit Internal SWA Executive and Managerial Support**

To launch the WDQI project and LDS, it is imperative that SWAs build support within their own agencies. If SWA WDQI project management staff do not have the support of their executive leaders (e.g., commissioners, directors), it is unlikely the LDS project will make it off the ground. The table below provides examples of the types of organizations SWAs may want to involve in the LDS planning and design discussions, including internal and external partners. SWA project management staff will be able to help articulate the goals of the LDS, including (1) providing workforce and education practitioners with the information they most need and desire, (2) informing policy development and resource allocation, and (3) easing reporting burdens and helping programs be accountable for results. Assuming there is senior-level support for the LDS vision, the next step will be to market the idea to managers and line staff within SWA, as staff at this level will be critical to project development and deployment.

SWA WDQI project management teams need to assess how their state currently operates its workforce data systems and what level of coordination and support is needed within the state’s public workforce investment system for the project. Through internal meetings, SWA leaders may seek support for the project before reaching out to stakeholders to achieve a united front. Many states throughout the public workforce investment system have their workforce programs housed within an umbrella agency that oversees all employment security and public employment and training programs. But even states that have programs housed within a single state agency do not always link and connect their data systems. Some state workforce agencies may have stand-alone data systems that function independently and lack integration. Attending to the capacity for linkages within the workforce system (e.g., wage record and unemployment compensation benefits data, labor market information, program participation and outcome data) can be an excellent starting point and evidence to partners of what an LDS can do.

**Tip:** Seek partners and staff who support the project.

When beginning initial outreach to partners it is important for LDS project management staff to work with individuals who are willing to advance these goals and who can contribute input about the design of the project. Choosing individuals who will act to obstruct the efforts underway only creates conflict and tension; these concerns are better addressed during the system development phase.
## Examples of Types of Stakeholders to Involve in the LDS Planning and Implementation Stages

| Internal Stakeholders | • State Workforce Agency Executives (commissioners, deputy commissioners, directors, managers)  
|                       | • State Workforce Investment Board  
|                       | • Local Workforce Investment Boards and Administrative Entities  
|                       | • State Workforce Program Coordinators (e.g., LMI, UI, WIA, TAA, NFJP, VETS, SCSEP, etc.)  
|                       | • Solicitor and Legal Staff  
|                       | • Information Technology Staff  
|                       | • Chief Information Officers and Public Information Officers |
| External Stakeholders | • P-20W Council  
|                       | • Program and Legal Staff from Other State Agencies (Departments of Education, Higher Education, Human Services, Corrections)  
|                       | • Representatives of Community College Systems  
|                       | • Representatives of University Systems (Public and Private)  
|                       | • Business and Industry (Chambers of Commerce)  
|                       | • Elected Officials (Governor’s Office, State Legislature, Local Elected Officials)  
|                       | • Advocacy Groups  
|                       | • Vendors  
|                       | • Researchers  
|                       | • Others (Motor Vehicles Department) |
Solicit External Support from Partners and Stakeholders

- **Interdependence and Mutual Need:** Whom does the SWA need to bring to the table in order to accomplish its tasks and goals for an LDS? How do stakeholders feel about establishing a partnership? Do they come to the table of their own accord or as mandated partners? What are the common priorities and issues facing state agencies that, if identified, can help build consensus for the work that must be undertaken?

- **Prior Experience:** Do any of the partners have prior experience in working together and developing an LDS? Does the workforce agency have the skills necessary to accomplish its aims? Can the state’s wage records and benefits or LMI unit support the development of an LDS or are outside experts needed (e.g., contractors, vendors, or universities)?

- **Representation:** Has the SWA contacted as many agencies, constituencies, and organizations as are necessary to solve problems and accomplish tasks related to establishing partnerships?

- **Barriers:** Are there any historical or traditional barriers between the partners? Is there any jargon or technical language used that could be a barrier? Are there any barriers (real or perceived) to developing a common vision for the LDS?

Internal and external stakeholders invited to participate in the planning and design of the LDS should have a genuine interest in the project, bring programmatic and/or technical capabilities, and remain committed to providing feedback and attending meetings based on the particular areas assigned. We recommend that workforce agencies create a set of guiding principles and practices to govern the way their partnerships operate (for an example, see text box below, Rules Governing LDS Partners).

**Use Guiding Principles to Engage Partners and Stakeholders**

It is useful to establish support for the development of an LDS using the following guiding principles when eliciting support from partners and stakeholders.

**Build Common Objectives:** Understand partners’ overall needs and motivations in order to develop strategies for engaging them in supporting the LDS. Envisioning how the relationship can be a win-win for everyone involved often requires doing some homework and/or holding discussions with the state agency’s leadership and staff to identify the benefits of an LDS. These

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discussions may bring together staff from across state agencies, including the governor’s office and state legislature, who are affected by the lack of an LDS and might see the need for one. Using a question and answer format, the SWA team may want to solicit their opinions about the current state data-collection systems, the reporting functions of these systems, and their ability to address policy-level questions. What problems have they encountered using existing ways of sharing information in order to make informed decisions? Involving each person in an assessment of the current program will allow individuals to begin to address needed changes. In this way, they will feel included and understand that their opinions are valued.

**Gain Executive Leadership Support:** Each partner will have an internal hierarchical leadership system that will need to be understood and adapted to by the SWA. Together with partners, the SWA will need to determine which representative from each partner organization will manage the activities and tasks and also who has decision-making authority. For the partnership to grow, senior leadership must support the project.

**Build Trust and Respect:** Building trust and respect between partners takes time. Finding small ways to build trust across agencies, like sharing current data-collection protocols and reports with one another, can help. Trust is most likely to come from time spent together, learning the strengths each partner brings to the table. Inquiring about the concerns of partner agencies also helps to build trust, because it shows that SWAs are willing to engage and listen. What do

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**Example: Rules Governing LDS Partners**

- Partners agree to support the vision and mission of the LDS project.
- Partners will strive to maintain open dialogue, so that discussions can take place without fear of retribution.
- Partners will explore ways in which they can hear and respond to feedback and concerns in a positive and supportive manner.
- Partners will clearly define which staff from within their agency will support the LDS initiative.
- Partners will commit to limiting the disruption caused by staff changes.
- Partners will work to ensure good handovers of LDS activities and progress in the event of staff changes.
- Partners recognize the importance of clarity and timeliness of all communications and project deliverables.
- Partners agree to keep their senior leadership informed of LDS progress.
potential partner agencies fear about linking data across state agencies? Are these concerns statutory or regulatory? It can be useful to acknowledge that change is difficult and explain why partners would want to support a change. Most of us are guided by self-interest, so consider how partners might answer: “What’s in it for me?” “How would this make my job easier?” “Will this help me?” Addressing factors that contribute to individual motivation to change is essential to building support for the LDS project.

**Stay Flexible:** SWAs must remain adaptable to a range of potential situations. Outside influences will affect the work of the partnership and its partners. It is important to remember that the project is not doomed if not everyone starts out supporting the creation of an LDS; rather these differences create an opportunity to explain the value and purpose of an LDS to skeptics. Flexibility ensures that leaders can deal with present issues, focus on the ultimate goals of the partnership, and allow potential new opportunities to arise so that the partnership can grow. If the leadership group agrees on the fundamental importance of creating an LDS, then smaller tasks can be assigned to cross-agency workgroups to resolve problems or concerns.

**Acquire Knowledge of Language and Cultural Differences:** Differences in language and culture will exist between partners. It is important to bridge these gaps when building the partnership. Neutral facilitation allows partners to hold frank conversations about language, including vocabulary and definitions, and cultural barriers. Being honest and open-minded with partners can help overcome any barriers.

**Develop a Schedule of Activities:** For partners and stakeholders to come to the table, it is important that they understand how much assistance they may contribute. Toward that end, SWAs may want to develop a schedule of activities. This schedule could include what needs to be accomplished in the next month, quarter, and year, depending on how long the partnership will be sustained. The schedule may also include strategic points of evaluation so that all partners are kept informed of progress to date.

**Assess Environmental Factors:** SWAs may want to consider doing an environmental scan to identify implications from workforce and education trends, political factors, economic climate, and technology developments. This is similar to the environmental scan or contextual inquiry recommended in chapter 1 to assess the state’s readiness to pursue an LDS.

In addition to these guiding principles for partner engagement and development, SWAs can benefit from creating a set of common values and rules governing the involvement of partner staff in the project.
Using these principles and rules to guide the partnership development process creates a foundation for the next two tasks, developing the research agenda and establishing a data governance program.

**Develop a Research Agenda**

To build initial support for the LDS, many SWAs invite partners and stakeholders into the process of developing the research agenda. A research agenda is a prioritized list of questions and objectives agreed upon by a consensus of partners and stakeholders, and should include a defined set of metrics that will be used to inform legislators, policymakers, and the public, via research-based products and tools. The process of developing a research agenda takes deliberate effort on the part of the SWA and its partners, and will influence policy decisions related to program design, service delivery, and program funding. SWAs that have embarked on this endeavor have found the process to be beneficial in building consensus among stakeholders for their LDS efforts. The process has also helped SWAs highlight areas where the state’s current data-collection efforts fall short in addressing key research areas and policy development.

