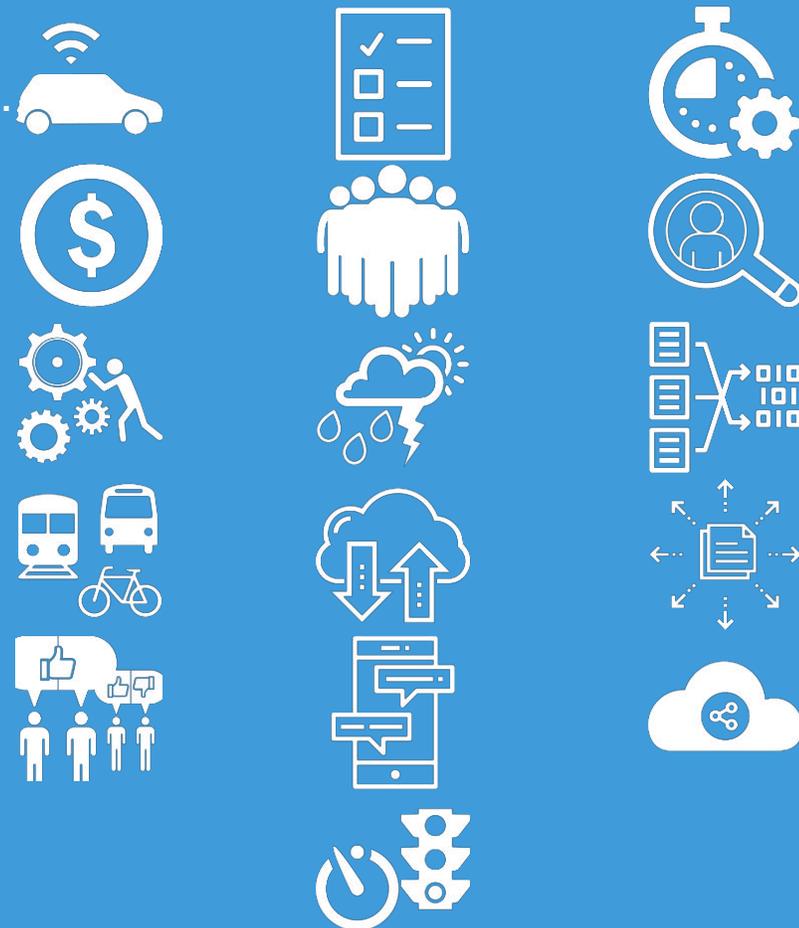


# Transportation Agency Capability Building Web-Based Guide Quick Reference

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A product of NCHRP Project 20-24(95)A —  
Ensuring Essential Capability for the  
Future Transportation Agency



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Spy Pond Partners, LLC

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## 1. Introduction

This memo provides instructions and a brief explanation of the Agency Capability Building Portal and digital guidebook for NCHRP 20-24(95). Access to the example digital content is provided via a link included in the next section. The draft guidebook is live.

This memo outlines and details the main features of the guide.

### 1.1 Accessing the Digital ACB Portal and Guidebook

There is now a full, live version of the digital portal and guidebook, populated with the revised content from the PDF version of the guide. This reference guide illustrates the content templates that are used for all the chapters and landing pages in the portal and demonstrates the user experience of navigating the portal in various ways.

You may access the ACB Portal by visiting this link: <https://www.agencycapability.com/>

The following sections of this document provide an overview of the elements of the portal and guide.

### 1.2 Background

National Cooperative Highway Research Program (NCHRP) Project 20-24(95)A is Phase 2 and 3 of a project on Ensuring Essential Capability for the Future Transportation Agency. The objectives of this project are to (1) describe emerging issues and societal and technological trends likely to influence the ability of DOTs and other government transportation agencies to develop and maintain the essential capabilities they need to fulfill their missions; (2) engage senior agency leadership and others in discussion of the leadership challenges these issues and trends represent; and (3) provide guidance on strategies agencies may pursue—for example through active management of their workforces and knowledge bases—to understand and meet these challenges.

The objective of this document is to provide a conceptual description of the web portal and digital guidebook. This website provides an interactive interface through which transportation professionals can browse, search, and read the contents of the guide and content related to topics within the guide. This document outlines the digital of the online platform, including the types of content it contains, how it is structured, and how users can interact with it.