**Step 1: Clarify the Benefits of Developing a Research Agenda**

Developing a research agenda:

- sets the stage for building collaboration among state agencies for sharing information and data through an LDS;

- allows SWAs and their partners to focus on a subset of important policy questions that can lead to actionable changes in how programs operate;

- allows for the open exchange of ideas, approaches, and results;

- provides SWAs and partners with a better understanding of any current, possibly duplicative data-collection efforts; and

- encourages further exploration of why and how certain activities or services lead to positive educational and employment outcomes for customers.
Step 2: Identify Lead Agency and Approach for Engaging Stakeholders

The first order of business is for the SWA to identify if it will take the lead in initiating the design of the research agenda or if another partner, like the state educational agency or a state research group, will take the lead. In some instances, it may make sense for the SWA to take the lead, especially if it is staffed to conduct research and analysis (e.g., it has a labor market information and analysis unit). If the SWA takes the lead in initiating the research agenda dialogue, the next decision is about the approach for gathering input. One approach is to hold separate, individual meetings, rather than coordinated group discussions, with state agencies and stakeholders to gather information. A second approach is to hold joint discussions with all state agencies and stakeholders to gather input and develop the research agenda. The approach used depends on the amount of data sharing and integration already underway between state agencies and the degree of consensus among agencies and stakeholders on the relevant policy questions. Ideal leaders for research agenda development are individuals who are comfortable with data, interested in quantifying success, and desire meaningful and lasting changes in their agencies. Research organizations and universities may serve as resources to SWAs, as they often request data from workforce and educational agencies to conduct their research.

Step 3: Map Source Data Systems and Data Elements

As discussed in the last chapter, to ensure that SWAs and their partners can address the research agenda and corresponding policy questions, a review of source systems and the data elements contained within them must be undertaken. Analysis of the state agency systems that will supply data for the LDS effort may include reviewing the timeliness of the data, relevant data management practices, the historical data available, relevant data volumes, and any known data-quality issues. For each data element, SWAs should record a definition, an indication of whether the element is mandatory or optional within the source system, the physical name of the table and the data element where the element is stored, the data type and valid values for the data element, and other comments. This mapping process allows SWAs and their partners to identify which system contains the most accurate and reliable data.

Make research agendas address real community issues:

As SWAs embark on developing a research agenda to guide their SLDS efforts, it is important to make sure the research approach is relevant to current problems of practice and to current policy issues.
Descriptions of two state approaches, Ohio and Pennsylvania, are provided below and serve as examples of a university serving as the lead and the SWA serving as the lead, respectively. In both examples, the lead agency involved a wide array of partners and built consensus for their research design into their LDS projects.

Research Agenda Case Study #1: State of Ohio, Round 1 and 3 WDQI Grantee

The WDQI is a partnership between The Ohio State University (OSU), the Ohio Department of Job and Family Services (ODJFS), and the Ohio Board of Regents (OBR). OSU serves to link available data between state agencies, creating a database of information that allows for the tracking of individuals from birth through employment. Employment and assistance data from ODJFS and educational data from the OBR and the Ohio Department of Education are provided to OSU and housed in an LDS.

In establishing the Ohio WDQI, the partner agencies conducted an environmental scan of all the existing data-collection efforts across their state agencies. This scan included collecting information on the data elements, data response categories, data collection and submission timelines, and types of federal and state reporting requirements. A series of conversations, most notably a series of research meetings sponsored by the OBR and facilitated by OSU, helped to put the WDQI together.

During these meetings, partnership members identified data elements to be collected in a single repository, enabling a wide range of important education and workforce questions to be answered. These initial questions developed from a range of sources, including K-12, postsecondary, and workforce. The questions served to guide the selection of additional data sources and help determine priorities for research and policy. The list of questions also responded to the interests of lawmakers as expressed in federal and state legislation. Multiple state agencies and colleges now use the Ohio Longitudinal Data Archive (OLDA) to answer research questions about Ohio’s workforce, education, and training, with a particular emphasis on projects that benefit most from a long-term, cross-program perspective. Priority research areas include:

**Program Evaluation**

What are the employment outcomes of workforce training and education programs?

How do long term employment outcomes vary by education level, subject area, and higher education institution?

What are the outcomes for unemployed workers who return to school, use unemployment insurance benefits, and/or receive workforce training through state programs?

What are the employment outcomes for at risk populations such as mental health service recipients, mortgage assistance recipients, and prisoners?

**Labor Market Behaviors**

What are the career and higher education pathways of Ohio’s students and job training program participants?

How well does the supply of higher education graduates meet the labor market demands of Ohio’s in-demand
occupations?

How do self-sufficiency outcomes differ for specific groups?

What are the long term trends in generational poverty in Ohio?

**Education Experiences**

What affects education persistence and academic achievement?

What are the employment effects of higher education experiences such as institutional policies, peer composition, and choice of major?

What is the relationship between academic achievement and future employment?

Currently Ohio has more than 40 research projects in active status. For the ongoing status of research projects, lists of reports, dashboards released and data access procedures see [www.OhioAnalytics.gov](http://www.OhioAnalytics.gov).

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**Research Agenda Case Study #2: Commonwealth of Pennsylvania, Round 2 WDQI Grantee**

The WDQI is a partnership between Pennsylvania’s Department of Labor and Industry (L&I), Department of Education (PDE), and Department of Human Services (DHS). Pennsylvania’s WDQI serves to link available data between these three state agencies in order to develop a longitudinal data repository for workforce, education, and human services data and to create a mechanism for analyzing performance, education, and training programs. The Commonwealth has named this system as Pennsylvania’s Workforce Data Quality Initiative (PA-WDQI), which is expected to provide significant analysis capabilities. PA-WDQI will help to inform decision makers about the performance of workforce, human services, and education programs and help to guide decisions, strategies, and resource allocations moving forward.

In its WDQI grant application, L&I identified an initial set of policy questions that the system could potentially answer. PA-WDQI established an Interagency Core Team with shared leadership to oversee WDQI project implementation. This Interagency Core Team initially met over the course of six weeks to discuss various aspects of the LDS and thereafter once or twice a month to strategically follow through implementation. From the beginning, the Interagency Core Team agreed on the importance of engaging staff from all levels of state government (senior leaders to line staff) to build consensus and generate ideas.

To seek input, the Interagency Core Team hosted a subsequent half-day working session with over forty representatives from the three state agencies. The Interagency Core Team members facilitated the discussion and requested input on five key questions:

Who are our stakeholders?
What are Pennsylvania’s policy questions?

Of these policy questions, which five have top priority?

What is the scope (availability) of Pennsylvania’s data as regards these top-five questions?

What concerns/suggestions/comments does the workgroup have regarding Pennsylvania’s LDS?

The workgroups identified one hundred policy questions. During a scheduled break, facilitators quickly categorized the questions into larger topical headings and each person ranked their priority questions by placing sticky notes next to their top five choices. The Interagency Core Team took this information and further refined the questions with the help of a consultant. The Governor’s Policy Office also reviewed and prioritized the policy questions, guiding the development of PA-WDQI.

After determining the highest-priority research questions, the consultant worked with the Interagency Core Team to identify which state source systems, datasets, and data elements could be used to answer the refined policy questions. For each source system, the consultant provided a description of the system, the scope of the data included in the system, the timeliness of the data, relevant data management practices, the historical data available, relevant data volumes, and any known data-quality issues.

The high priority policy/research questions are:

What educational and training programs lead to long-term employment and self-sufficiency?

What is the return on investment of education/training programs (cost of attendance versus expected salary; expected lifetime earnings with and without training, etc.)?

What is the wage differential for individuals before/after postsecondary education?

What benefit (if any) can be attributed to a postsecondary credential compared to a high school diploma, based on wages earned?

What is the educational attainment of individuals that receive public assistance?

Do workforce program outcomes vary by educational attainment?

What programs' graduates have the highest rate of employment within a given number of months after graduation?

What are the retention rates and wage data over time (not just the second quarter after exiting) for students exiting career and technical education (CTE) programs?

How can this data be used to identify high-demand, high-skill, and high-wage jobs, in order to set goals for CTE programs to meet future labor market demands?

What programs' graduates are most likely to work in state after graduation?

What programs are most likely to result in self-sufficiency from state services (TANF/SNAP)?
Establish a Data Governance Program

Establishing an interagency data governance program helps SWAs and their partners ensure the integrity, reliability, confidentiality, and availability of data by reducing security risks and misuse of data through identified standards, policies, and procedures.

There are many definitions of data governance, but the one that seems to address all of the important areas is by the Data Governance Institute (DGI). DGI defines data governance as:

“A system of decision rights and accountabilities for information-related processes, executed according to agreed-upon models which describe who can take what actions with what information, and when, under what circumstances, using what methods.”

18 www.datagovernance.com/adg_data_governance_definition.html
This definition illustrates that data governance is both an organizational approach and a structure by which SWAs and their partners manage data in order to secure information and maintain confidentiality. Developing an interagency data governance program is complex and time-consuming because SWAs and their partners must address a myriad of security requirements, data uses, reporting specifications, and reporting requirements across state agencies and programs. The challenge for SWAs and their partners is that they generally work autonomously, so that each agency feels that it is the “owner” of its program data and systems and does not view the collection of this information as a larger statewide asset. Data governance is a way for state governments and the agencies that work on their behalf to see data and information as a statewide asset and to look for opportunities to share information in a secure and relevant way with one another, in order to improve program service delivery and efficiencies. WDQI and SLDS grants can serve as a useful basis for launching interagency data governance programs. Establishing a data governance program helps to ensure data availability, confidentiality, and integrity by creating a governing body that specifies standards, policies and procedures, and responsibilities regarding data ownership and use.

Understand the Focal Areas and Key Components of a Data Governance Program

SWAs and their partners must first identify their motivation in establishing a data governance program. DGI points out that “data governance always exists to meet specific organizational needs” and that the scope and focus of a state’s data governance program will vary depending on these needs. There are six areas that SWAs and their partners may want to focus upon:

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20 The information is this next section is summarized from the Data Governance Institute: Gwen Thomas, “How to Use the DGI Data Governance Framework to Configure Your Program.”

21 www.datagovernance.com/fc_focus_areas_for_data_governance.html.

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Tip: Check for longitudinal data efforts that are already underway.

A number of state educational entities across the country have formed P-20W councils. P-20W refers to data from pre-kindergarten (early childhood), K-12, postsecondary, and postgraduate education all the way through to employment, as well as other data (such as public assistance and corrections). One task undertaken by many P-20W councils is developing an interagency data governance program that spans K-12 to workforce systems. Before embarking on an interagency data governance program, it is best for SWAs to ascertain if efforts are already underway through a joint governing body, like a P-20W council.
<table>
<thead>
<tr>
<th>Data Governance Focus Area</th>
<th>Charter for This Type of Program Holds Data Governance Committee and Data Stewards Accountable to:</th>
</tr>
</thead>
</table>
| Policies, Standards, and Strategy | • Contribute to standardized data definitions  
• Prioritize the need for formal policy, standards, or data-related requirements  
• Write policy, standards, or data-related requirements  
• Collect policy, standards, or requirements from across the organization into a set that stakeholders, data stewards, and other data governance participants can access  
• Reconcile gaps, overlaps, and inconsistencies in policy, standards, or requirements  
• Write business rules to address the applicability of policy, standards, or requirements  
• Set accountabilities for the design, implementation, monitoring, and enforcement of policy, standards, or requirements  
• Work with content management, document management, portal management, and intranet teams, and others to consistently post policy, standards, or requirements  
• Report status for policy enforcement initiatives  
• Identify stakeholders, establish decision rights, clarify accountabilities |
| Data Quality | • Set direction for data quality  
• Collect data quality rules from across the organization into a set that stakeholders, data stewards, and other data governance participants can access  
• Reconcile gaps, overlaps, and inconsistencies in data quality rules  
• Monitor data quality  
• Report status for quality-focused initiatives  
Identify stakeholders, establish decision rights, clarify accountabilities |
<table>
<thead>
<tr>
<th>Data Governance Focus Area</th>
<th>Charter for This Type of Program Holds Data Governance Committee and Data Stewards Accountable to:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Privacy, Compliance, and Security</strong></td>
<td>• Help locate sensitive data across systems</td>
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<tr>
<td></td>
<td>• Align governance, compliance, security, and technology frameworks and initiatives</td>
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<tr>
<td></td>
<td>• Help assess risk and define data-related controls to manage risk</td>
</tr>
<tr>
<td></td>
<td>• Help enforce regulatory, contractual, and architectural compliance requirements</td>
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<tr>
<td></td>
<td>• Support access management and security requirements</td>
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<td></td>
<td>• Identify stakeholders, establish decision rights, clarify accountabilities</td>
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<tr>
<td><strong>Architecture Integration and Analysis</strong></td>
<td>• Ensure consistent data definitions</td>
</tr>
<tr>
<td></td>
<td>• Support architectural policies and standards</td>
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<tr>
<td></td>
<td>• Support metadata programs, Service-Oriented Architecture, master data management, and enterprise data management</td>
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<tr>
<td></td>
<td>• Bring cross-functional attention to integration challenges</td>
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<tr>
<td></td>
<td>• Identify stakeholders, establish decision rights, clarify accountabilities</td>
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<tr>
<td><strong>Data Warehouse and Business Intelligence</strong></td>
<td>• Establish rules for data usage and data definitions</td>
</tr>
<tr>
<td></td>
<td>• Identify stakeholders, establish decision rights, clarify accountabilities</td>
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<tr>
<td></td>
<td>• Identify software data life cycle-embedded governance steps and loop-outs for projects</td>
</tr>
<tr>
<td></td>
<td>• Clarify value of data assets and data-related projects</td>
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<tr>
<td>Data Governance Focus Area</td>
<td>Charter for This Type of Program Holds Data Governance Committee and Data Stewards Accountable to:</td>
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<td>---------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Management Alignment</td>
<td>• Measure the value of data and data-related efforts.</td>
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<td></td>
<td>• Align frameworks and initiatives</td>
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<td></td>
<td>• Identify stakeholders, establish decision rights, clarify accountabilities</td>
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<tr>
<td></td>
<td>• Identify SDLC-embedded governance steps and loop-outs for projects</td>
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<td></td>
<td>• Monitor and report on data-related projects</td>
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<td></td>
<td>• Promote data-related messages and positions</td>
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</table>

SWAs and their partners must create effective data governance programs that encompass one or more of these focus areas because these areas shape the data governance initiative and drive the types of rules and issues the LDS addresses, the emphasis placed on data-related decisions and actions, and the level of involvement of different partners and stakeholders.
**Key Components of Data Governance Program**

In addition to its core focus areas, a solid data governance program will address a number of key components. This section briefly discusses them.

**Decision-making authority:** The data governance program will establish an organizational structure, with different levels of data governance and specific roles and responsibilities for each level. This is accomplished by creating a data governance committee, identifying data stewards, and tasking them with clear roles and responsibilities.

**Standard policies and procedures:** A data governance committee will work to adopt and enforce a written data governance plan. These policies and procedures should touch every level of the organizations involved in the WDQI and LDS efforts. This plan will be formalized in writing and partners and stakeholders should have an opportunity to review it and provide comments and recommendations.

**Data inventory:** The data governance program should conduct a thorough review and inventory of all data that require protection. This activity should be repeated frequently to mitigate data disclosures.

**Data content:** The data governance program must identify the purpose(s) for which data are collected and justify the collection of sensitive data. All data should be categorized based on their sensitivity, and measures should be taken to avoid disclosure.

**Data records:** The governance program further specifies activities related to handling data that will ensure compliance with security policies. This requires SWAs and their partners to clearly specify activities related to data handling and processing by data stewards as well as users of the data.

**Data quality:** It is vital to ensure that data are accurate, relevant, timely, and complete for the purpose(s) for which they are collected. To ensure that data being collected are high quality, SWAs and their partners typically establish strategies and procedures for preventing, detecting, and correcting errors and misuses of data.

**Data access:** Differentiated levels of data access will be defined and assigned to individuals based on staff roles and responsibilities.

**Data security and risk management:** The governance program will ensure the security of sensitive data by mitigating the risks of unauthorized disclosures, establishing a comprehensive data security plan that has checks and balances to mitigate data breaches.
**Data dissemination:** The governance program will ensure that data sharing and reporting activities comply with federal, state, and local laws. The release of data must adhere to the policies and procedures of the organization and protect the disclosure of any personal, identifiable data.

**Decision making authority:** An organizational structure with different levels of data governance and specific roles and responsibilities for each level can help advance the partnership’s work. This is accomplished by creating a data governance committee and identifying data stewards with clear roles and responsibilities.

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**Data Governance Tools**

1. The Data Governance Institute. This site has a wealth of data governance information and tools that can assist SWAs in their efforts to create a data governance program. Visit [www.datagovernance.com](http://www.datagovernance.com).

2. The Data Administrator Newsletter (TDAN). This website provides available articles and resources related to data governance, including an assessment tool that SWAs and their partners can use to evaluate the current state of their data governance. Visit [www.tdan.com/view-articles/10149](http://www.tdan.com/view-articles/10149).


5. National Association of State Chief Information Officers (NASCIO). This organization has a number of publications related to data governance, data management, and data security. Visit [www.nascio.org/](http://www.nascio.org/) and search under Publications & Research.

The Chief Information Officer (CIO). This site has a number of articles that address the steps of creating a data governance plan. Visit [www.cio.com/](http://www.cio.com/).
Key Drivers of a Successful Data Governance Program

Key drivers of successful data governance programs include a variety of activities to build support for the program and ensure that staff assigned to the program can tackle the myriad of responsibilities involved in developing a data governance program. Below are short descriptions of the key drivers of successful data governance programs. For more detailed descriptions of the key drivers of successful data governance programs, please review the online resources in the Data Governance Tools text box.

1. Assess Governance of State Workforce Data and Need for Data Governance Program

In order to begin developing a data governance program, it helps for the SWA to evaluate where its state agency ranks on eight key areas of data governance. Robert S. Seiner, a leading expert in data governance, developed a tool, published in The Data Administrator Newsletter, that organizations can use to assess how well they are “governing” their data. This assessment tool is available at www.tdan.com/view-articles/10149. It provides SWAs and their partners an opportunity to evaluate themselves in key data governance areas in order to gain a better understanding of how data governance programs can benefit efforts by their organization and the state to link data.

As discussed in the last chapter, SWAs and their partners should familiarize themselves with any federal, state, or local laws that might impact LDS work, such as the Federal Education Rights and Privacy Act (FERPA), Social Security Act, and the Health Insurance Portability and Accountability Act (HIPAA). Some states have even implemented legislation limiting data sharing between state agencies. Understanding how these laws are interpreted at the state level will help SWAs and their partners as they embark on developing an LDS.

SWAs and stakeholders also need to assess their readiness to implement a data governance program before embarking on a formal approach to governance and assigning staff to serve as data governance coordinators and data stewards.

2. Communicate Benefits of Data Governance Programs and Elicit Executive Support

When embarking on the creation of an LDS, most SWAs soon realize that they do not have data governance programs in place and must spend some time meeting with administrators, policy
analysts, governing bodies, legal agents, and technology staff to discuss the various components of a data governance program. Creating a data governance program does not happen overnight; SWAs can expect to spend a minimum of three to six months working on their data governance programs. However, the lasting benefits are worth the investment in terms of how agencies manage their data, ensure the collection of quality data, and foster effective use of data as a system, rather than as compartmentalized departments.

Most SWAs have obtained support for a data governance program by articulating the benefits of developing a data governance program. Some of the benefits of a data governance program include that it:

- helps to protect interests of stakeholders by enforcing compliance with agreed upon rules and regulations regarding data management, including security to protect personally identifiable information (PII);
- outlines who can take what actions, when, with what information, and using what means;
- defines rules of engagement, including organizational bodies, accountable individuals, and processes;
- formalizes a set of policies and procedures that span the life cycle of data, from acquisition to disposal;
- enhances understanding of data assets; and
- ensures the collection of accurate and reliable data that may be used to improve workforce development programs.