### 1.3 Document Overview

This document is organized with the following sections:

- **Section 1 – Introduction** introduces this document and provides a link to the Portal.
- **Section 2 – ACB Portal Overview** presents the key functions and features of the ACB Portal, describes the development of the taxonomy to categorize the content on the website, and provides the overall navigation map for the website.
- **Section 3 – ACB Portal Templates** presents high level visual examples of the website interface and the relationship between its different pages.

## 2. ACB Portal Overview

The ACB Portal is designed to be a central repository for information and resources to support transportation agencies' organizational needs. Practitioners will have easy access to tools and products developed through NCHRP 20-24(95). Resources and tools will be added over time, strengthening the ability of the portal to meet the needs of transportation agencies.

The Portal is structured around five key functions, designed to satisfy the needs of a wide range of users and uses:

1. **Guided discovery.** Users browsing the Guidebook will be directed to relevant supporting resources related to the guidance. For example, Guidebook chapters (and sub-chapters) will contain a set of links to related content elsewhere in the Portal. Because these links will be programmatically populated, users will see updated sets of links as new content is added to the Portal.
2. **Directed search.** Users who would like to find relevant ACB resources will be able to employ either a text-based search or use a categorical search to 'drill-down' in an area of interest across publications, events, job postings, etc. The Agency Capability Framework, shown in Figure 1, provides a big picture view of the workforce, information, and technology trends and challenges DOTs face in developing and maintaining crucial capabilities. All portal content is organized and tagged based on this framework to enable cross-site directed search.
3. **Scenario-based exploration.** Users who are interested addressing a specific business challenge can choose to start with a query of existing scenarios. Users can then employ the search interface to add and subtract characteristics as desired to identify a one or more scenario of interest. By selecting a scenario, users will also be able to access relevant guidance and resources.
4. **Information push.** In addition to searching the site, users will be able to sign up for periodic updates on new information and resources. These updates take the form of emails with links to resources that have been recently added to the Portal.
5. **Sharing content and experience.** The platform will use simple form-based submission tools to make it easy for users to share content about their own work and experiences – which can assist others in similar positions at other organizations and agencies. Tools for submitting content to the Portal will be designed to support feedback loops where users will return to the portal to seek examples of noteworthy practices and insights on key challenges. Since the ACB Portal addresses areas where the state-of-the-practice may be expected to change rapidly, this feature will be valuable to practitioners who are producing work on a daily basis.