Regardless of a state’s size and budget, eliciting executive support for a data governance program is of paramount importance because it drives the way administrators and line staff treat the data. When framing the argument for a data governance program with executive-level staff, it is important to do so in terms of cost-savings and staff resources. Given that federal incentive funds and sanctions are tied to data-driven performance outcomes for many workforce programs, it may also benefit SWA staff to stress the tangible benefits of instituting a data governance program with senior workforce and education leaders. Regardless of how SWAs market the data governance program, senior executives must be on board for the program to take root. Keep in mind that most states do not have separate budgets to support data governance programs; rather state departments usually use existing grants and programs (e.g., WDQI, WIA, LMI) to help fund these initiatives.
3. Create a Data Governance Committee with Clearly Defined Roles and Responsibilities

The creation of a data governance committee with clearly defined roles and responsibilities is another key driver of successful data governance programs. This committee should include, at minimum: high-ranking senior executives, agency communications staff, legal staff, and program office directors (e.g., LMI, UC, WIA Title I, K-12, postsecondary, community college, and universities). It is the responsibility of the data governance committee to create a vision for the state’s data governance program over the next few years.

Tasks assigned to the data governance committee include, but are not limited to:

- Keeping track of the data stakeholders and stewards and establishing data priorities
- Serving as a liaison to other offices and programs (e.g., IT, system architecture, contractors, etc.)
- Collecting and aligning policies, standards, and guidelines from partner organizations and programs around data retention, archiving, data requests, data use, and data access
- Arranging for information and analysis, as requested
- Facilitating and coordinating meetings with data stewards to ensure that MOUs are in place and PII is protected
- Articulating the continued value of a data governance program
- Providing centralized communication and oversight for data collection and analysis, including developing a data calendar

The level of effort needed to accomplish these tasks varies by state.

4. Identify a Data Governance Coordinator

After gaining executive-level buy-in, it is important for the SWA and its partners to identify a person who is responsible for ensuring that a data governance program is in place. Because there is no substitute for strong leadership, this person must have the authority to make
decisions and a tenacious spirit to keep the process moving forward. Developing a data governance program is often a political challenge that requires building consensus among many diverse state agencies and stakeholders. Therefore, political leadership within the organization must be a priority when selecting the representative(s) to lead the data governance program. Once selected, the data governance coordinator can work to create a governing council of organizational stakeholders from across the various state agencies to establish stewardship policies and report on the progress of the data governance committee to high-ranking officials in the state.

5. Identify Data Stewards

Because there are so many intricacies inherent in the data, it is important for SWAs and their partners to identify data stewards. Data stewards are program-area staff with in-depth knowledge about data-collection efforts and their intended uses. Data stewards are responsible for implementing and enforcing policies and business rules established by the data governance committee, and correcting data-quality problems by matching records, replacing bad data with good data, and making decisions about which data should be used when more than one record exists for the same person. These data stewards should be individuals that have subject-matter expertise, have frequent use for the data, and use the data to prepare federal and state reports. Data stewards are usually very good resources for the data governance committee because of their understanding of how data has been used and abused in the past and how it can be maintained and secured for future use.

6. Monitor Efficacy of Governance Program

A data governance program is about how agencies use data to benefit and protect themselves. Data governance is largely about organizational behavior. Therefore, because people, policies, and data needs change constantly within state agencies, it is important to regularly monitor the ability and efficacy of state agencies to change organizational controls in order to meet demands. SWAs and their data governance committee should have ways to document practices and technology that support the human decision making process. This way, regardless of staff changes due to retirements and job changes, the data governance committee and stewards can ensure that the structure of the data governance program is sustainable and protects the continuity of the state’s vision for its LDS. In addition, the data stewards are responsible for actively monitoring data-related activities for compliance with established policies and procedures.
Chapter 3: Designing the System

Now that the SWA has formed partnerships, established a data governance program, and especially, as it pertains to this chapter, determined a research agenda, the SWA needs to construct a data system that can generate the data needed to answer its research questions. The four-step process discussed below is an ideal representation. In reality, SWAs will enter the process at different places, and will, in some case, be able to skip steps altogether. For example, some states have research agencies or centers that pre-date current LDS efforts. In those cases, SWAs may decide to share data with this existing system(s) and thus will not have to actually build out a separate LDS, allowing them to skip the Build phase altogether, greatly simplifying the LDS development process.

For the purpose of presenting a complete picture of creating an LDS, the process can be broken down into four phases: Explore, Plan, Build, and Maintain. For those SWAs that are working from existing efforts, it is still critical to engage in the Explore phase and some of the Plan phase, though much of the Build and Maintain phases may be skipped if the existing data repository has already established the data architecture, security, and maintenance procedures.

Designing the System Framework
Explore Phase

Generally, the Explore phase is a time when SWAs can identify their data needs and get a better understanding of the data that are available for use. While developing a research agenda is discussed separately in this manual (see chapter 2), if the SWA can engage in the Explore phase before or concurrently with the development of its research questions it can streamline the process of agenda setting. It is not uncommon for an SWA and its partners to develop research questions and only afterward realize that the system does not have the capacity to answer those questions. If the SWA already knows what data are available in its data systems and those of its partners, the SWA can direct the research agenda toward answering question for which data elements are actually available and/or develop a plan to collect the additional data elements needed. It is also useful for the SWA to get a better understanding of what data it wants and what data are available before actually constructing the LDS. For SWAs that are joining existing LDS systems, this may be the only phase they need to undertake.

The Explore Phase consists of three sub steps: assessing data needs, identifying existing data structures, and mapping the data.

Assess Data Needs

There are likely a variety of research questions that the SWA, its partners, and other stakeholders want the data in the LDS to answer. For each of these questions, the SWA should identify the data sources and variables needed to address them and be as specific as possible.

Let’s use an example to illustrate this point:

The SWA and its partners are interested in finding out the employment outcomes for graduates of postsecondary manufacturing programs. To find out what data are needed to answer this question, the SWA has to define what it means by employment, postsecondary institution, and manufacturing program. The SWA also has to determine what time periods it is interested in investigating, such as short-term outcomes, long-term outcomes, or both. Then the SWA has to determine which data sources contain this information.

Our theoretical SWA has decided that it is going to compare the annual earnings of associate-degree holders from welding programs at community colleges to the annual earnings of associate-degree holders in multi-skilled programs at community colleges within one year of graduation in, say, 2012. At the very least, this comparison requires two sources for individual-level data: lists of individuals who obtained associates degrees in welding and multi-skilled programs in 2012 from each of the community colleges; and wages earned as shown in UI
Wage Records from 2012 through 2013. Both sets of data need identifying information that can be used to link the records, for instance SSNs and/or names and dates of birth.

As demonstrated in this example, even the simplest questions need to be thoroughly and thoughtfully defined in order to understand the specific data elements required to answer them. Developing and operationalizing questions can be time-consuming and is typically an iterative process as the SWA learns what data it can access. For instance, our theoretical SWA in the example above might have wanted to look at long-term outcomes, but had to restrict its inquiry to short-term earnings because historical data on manufacturing graduates was not available prior to 2012. The good news is that, once some initial decisions are made around operationalizing research questions, processes may be accelerated because the SWA can build off of its own prior work.

**Identify Existing Data Structures**

Once the SWA has an understanding of the types of data that are needed to answer the questions on its research agenda, the SWA needs to determine in which data systems or databases these data elements are located. In the example above, the SWA can clearly see that it needs wage data from the state UI department or agency and student records from the community colleges. Depending on the structures in place in that state, these student records might come from one of a few different kinds of sources: individual postsecondary schools, the state community college system, or the state office of higher education. Thus, it is a good idea at this point for the SWA to conduct an inventory of the existing data sources in its state, not only to identify the sources of data, but also to determine how its efforts might coordinate with ongoing LDS work in the state.

**Determine What Data Is Held by the SWA**

Regardless of whether the SWA decides to join an existing effort, the SWA needs to determine what data are available in its own agency and specifically what departments within that agency have which data elements. Common data elements contained by SWAs are: Workforce Investment Act (WIA) program data, Trade Adjustment Assistance (TAA) program data, Unemployment Compensation (UC) and Unemployment Insurance (UI) data, and Labor Market Information (LMI) data. SWAs may also house other data, such as from apprenticeship programs, and federally and state-funded employment and training program data. However, the way each SWA is organized regarding which department holds the data and how accessible those data are to other departments within the agency may vary quite a bit. It will be extremely useful to understand the “lay of the land” of the SWA’s data holdings at the beginning of the
project. For many SWAs, obtaining access to data in its own agency is fairly simple and the workforce data are often the first kinds of data plugged into the LDS. In other cases data access may have to be negotiated and, as this process can be time consuming, it is helpful to begin obtaining MOUs or data-sharing agreements (DSAs) right away.

**Determine What Data Structures Partners Have in Place**

It can be more challenging to determine what data are available from partners. In the example of the SWA above, it knows it needs postsecondary student-level data, but it also needs to know which agency has that data. In some states, the other sources of data the SWA wants to include in its LDS may be obvious. Regardless, developing an understanding of the data contained in the state entities early is useful, as that understanding will greatly inform the process of how SWAs build systems and incorporate partner data.

**Determine If There Is an Existing Data System**

As discussed in chapter 1, Taking Stock, it is also important for the SWA to understand if there is an existing state data system, such as an education-driven P-20 system, as having this may make it unnecessary for the SWA to undertake building its own system from scratch. As long as the SWA is allowed to contribute data to and access data from the existing system, joining that system is likely preferential to building an additional system in parallel, because the existing data platform is likely to facilitate easier data sharing and data linking. In some states, these existing systems already may have developed a variety of structures and procedures for data sharing and system maintenance, such as a data governance board, practices for processing research requests, procedures for data sharing and linking, and data security protections, to name a few. SWAs may be able to benefit from leveraging existing efforts, while still meeting its needs and requirements. Existing structures are likely to vary somewhat from state to state in how they are organized. The types of systems that the SWA may want to consider joining can include existing SLDS efforts, state agencies tasked with warehousing data, warehouses developed from state and university partnerships, or other systems. Knowing what is already out there will greatly inform the path that the SWA decides to take in developing an LDS.

**Determine What Data Sharing Is Already in Place**

In many states, there is a substantial amount of data being shared across agencies regardless of whether or not there is an LDS in the state. When this is the case, it is much easier to expand
this data sharing to the LDS than to start from scratch. Figuring out what data are already being shared and how sharing practices might be expanded is a critical beginning step.

**Map the Data**

After locating the sources of the data needed to construct their LDS, SWAs must gain a deeper understanding of data elements, both in their agencies and in partner agencies, and must determine how different data sources map to each other.

One of the best ways to really understand the workforce data that the SWA has in-house is to create a data dictionary for each data source. For this purpose, a data dictionary is a file that includes information about the data elements contained in a given system as well as details about those elements, such as each element’s meaning, relationship to other data, origin, usage, and format. This is a critical step in developing an LDS, as doing so requires the SWA to have a list of the data elements, variable definitions, and how variables are coded. The benefits of developing a data dictionary for the agency are twofold: first, the SWA can identify what data it has and secondly, by comparing its data dictionary to data dictionaries from other agencies, the SWA can determine how data might be combined to answer its research questions. This is especially important in establishing which individual-level identifiers are present in all data sources, in order to determine how the records will be linked.

**Helpful Resource**

One tool that the US ED has funded to facilitate mapping multiple databases is the Common Education Data Standards (CEDS) project. Because institutions across the P-20W environment use many different data standards to meet information needs, these certain data agencies need to be able to understand, compare, and exchange data in an accurate, timely, and consistent manner. The CEDS project is a national collaborative effort to develop voluntary, common data standards for a key set of education data elements to streamline the exchange, comparison, and understanding of data within and across P-20W institutions and sectors. For more information see ceds.edu.

Source: Modified from https://ceds.edu/whatIsCEDS.aspx.

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Plan Phase

The next phase of building the LDS is the Plan phase. Even SWAs that are joining existing efforts may find it useful to think through the system design so that they understand the basic system structures. The Plan phase is divided into 3 sub steps: selecting a model, deciding on LDS location, and determining who will build the actual LDS.

Select LDS Model

If the SWA is tasked with creating a model from “scratch,” it first needs to determine what system model it will use. The decision about which model to use will depend on the organization of the state, its policies and laws, agency regulations, and the regulations and policies of partner agencies. After determining the model, SWAs then need to decide what organization will be tasked with overseeing the LDS and its management.

Understanding LDS Models

Before an SWA determines the type of LDS model it should use, it is helpful to get a basic understanding of the options. SWAs typically choose between two basic models: centralized (typically referred to as a data warehouse) and federated. Diagrams of both these models are shown in Exhibits 1 and 2.

In a centralized model, all participating agencies copy their data into a single, centrally located warehouse where data are organized, integrated, and stored using a common data standard. As shown in Exhibit 1, after agencies contribute data to the LDS, matched using common identifiers or matching algorithms, deidentified data is then integrated into the warehouse. From this warehouse, users can query the system to obtain access to the combined data.

Data may be accessed through reports, through a data cube, through a data mart, or through various datasets.

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25 A data cube is “a three-dimensional (3D) (or higher) range of values that are generally used to explain the time sequence of an image’s data. It is a data abstraction to evaluate aggregated data from a variety of viewpoints. It is also useful for imaging spectroscopy, as a spectrally-resolved image is depicted as a 3-D volume. A data cube can also be described as the multidimensional extensions of two-dimensional tables. It can be viewed as a collection of identical 2-D tables stacked upon one another. Data cubes are used to represent data that is too complex to be described by a table of columns and rows. As such, data cubes can go far beyond 3-D to include many more dimensions.” From Techopedia, www.techopedia.com/definition/28530/data-cube.

26 A data mart is “a subject-oriented archive that stores data and uses the retrieved set of information to assist and support the requirements involved within a particular business function or department. Data marts exist within a single organizational data warehouse repository. Data marts improve end-user response time by allowing users to have access to the specific type of data they need to view most often by providing the data in a way that supports the collective view of a group of users.” From Techopedia, www.techopedia.com/definition/134/data-mart.
A centralized model has the benefit of being somewhat easier to construct than the model we will discuss next, but if the political/legal context in the state prevents the SWA from storing data from various agencies together (either due to concerns over privacy/confidentiality or to concern over which agency would “own” the combined data), a data warehouse may not be a viable option; instead SWAs might consider a federated model.

Exhibit 1: Structures of a Centralized Data System

In contrast a federated model is shown in Exhibit 2. Federated models are frequently used

Virginia’s Federated Model

The Virginia Longitudinal Data System (VLDS) is built on a "federated" system that merges data across the participating agencies in a complex double-deidentifying hashing process that leaves private data behind the existing firewalls of the participating agencies. The system, refers to as a “shaker model,” prepares the data using a one-time, one-way hashing algorithm to create a random set of unique identification code for each individual. VLDS then applies the unique identification code to each instance of the individual in all data tables provided from that data request. Each time a researcher requests data, the system will generate a completely new set of unique identifiers for each individual in the data. This feature, developed to comply with state law, ensures that the new dataset cannot be linked to the previously requested dataset based on unique identifiers. Visit www.vlds.org.
when state agencies prefer to retain data ownership rights or when a state policy or regulation prohibits the sharing of data in a central repository. In a federated model, the data are not stored together. Rather, the individual agencies retain ownership and control of their data, but agree to combine it on an ad hoc basis in order to support specific research. After data are linked for a request, cached, and delivered to the user, the data are destroyed. The outputs of the system may be the same as those of the centralized system.

Exhibit 2: Structures of a Federated Data System

In some cases, the type of model an SWA might choose will be clear based on state-level contexts. To develop an understanding of which type best suits different SWA circumstances, Exhibit 3 briefly compares some key features of the two types.

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### Exhibit 3: Features of Centralized and Federated Data Systems

<table>
<thead>
<tr>
<th></th>
<th>Centralized</th>
<th>Federated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure</strong></td>
<td>All current and historical data are copied and stored in a single, central repository of data (the data warehouse) and are organized, matched, integrated, and stored using a common data standard.</td>
<td>Data are queried from source systems and matched to fulfill individual research requests. Requested data are not saved and data must be built or rebuilt for each query.</td>
</tr>
<tr>
<td><strong>Data Ownership</strong></td>
<td>Data ownership is with the source agency and data stewardship is shared between the source agency and the data warehouse agency/entity.</td>
<td>Data ownership is maintained by the source agency.</td>
</tr>
<tr>
<td><strong>Privacy/Security</strong></td>
<td>Primary responsibility is with the centralized data warehouse agency/entity, but may be dictated by source agencies via data-sharing agreements or MOUs. There is higher risk in the event of a breach due to the amount of data contained in one system.</td>
<td>Primary responsibility is with the source system agencies, which will need to develop secure processes for handling data queries. Risk associated with data breaches are lessened because the amount of data that could be accessed is limited.</td>
</tr>
<tr>
<td><strong>Development</strong></td>
<td>Requires ample time to build the centralized warehouse. Start-up costs for infrastructure development and training can be extensive.</td>
<td>Construction of the technical features of the system generally takes less time and therefore less money. Does require extensive development and maintenance of data-sharing policies and data governance structures.</td>
</tr>
<tr>
<td><strong>Sustainability</strong></td>
<td>Possible approaches include a state appropriation to the centralized data system agency/entity for the development and ongoing support and maintenance of the centralized system. Another approach would be for each participating agency to pay a proportional part of the needed funds for the support of the centralized system, in a cost recovery model.</td>
<td>Possible approaches are for each participating agency to make their contribution to the processes needed for the federated system. Another approach would be a specific state appropriation allocated to each participating agency, based on a funding formula.</td>
</tr>
</tbody>
</table>

Determine the Managing Entity

After deciding on the type of LDS to build, the SWA needs to determine which entity will manage the system; the decision will depend in part on the model selected.

For SWAs that select a centralized model, there are several options as to who will manage the data system. The SWA can decide to retain management duties of the system in-house, typically with input from and coordination with data-sharing partners. This allows the SWA to maintain control of how the system is developed and maintained. Another option is to have a data-sharing partner manage the LDS. This typically occurs when a partner, such as another state agency, either already has established an LDS or is more capable of managing the system due to having more funding and/or staff time. Using this option, the SWA can best leverage partner resources in the development of the system, while taking precautions to establish a coordinated system of data governance and data stewardship. The last option is to use a third-party entity that is not itself a contributor of data to the LDS, but simply a party that serves as a data repository. These entities are typically referred to as “trusted brokers.” Trusted brokers can include a state agency dedicated to managing data warehouses, a university that partners with the SWA or the state to house data, or even a nonprofit partner contracted by the state or state agency to serve as its data manager (see the text box below, Examples of Trusted-Broker Models, for more about trusted-broker configurations).
In a federated system, where all agencies retain ownership of their data, partners do not need to worry about who will “house” the system; however, use of this model typically requires more coordination between participating agencies, especially in data governance. While having a solid data governance structure is key for all LDS projects, SWAs may find that data governance of federated systems requires more intensive collaboration between partners in developing data-sharing agreements and the processes and procedures by which data will be shared.
Choose Who Will Build the System

The last step in the planning phase is for the SWA to determine who will build its data system. Three of the most common options for LDS builders are external third-party vendors, state or agency IT staff, or trusted brokers. In this area, the experiences of SWAs in building LDSs have varied widely, depending on the answers to questions such as:

- Is there an existing infrastructure for building the LDS? If the SWA is joining an existing system, the question of who will build it is likely already resolved. In addition, if an SWA uses a trusted broker for data management, the broker will take responsibility for developing the system.

- What are the costs of building and maintenance? Using a trusted broker or state/agency IT department typically costs less than using a vendor, provided the broker or agency has the requisite system development skills and resources and commits to maintaining and enhancing the system over time.

- What experience does the builder have with creating an LDS? The SWA should investigate the ability of the potential builders, to determine if each has the needed experience and available resources to build the LDS. While trusted broker and state/agency IT departments are likely to charge less, a vendor is likely to have more extensive experience with projects such as this. And, perhaps more importantly, because they are contractors, vendors will have the capacity to dedicate sufficient staff time to the project, whereas other potential builders may have difficulty devoting adequate staff resources to the LDS.