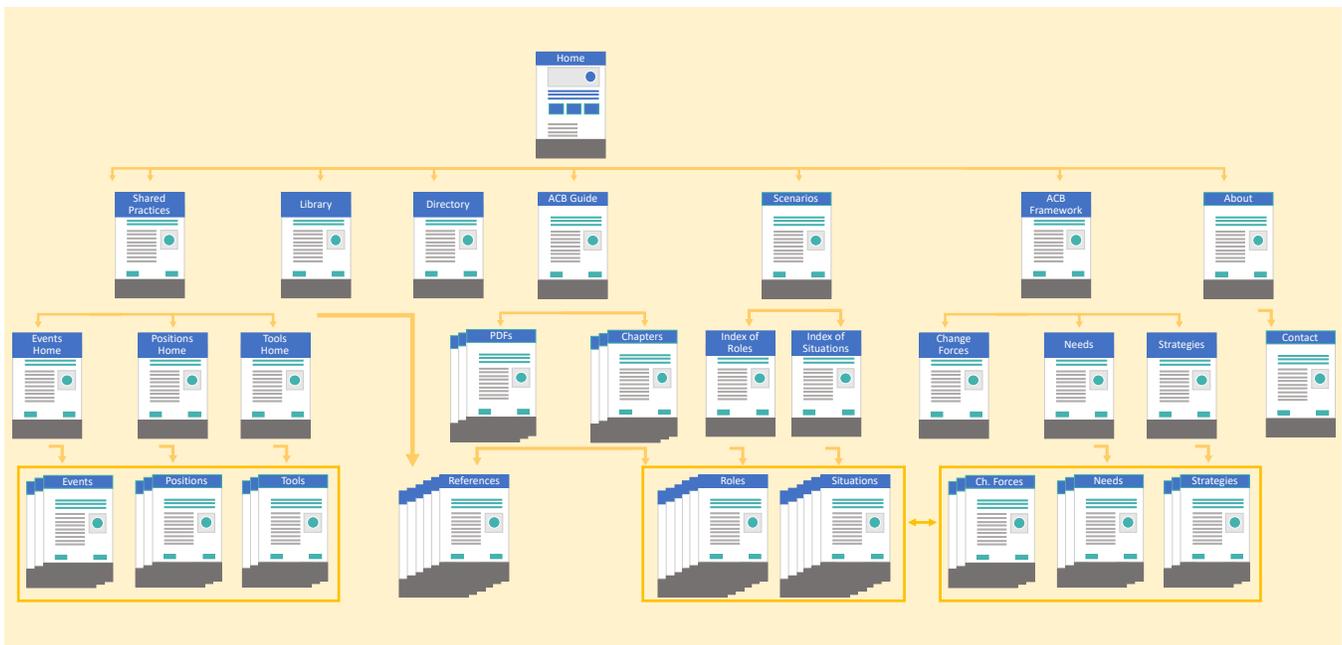
## 2.1 Agency Capability Framework



Figure 1. ACB Framework.

## 2.2 Navigation Map

This navigation map is a visual representation of the website’s hierarchy and provides a high level example of the features that will be available to users. Figure 2 shows the navigation map.



**Figure 1. Site Map**  
 (See following page for a larger site map image)

The Portal has seven main pages linked from the Home Page

**Shared Practices.** The online ACB resource base encompasses a set of related resources addressing current ACB practice. These resources include: Calendar of events, Example job descriptions, User-submittal tools for sharing new content

**Library.** A searchable index of agency publications and documents.

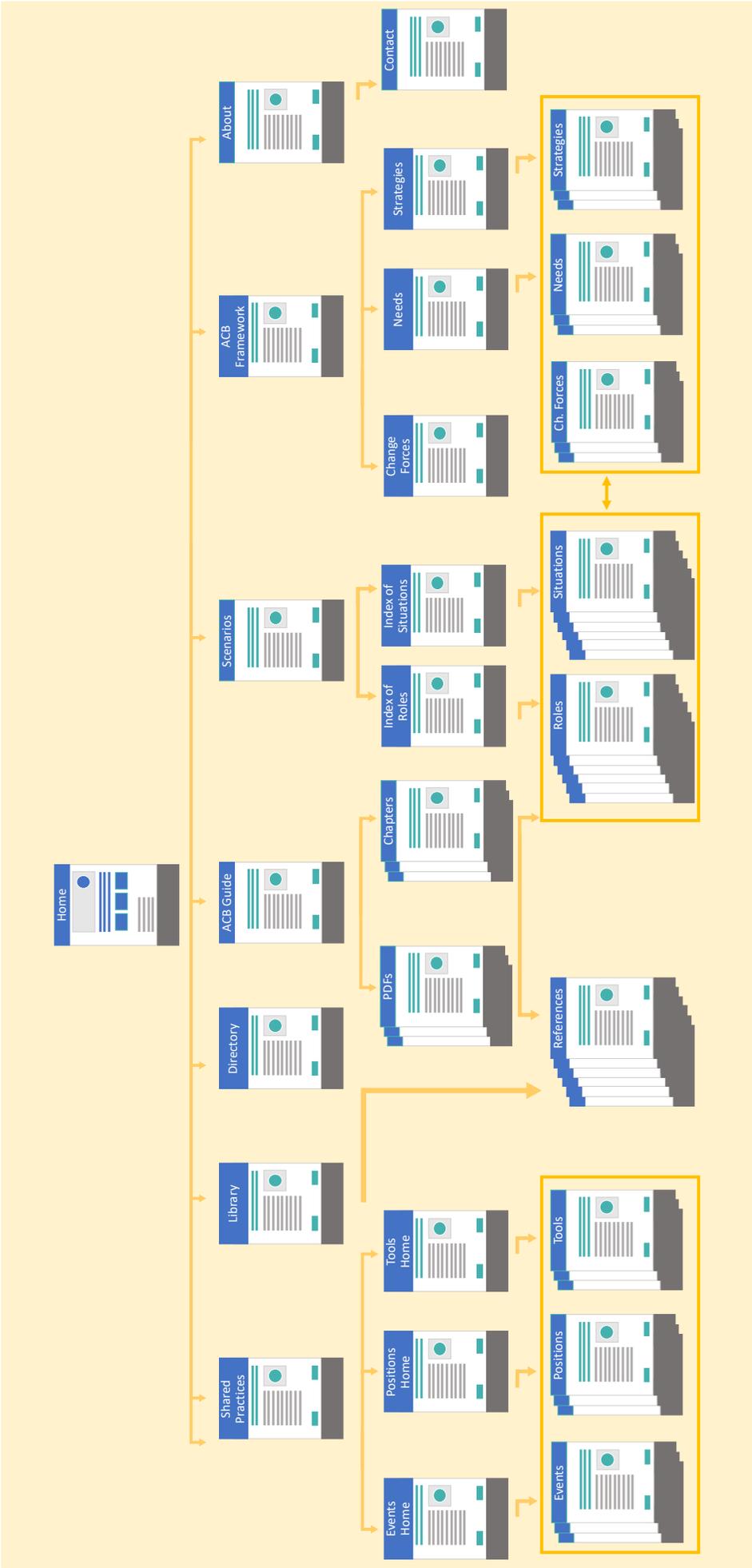
**Directory.** The directory will provide access to a list of transportation practitioners who can support a range of activities (e.g., sharing new recruiting approaches, assessing novel training materials).