- What kind of working relationship can the SWA expect from the builder? The SWA should spend time thinking about what the optimal working relationship with the vendor would look like and determine if each of the possible builders could fulfill its expectations, particularly as regards communication. This assessment will vary by state, as the relationship between each SWA and its state or agency IT department is likely to be context specific. Communication with vendors might be more easily negotiated, but often vendors do not have the benefit of being embedded in the state system or in close physical proximity to the SWA.

If an SWA decides to select a third-party vendor to build its LDS, Exhibit 4 offers some tips from SLDS grantees, as documented by US ED.
Exhibit 4: Tips for Coordinating with Vendors

<table>
<thead>
<tr>
<th>Do</th>
<th>Do Not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define the vendor management process before contract execution</td>
<td>Do not always go with the lowest price; determine the best value by factoring in quality in addition to cost</td>
</tr>
<tr>
<td>Base the relationship on a solid, explicit framework, while striving for collaboration and partnership</td>
<td>Do not approach the vendor relationship as adversarial</td>
</tr>
<tr>
<td>Document the relationship with the vendor on the front end, above and beyond the necessary legal documentation</td>
<td>Do not use money as a leverage point (e.g., withholding payment as a method of asserting power if the vendor does not deliver on time)</td>
</tr>
<tr>
<td>Consider outsourcing acquisition assistance to help with vendor management</td>
<td>Do not hire a vendor and then simply step back and expect them to deliver the product you want</td>
</tr>
<tr>
<td>Continually course correct, making contract amendments and pricing adjustments as needed to adapt for changes</td>
<td></td>
</tr>
<tr>
<td>Allow vendors to innovate and bring solutions</td>
<td></td>
</tr>
</tbody>
</table>


**Build Phase**

Once all the LDS design decisions have been made, the SWA can move to building the system. There are three sub steps in this process: designing and developing the system, testing and modifying the system, and deploying the system.

**Design the System**

Now that the SWA has planned the system model and location and identified the builder, the SWA can begin to design and develop the system itself. In designing the system, the SWA will want to define their business rules and plan system processes.

The SWA can now use the information gathered in the Explore phase to figure out how data will be linked across source agencies. This requires that the SWA delineate common identifiers in included datasets, so that records can be successfully linked. SWAs can use either deterministic or probabilistic data matching. Deterministic matching compares unique identifiers (typically SSNs) to determine an exact match. In probabilistic matching, several fields may be compared between two records and each field is assigned a weight; the sum of the weights is used to indicate the likelihood of a match.28

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SWAs using centralized LDS systems will also need to plan their identity management strategy, meaning that they establish business processes for how the digital identities of individuals will be created, maintained, and used. To do this, the SWA will determine how much identifying data from each contributing agency will be retained for each individual after matching records from multiple agencies are linked in the LDS. It is important to consider that different agencies may have different representations of a single individual (e.g., SSN, full name, nickname). Recording all known representations of each individual will facilitate future data matching and error resolution.

The project team will also need to consider how end-users will access the system. In today's environment of heightened awareness around data security, the SWA will want to make certain that the LDS is designed with sufficient security protections in all processes, from data matching...
to end-user access. The SWA should also be sure to clearly and thoroughly vet and document security procedures.

This process may require close collaboration with developers. SWAs will want to design the main features that they want in the system and discuss the logistics and feasibility of these with system builders.

**Develop, Test, and Modify the System**

Once the SWA and the builder have agreed on a design, the developers will go about constructing the system. One challenge that some agencies have faced is miscommunication with system builders. Sometimes program staff and IT staff do not share a common “language” and it can be difficult for an SWA to communicate its desires in a way that developers easily understand. SWAs should try to clearly explain the needed inputs and outputs of the LDS they wish to build, document and discuss data structures, and be prepared to have ongoing working conversations with system builders.

Following the initial system build, the SWA may need to develop a user testing plan, and schedule and conduct user acceptance testing to ensure that the system functions satisfactorily. Taking more time in the testing phase can help avoid system glitches later. If test users uncover glitches or other issues, developers can then modify the system to correct these.

**Deploy the System**

System updates are important for keeping the LDS functioning optimally, so that its use can have the intended impact on research and policymaking. These system updates include software and hardware updates, security audits and patches, and revisions to system documentation as it changes.

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31 “User acceptance testing is the last phase of the software testing process. During user acceptance testing, actual software users test the software to make sure it can handle required tasks in real-world scenarios, according to specifications.” From Technopedia, www.technopedia.com/definition/3887/user-acceptance-testing-uat.


33 Ibid.
**Evaluate System Effectiveness**

Another key task for the SWA to undertake during the Maintain phase is to evaluate the effectiveness of the system in order to ensure that it continues to meet the needs of the SWA, partner agencies, and other stakeholders, and, if not, undergoes necessary modifications or enhancements. Changes in the state context, such as more mandated data sharing or new security regulations, may require SWAs to revisit the design and build out of the system to meet new system requirements.\(^{34}\)

**Maintain System Security**

Throughout the life of the LDS, the SWA must take all necessary actions to maintain the system’s security. This includes protecting PII from mishandling or breaches by revisiting and updating system security processes and procedures, updating hardware and software, properly training staff on data handling, and monitoring end-user access. SWAs should also create and document the actions that must be taken in case of a breach of data, so that in the event of a breach, the SWA will be able to address it swiftly, minimizing risk to the public and the agency.

\(^{34}\) Ibid.
Chapter 4: Data Use

In order to make a difference in individual outcomes, program design, and state policy, an LDS that integrates education and workforce data needs to be useful. Luckily, usefulness is a broad spectrum. A researcher might find a lengthy and detailed research report useful, whereas a locally elected official or state legislator might find a one-page policy brief much more useful. In this chapter, we explore a variety of data products and tools that different LDS constituencies might find useful.

One key aspect of usefulness is access. For the system to serve its purpose, stakeholders must be able to access the data generated by an LDS and use it in a meaningful way. In order to develop a system that includes user-friendly tools that put the data in the hands of stakeholders, SWA staff members will ask the following questions: What are the ultimate objectives for connecting different sources of longitudinal data? Who will use the LDS data to meet these objectives? What data products will best meet those parties’ needs?

SWAs may want to use the mission and goals of the SLDS to inform all decisions regarding data use. We offer five steps necessary to identify data products appropriate for the mission and goals of the LDS.

Step 1: Identify target users
Step 2: Select data product(s)
Step 3: Design and produce data products
Step 4: Launch data products
Step 5: Provide continuous support
Step 1: Identify Target Users

Before selecting specific data products to develop, SWA staff should identify the potential data users who can best help the SWA (or P-20W system) meet its goals. SWAs should work with the LDS data governance body and/or data steward committees to prioritize stakeholders who can best use the data to meet the goals of the LDS. The following questions can serve as a guide:

1. What types of decisions does each user inform, and how do these decisions make an impact on the goals of the LDS?\(^{35}\)

2. Will the LDS have the relevant data to meet the needs of the users? Do the data include the necessary content and have the right level of granularity?\(^{36}\) For example, users may be interested in employment outcomes for students at various geographic levels, such as at the state, city, or district level, or at specific post-secondary schools or colleges.

3. Can the LDS produce and release the data in the timeline required by the users?

4. What type of data do the users already access? How do they access and use the data? What is their estimated technological capacity (are they able to manipulate datasets using an online tool, for example)?

5. Are users interested in and in a position to use data to make informed decisions?

Potential data users may include policymakers, students, job seekers, service providers, and researchers.

**Policymakers**

Legislators and staff members from workforce, education, social services, and other agencies at the local and state level can use information provided by the SLDS to make evidence-based decisions about workforce development programs and policies. Longitudinal data provide timely, granular facts to help policymakers assess what is working (or not working) in order to allocate funding more effectively and provide technical assistance as needed. Questions that policymakers could answer using an LDS include:

- Which types of training programs produce the best outcomes for specific populations?

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\(^{36}\) Ibid.
• What combination of services are workforce customers receiving? How can service providers collaborate to increase efficiency and better serve customers?

• Are workforce development programs and education programs reducing participation in social services programs, such as UI, SNAP, and TANF?

• What percent of career and technical education graduates are employed in their field of study?

• Is the public workforce system meeting the need of employers for a skilled workforce?

• Are education and workforce systems training customers for industries and occupations that are in demand based on employer input?
**Students and job seekers**

Longitudinal data can help individuals such as job seekers and those interested in training programs identify in-demand careers in their local economy and training programs with high employment rates in careers of interest. The public may turn to an LDS to answer the following questions:

- Which workforce training programs have the highest employment outcomes after program completion?
- Which occupations have the greatest job stability?

**Service Providers**

Managers and line staff working in adult basic education, job training, career and technical education, and postsecondary education can use an LDS to monitor outcomes of their clients, students, and participants for program improvement, marketing, and funding requests. An LDS can help service providers answer the following questions:

- What industries are participants employed in after receiving services?
- Are there certain subgroups that have better (or worse) outcomes after program participation?

**Outside Researchers**

Academics and think tank staff interested in workforce development can use an LDS to develop research papers and reports that will add to the body of knowledge on workforce development, education, and social services issues. These users may include unassociated research entities as well as principal-agent research partners who house and/or link WDQI data components through a formalized partnership. The Ohio Department of Job and Family Services and the Ohio Board of Regents, for example, partner with the Ohio State University, which links available data between the state agencies and helps the project identify priority research questions.
Step 2: Select the Right Data Product(s) for Target Users

After SWA staff members determine which actors can best use the data to serve the mission of the LDS, they should identify the best medium to present the data. An LDS can produce a variety of different data products that serve different needs and potential users. When selecting the appropriate data products, SWAs should consider the technological skill of the users and the degree to which they will need to manipulate the data. Will prepackaged reports, such as a scorecard or static data dashboard, provide enough information? Alternatively, will the users require more flexibility, such as the ability to manipulate report parameters using interactive data dashboards and querying tools? The most popular data products—scorecards and dashboards, data stories, research reports, and raw data requests—are reviewed below.

**Scorecards And Dashboards**

Scorecards provide a quick visual summary of performance metrics toward specific objectives for a given program or entity, such as a workforce system or an American Jobs Center. Program managers, policymakers, and line staff can use scorecards to identify areas of improvement and inform future decisions. Virginia’s Workforce System Report Card (shown below), uses a simple visual key to allow the reader to quickly assess the progress being made in key workforce areas.

![Virginia’s Workforce System Report Card](https://www.vaperforms.virginia.gov/images/WorkforceCard/WorkforceReportCard.png)

Similar to the dashboards of cars, data dashboards display the status of an institution or cohort at a particular point in time. They can provide static images or offer more flexibility, allowing users to visualize and analyze key performance indicators by manipulating the parameters of the model. Dashboards are typically designed to provide information to the public by, for example, informing consumers about the outcomes associated with workforce training and education programs. They can also provide status updates to policymakers regarding demographics, employment patterns, educational outcomes, and other topics.

For example, Texas’s online data dashboard, Texas Consumer Resource for Education and Workforce Statistics (CREWS), shown here, uses colorful charts to display educational and employment outcomes by statewide results, by postsecondary institution, or by college major, with the parameters of the search able to be determined by the user.38

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38 www.txcrews.org
While scorecards and dashboards can be static (as in the Virginia example above), they are commonly displayed via user-friendly web-portals that allow users to select the data they want to access and its presentation format, in graphs, datasets, reports, or tables. They can also provide access to prepackaged, depersonalized datasets for download or provide statistical and visual analysis tools that allow data-savvy users to produce longitudinal reports and identify trends.

**Data stories**

Data stories combine narrative and data visualization to demonstrate how policymakers, researchers, and the public have used data to answer critical research questions. They are an engaging way to communicate the results of research to busy audiences, such as policymakers and the public, who may not have time for or interest in reading longer reports.

Data stories can also serve as important marketing tools by demonstrating the value of the longitudinal data system to policymakers and potential users. Rhode Island’s WDQI research partner, for example, publishes data stories on its website to introduce users to capabilities of its web portal and WEAVE, the data visualization software it uses. The data stories, presented through a series of slides, include “tips and tricks for visualizing data with the graphing options of WEAVE’s interactive software.”

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### More Links to Dashboards and Scorecards

- Washington State Report Card, Office of the Superintendent of Public Instruction
- Raising Expectations: A State Scorecard on Long-Term Services and Supports for Older Adults, People with Physical Disabilities, and Family Caregivers
- College Affordability and Accountability Center, College Score Cards
- District and School Report Cards, Wisconsin Department of Public Instruction
Traditional Research Reports

SWAs or research partners can produce traditional research reports for internal use or academic publication. For example, the Office of Financial Management (OFM) in Washington State used its SLDS, which links high school, postsecondary and UI wage data, to produce a report that examines the earnings premiums of bachelor’s degrees from the state’s public colleges and universities. OFM staff have reached out to the media in order to publicize the results, receiving attention from the Seattle Times and local televised news stations.

Requests for Raw Data

SWAs can provide sets of raw, depersonalized data to outside researchers through standing data agreements or individual, project-based requests. For example, Ohio established a data request system that allows vetted researchers to access data under restricted conditions that protect the privacy of records contained in the LDS, which is housed in the research institute of its university partner. Researchers have the option of accessing data in-person at the university or through a secure server from the researcher's primary institutional office. The agreement allows researchers to report only aggregate, summary data and requires that they provide WDQI partner agencies with copies of key findings for a twenty-one-day review period prior to public release.

Sample Data Stories from Rhode Island DataHUB

**Math Preparation and Postsecondary Success**

This data story focuses on the importance of strong math preparation. It examines the level of math proficiency Rhode Island students obtain and how this relates to their postsecondary success. Issues of enrollment, remediation, and persistence are explored.

**The Educational Costs of Unhealthy Housing**

Environmental hazards in the home such as lead, mold, allergens, carbon monoxide, pesticides, and radon harm thousands of children in Rhode Island each year. In this story, we examine the educational costs of unhealthy housing, using lead poisoning as our proxy for unhealthy housing.

*Source: RI DataHUB, [http://ridatahub.org/datastories/](http://ridatahub.org/datastories/).*

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presenting their research findings. A sampling of research requests, planned analyses, and anticipated products that have been made by university researchers to Ohio's longitudinal data archive, and with which researchers are working on to create a variety of products, includes:

- Data analysis and dashboard development for workforce development program outcomes
- Exploratory analysis of UI claimant service use and employment outcomes
- Effects of higher education participation (including STEM focus, community college, and dual enrollment, etc.) on employment outcomes
- Effects of educational experiences on employment outcomes
- Effects of NFWS/SIF program for incumbent workers, mortgage assistance program, ODMH program, etc. on employment outcomes
- Higher education and employment outcomes of a specific Ohio county’s students, and of the graduates of a specific state college
- Effects of energy industry developments on local jobs.
Data Confidentiality: How to Protect Individual Privacy AND Create Quality Products

Despite the resistance SWAs may face from those wary of the use of longitudinal data, states can balance the dissemination of data and individuals’ right to have their personal information kept private by following state guidelines developed by data stewardship committees. SWAs can ensure personal privacy at various stages of LDS use by:

Storing and analyzing data in-house

By limiting access to personally identifiable information (PII) to necessary and appropriate individuals, SWAs can ensure data confidentiality.

- Assign different levels of access to staff members based on their roles, limiting the type and scope of data they can access.
- Establish internal controls, such as training procedures and confidentiality agreements, for SWA staff who have access to data
- Institute mechanisms to track data access by SWA staff members

Reporting aggregated data through dashboards, scorecards, data stories, or web portals

In order to avoid accidentally disclosing PII when sharing aggregated data, SWA should follow their state’s miminum group size reporting rules and suppress information that does not meet this standard. (Individual states have adopted their own standards, with the minimum number of students ranging from five to thirty.) “Data about individual students should be combined with data from a sufficient number of other students to disguise the attributes of a single student. When this is not possible, data about small numbers of students should not be published.”

Sharing data with other state agencies, postsecondary institutions, researchers, or third-party contractors

SWAs may choose to share data with other entities who engage in research on behalf of the SWA or for their own purposes. To take advantage of these partnerships and ensure data confidentiality, SWAs should:

- Work with their data steward committee to establish policies that guide decisions about whether, and with whom, to share data
- Enter into data-sharing agreements with all other parties who receive data, to ensure confidentiality
Step 3: Design and Produce Data Products

Depending on the in-house skills of the SWA, the team may want to hire a consultant to develop the data product. For example, a scorecard may require the expertise of a graphic designer, while an effective web portal or interactive data dashboard may require a web designer. Many data products, such as data stories and data dashboards, require effective data visualization to maximize their effectiveness. Below is a sampling of data visualization tools that WDQI grantees and other SWAs have recommended for designing LDS products.

Data Visualization Tools

Tableau: With its user-friendly interface and a host of visualization tools, Tableau is easy to get started with. However, using the more advanced features takes time and effort. A free version of the software is available which requires making the user’s data public. The paid version does not allow for online sharing of interactive visualizations.

Highcharts: Based solely on JavaScript, Highcharts does not require plug-ins like Flash or Java. The software supports a large selection of charts and graphs. The product is free for noncommercial use.

WEAVE: This web-based visualization platform allows multiple levels of users to integrate, analyze, and visualize data and publish results on a web page.

Step 4: Launch Data Products

Once SWA staff members identify the data products and the target data users, the team should develop a communication strategy to introduce the product. If potential users do not know what data are available, how to access them, and the range of possibilities for how to integrate the information in decision-making, the LDS may not achieve its usefulness objective. A successful rollout requires marketing and user training.
**Tip: Consider Conducting a Pilot Rollout to Solicit Feedback**

When the Department of Labor in Maine developed scorecards for community colleges through its WDQI grant, the team implemented an iterative rollout process, producing multiple rounds of draft scorecards and holding meetings and focus groups with members of the community college consortia, to solicit feedback. Soliciting multiple rounds of feedback helped build buy-in for the product and ensured that the data product was accurate and reflected the appropriate level of detail for public use.

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**Market the Product**

The marketing strategy should be designed around the type of product and the target users, in order to get the product into the hands of those who can best use it. The LDS team should consider the best mechanism to reach the target users. In addition, the LDS team should time the rollout around the users’ schedules and release the product when they are likely to be most useful to the users (and not when users may be too busy to pay attention). In addition to promoting access to the system, marketing tools can educate the public on appropriate ways to use the data provided by the system.

States can choose from numerous marketing strategies. For example, the Virginia LDS team posted an informational video on their website, demonstrating to students and other interested parties how they could use WDQI data system. In Florida, the LDS team conducts presentations across the state and nationally and training classes within the state for its Florida Occupational Supply/Demand System online application. Online Communities of Practice, such as the one supporting WDQI grantees, are places for grantees to post promotional materials about their products for other states who might be interested in using the product platform or in developing something similar.

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**Train Potential Users**

LDS staff should create documentation, such as a user manual, that describes the system, identifies the potential uses of the system, and provides clear instructions on how to use the product. Depending on the selected data product and the target users, a formal training on accessing, analyzing, interpreting, and using the data for informed decision-making may be required. The format of training depends on the target users. Policymakers or local workforce agency staff may benefit from ongoing in-person or web-based professional development sessions, while the public or other service providers may benefit from downloadable manuals or web-based video tutorials that explain how to use the data. The SWA may consider creating an active help desk to maximize the use of the system and support for users. The team can develop help-desk queries to track user needs, inform future user trainings, and enhance the LDS manual or FAQs. 43

**Step 5: Provide Continuous Support to Meet**

In order to maximize the sustainability of the LDS over time, the team should solicit continuous feedback from partners and users, asking whether and how the system supports their needs, how the system has helped them achieve their goals, and what information they would find useful in the future. This will ensure ongoing support and allow the system to become an essential part of the workforce system and the public domain, even as user needs change. The team should also track system usage, such as the percentage of target users engaging with the data products and the frequency and timing of their use of the system. 44

Of course, understanding user needs will only improve the SLDS if the system is set up to respond and evolve over time. A system should have ongoing funds set aside to redesign data products and tools as users’ needs change. For this reason, we turn last but not least to the topic of sustainability.