**Guidebook.** The guidebook includes both a stand-alone online version of the full ACB Implementation Guidebook (the Guidebook) and modular excerpted content drawn from the Guidebook that is integrated with the ACB Scenarios.

**ACB Scenarios.** Use case scenarios drawn directly from actual DOT experiences are defined according to the specific change forces and needs encountered by agencies, as well as the strategies used to address them. By employing the common ACB Framework, these scenarios provide a means for users to engage with relevant Guidebook content and to identify related shared practices and other resources.

**ACB Framework.** The ACB Framework is defined by the Change Forces, Needs, and Strategies developed through Phase 1 and shown in Figure 1. The Framework functions as the basic core structure for categorizing Portal content: all resources in the resource base are categorized according to the framework to support direct querying via a web-based search interface. This approach allows references and/or links to shared practices and other resources to be integrated with the ACB Scenarios and the Guidebook (described below).

**About.** The About page of the website will contain basic information about the project and contact information for questions. User of the Digital Guide will also be able to submit resources, examples, or information on their experience with TAM in this portion of the website.



## NCHRP 20-24(95)A Web-Based Guidebook Quick Reference

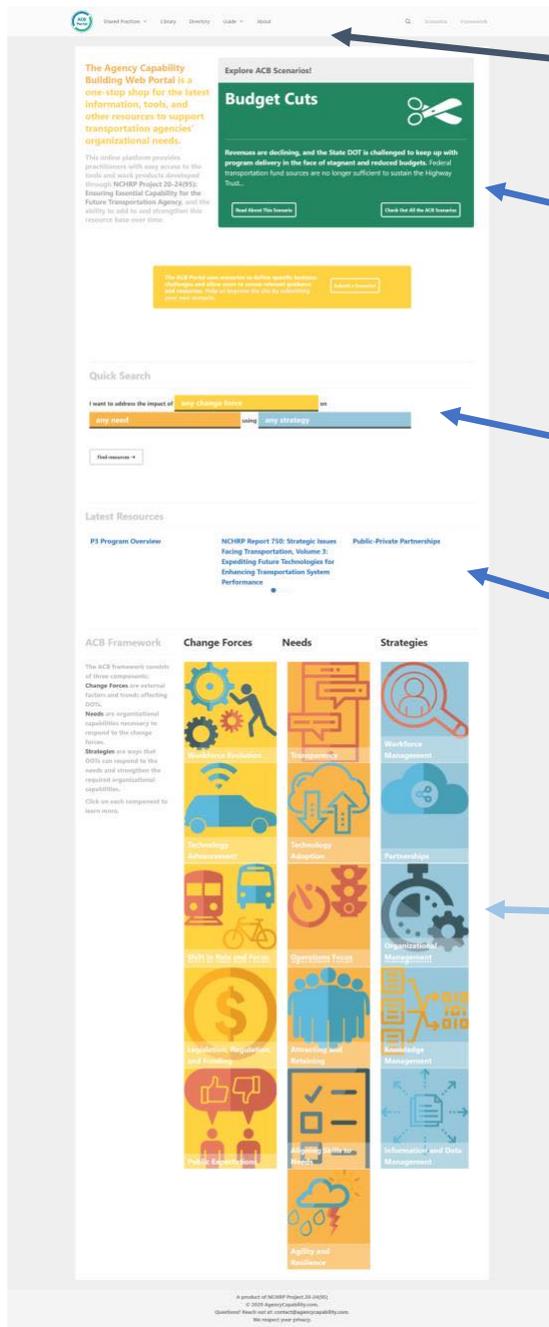
In order to organize the Digital Guide and make the content searchable for the user, the guide text and supporting content must be tagged and categorized according to a structured taxonomy. Content tagged according to the taxonomy includes:

- Guide content
- ACB Scenarios (roles and situations)
- Shared practices including events, example position descriptions,
- References and external resources

### **3. Web Portal Format and Content Templates**

The ACB Guide website will be constructed according to a set of page and content templates, which define the structure of the website pages and interface elements (e.g. menus, sidebars, search results). These templates serve as a blueprint that defines each web page's structure, content, and functionality. The following preliminary templates illustrate the features described above, show an example chapter layout, and demonstrate how the elements of the ACB Portal are related.

## Portal Landing Page



### Main Elements of the Homepage

**Main navigation.** Persistent top menu appears on every page to aid site navigation.

**Scenario slider.** Panel that introduces ACB related roles and situation.

**Resource search.** Search the ACB resource library according to the framework.

**Latest resources slider.** Displays the resources added most recently to the portal.

**ACB framework navigation.** Navigate to the landing pages for the framework elements.

Figure 1. ACB Portal Landing Page—Main Elements

## ACB Portal Framework Page



### Features of the Framework Page

**Organized Columns.** Each category of the framework is organized into a color-coded column, populated by panels corresponding to the framework components.

**Reversible panels.** Hovering over a component's panel gives summary information on the element, and link to a more detailed page.

Figure 2. ACB Framework Page

## Framework Component Sample

Each of the framework components has its own landing page—color-coded to match its parent element’s color scheme.



### Features of the Framework Component Page

Crosslink to the guidebook.

Associated tags and keywords.

Full description of the component.

Dynamic sidebar. Contains any roles, situations, or resources associated and tagged with the framework component. Each of the sidebar panels can be clicked on to expand or collapse its content..

Figure 3. Framework Component Page

## Role- and Situation-based Guidance

The scenarios page offers two different views based on the selected tab. By default, the Role-Based Guidance tab is selected. In this view, all of the roles from the ACB Guidebook are displayed. Each role panel can be clicked to navigate to the Role-specific page. By clicking on the Situation-Based Guidance tab, the page view changes to display the Situations from the ACB. Each panel is linked to the corresponding Situation page.