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44 Ibid.
Chapter 5: Sustainability

Even the most powerful LDS will produce limited benefits if its owners cannot sustain it. Building a longitudinal data system requires not only substantial upfront investment, but also ongoing funding, maintenance, and management. The SWA or P-20W team must continue to add data over time and invest in developing products that evolve as stakeholders and stakeholder needs change. However, planning for sustainability does not begin after the system is built; it should be integrated at the beginning of the planning process. A shift in mindset may help the SWA internalize this continuous focus on sustainability. Rather than thinking of the work as a project, think of it as creating infrastructure. Working on a project implies a temporary task with a beginning and an end, often defined by a grant cycle. Developing infrastructure means creating something that has ongoing institutional support—something built to last.

Build the Foundation for Sustainability

How to turn an LDS from a temporary project into a necessary infrastructure that supports the work of the SWA and its partners? An LDS can by successfully institutionalized and sustained when three key components are in place:

1. Envisioned stakeholders value the LDS
2. Stakeholders trust that the LDS is secure
3. The LDS has become a keystone of data-driven governance in the state

Key 1: Envisioned Stakeholders Value the LDS

As discussed in chapter 4, a longitudinal data system holds little value unless it produces resources that are seen and used by the stakeholders of the system: researchers, workforce system administrators and staff, educators, policymakers, and the public. The first key to sustainability is creating useful products that are accessible by the target audience.

Stakeholders have different interests and needs, as well as different technical skills at interpreting data products. In order to guarantee ongoing engagement, the LDS team may consider creating multiple products with different stakeholders in mind. To do this, the team must first know its stakeholders' interests, questions, and needs. As discussed in chapter 2, there are multiple ways to do this. The team can identify the agenda or strategic plan of executive leaders in the SWA or elsewhere in the state; refer to the research agenda crafted by
a cross-agency team; or hold focus groups with potential users, such as the research community and line-level staff at LWIAs, community colleges, social services agencies, and other potential users of the data.

After the team has identified which data the stakeholders need, the team should identify the best method to communicate that data—and analysis—to the appropriate audience. For instance, researchers and staff supporting policymakers may want a highly detailed report. In contrast, a governor might not have the time to read a lengthy research paper, but would refer to a one-page policy brief or a scorecard showing snapshot information. Career counselors, parents, and students are likely to find the most use in an online data dashboard that shows relationships between different sources of data, such as the relationship between choice of major or school and eventual employment outcomes. Chapter 4 provides more information about the different types of data products that may be appropriate for different audiences.

However, even the best products will not be valued if no one knows about them. As discussed in chapter 4, an outreach strategy will encourage use of the data products, greatly increasing the likelihood that stakeholders will find them valuable. Outreach may include training and technical assistance for intended users to ensure that they can access the data, understand it, and use the data to make decisions. As with the products themselves, outreach approaches should vary according to the target audience. For example, conference presentations may be an appropriate means to reach researchers, while providing American Job Center career counselors with links or desktop widgets may be the best way to encourage use of data dashboards that show employment and wage outcomes for graduates of approved training providers.

SWAs may also consider branding the LDS so that users are aware of the system they are using. This encourages increased support of the system, as users connect the benefits of the data products to the data system itself and are more likely to seek out other products created by the SWA or P-20W team. Moreover, requesting that stakeholders who use the LDS to create their own products (e.g., policy briefs) cite the LDS further publicizes the system and encourages other users to access it.

**Tip:** Produce small-scale products quickly to demonstrate value.

SWAs do not need to wait to have fully developed, comprehensive data products such as scorecards before demonstrating value to users. They can start with smaller research projects that demonstrate the potential of the project, such as calculating the average earnings of a cohort of community college students.
Key 2: Stakeholders Trust that the LDS is Secure

As is discussed throughout the manual, data security is increasingly critical in the era of the Internet, when more data about individuals than has ever been available are collected and can be transported and downloaded by a myriad of devices, some of which can be purchased on street corners all over the world. Any perception that the data in the LDS is vulnerable could extinguish support from the public, policymakers, and partner agencies, and even create a backlash against the system. Under such conditions, the LDS team will struggle to find additional funding or partners willing to help share the cost. Chapter 3 touches on some of the technical aspects of maintaining data security in the system itself and chapter 4 discusses how to maintain data security when creating data products for dissemination.

Key 3: The LDS has Become a Keystone of Data-Driven Governance

The most effective way to ensure ongoing support of the LDS is to embed use of the system into the culture of the SWA, its partner agencies, and state-level executives. Once stakeholders rely on the system in making policy decisions, the means to support it are likely to follow. Integrating the LDS into the culture of stakeholder agencies can occur at multiple levels—from line staff to executive leadership. For example, if the staff of a state’s American Job Center network routinely check the performance of service providers using dashboards produced by the system, and managers know that they do, managers are likely to argue for the system's maintenance. Below, we further detail how LDS teams can engage executive-level leadership in order to integrate the LDS into agency culture at the SWA, partner agencies, and the state.

Aligning the goals of the LDS with executive leadership goals is an effective way to build high-level support and integrate the LDS into the culture of the SWA and other state agencies, because the system will rely on the support of executive leaders, such as the governor, workforce commissioners, and education and workforce legislative committees.

As chapter 1 describes, the SWA team has already taken stock of and understands the executive leadership's goals, strategic priorities, and policy questions, both short-term and long-term. A governor's strategic plan or SWA's five-year plan are good places to start, but staff members who support senior leaders can also provide valuable input around policy priorities. In fact, the SWA may consider recruiting these individuals to the LDS team or P-20W governance body. In addition to providing useful information regarding the priorities of executive leaders, executive

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46 The remainder of this section was developed using material originally developed by Keith Brown, contractor to the SLDS State Support Team, for the 2014 SLDS Best Practices Conference Sustainability-Leadership Session.
staff who “have the ear” of the leader can serve as valuable project champions. The team need not limit these efforts to the governor or the commissioner of the workforce agency. The LDS may be able to support the policy priorities of leaders in other agencies, such as education and social services, or of legislators or other elected officials. Staff supporting agency heads and legislators can help identify research questions and potential data products that would support the priorities of the leaders they support, creating broad-based support for the system.

With these three keys in place, the LDS team has the foundation of a sustainable system that is valued by stakeholders and is one cornerstone of a culture of data-driven governance. Of course, these keys alone will not guarantee sustainability if the team does not have a plan in place to fund the system after the grant is over. The following section provides an overview and some tips related to funding the ongoing use and maintenance of the system.

**Plan for Sustainability**

No one wants to invest resources to build a system that cannot be sustained. In order to plan for sustainability, the SWA should have a detailed understanding of the costs of maintaining the system. Chapter 1 provides suggestions for assessing the cost of building and maintaining the system.

With these costs in mind, the LDS team can begin cataloguing potential funding sources for system maintenance. While there are numerous ways to fund an LDS, there are five primary sources:

**Federal Funding:** Several states have received multiple rounds of WDQI and/or SLDS grants, allowing them to maintain and continue to develop their workforce LDS or P-20W systems. While continued WDQI or SLDS funding is not guaranteed and should not be the only planned source of sustainability funding, it can provide the means to further develop the system—and develop other sources of ongoing support for the system. With the federal government’s current focus on data use and accountability, other sources of federal funds may arise in the future.

**State Funding:** Legislatures may allocate resources from the state’s general fund to maintain the system. In addition, legislators may pass laws that contain provisions for ongoing funding of the LDS. Several states have passed legislation that provides funding to maintain their LDS, including Florida and Minnesota.

**Fee-for-Service:** SWAs can charge partner agencies, researchers, and other data users for access to the data or for the various data products that the system produces. For example, a state that produces data dashboards for community colleges can require an annual fee from
the colleges in return for the service, or a state can charge its social services agency for calculating performance measures for its programs.

**Partner Contributions:** Partners that contribute data and use the system can agree to share the cost of ongoing maintenance, either through direct funding or by providing in-kind resources such as hardware or staff time.

**Foundations:** A number of foundations are interested in promoting the use of integrated data to improve social outcomes, such as the Bill and Melinda Gates Foundation, the Joyce Foundation, and the Knight Foundation.

### Continuously Revisit the Sustainability Approach

Sustainability planning is an iterative process and should be revisited continuously throughout the life of the system. Sustainability planning cannot be put off until the last few months of a grant. Ongoing steps for continuous attention to sustaining the longitudinal data system, many of which we have discussed in previous sections of the manual, include:

- Investigating and updating lists of potential funding sources, beneficiaries, and partners
- Providing continuous training and technical assistance to data users, to maximize the use of the system and its products
- Soliciting feedback from program partners and data users to ensure that the LDS is essential to the workforce, education, and social services systems
- Implementing an evaluation strategy to assess the effectiveness of the data products in improving workforce programming and policy
- Identifying a mechanism for reviewing and responding to changes in the needs of leadership, staff, partners, and other stakeholders
- Producing occasional reports that summarize developments in the project and highlight ways in which the system has been useful, such as an annual report for the state Workforce Investment Board, the governor, or the legislature

The SWA or P-20W governing body can also create an ongoing sustainability working group or subcommittee. Such a body can facilitate many of these steps, such as soliciting feedback from program partners and evaluating the effectiveness of data products, and can encourage shared responsibility for sustainability of the project across partner agencies.