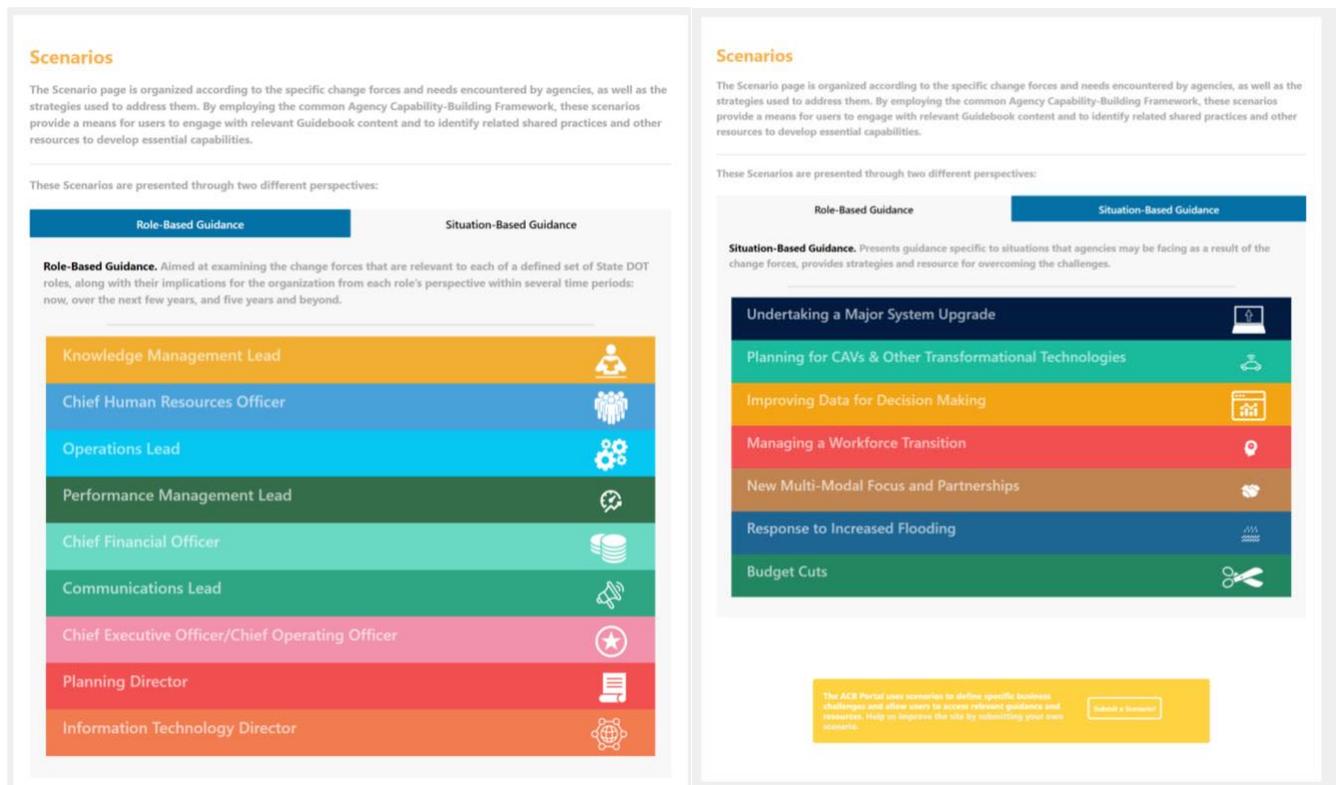


Figure 4. Scenario-based guidance landing

# Sample Role Page

The role pages are designed to imitate their respective ACB Guidebook print version pages. ACB framework components on this page are linked so that users can navigate from this page to each component's page. Users can also click on resources or the resource external links to learn more about the featured resource.

Role

## Performance Management Lead

## Features of the Role Page

### Defined

The Performance Management Lead is responsible for collecting, measuring, reporting and recommending action related performance information within the agency.

### Challenges and Opportunities

In your role, what are the most critical challenges and opportunities? Looking across the agency, what capabilities are required to successfully take them on? How can you help build capabilities to address the challenges and opportunities based on their criticality and complexity in terms of the major change forces that are driving them.

**Definition.** A brief definition of the role.

Change Forces	Challenge/Opportunity	Your Responsibility
<b>Technology Advancement</b> New technology impacts the tools, methods and strategies available to use data to maximize business outcomes. Connected and autonomous vehicles may generate new data for understanding system performance.		<b>Technology Adoption.</b> Help the agency leverage business intelligence to improve data-informed decision-making and use performance-based approaches to maximize investments. Anticipate future availability of new data sources for performance measurement.
<b>Shift in Role and Focus</b> The agency's approach to performance measurement needs to consider people movement across all modes, including passenger and commercial vehicles, bus and light rail, and bicycle and pedestrian travel.		<b>Operations Focus.</b> Advance performance measures that are multimodal and operational in nature.
<b>Legislation, Regulation, and Funding</b> Responding to new legislative requirements may require new performance measures, modified performance reporting processes, and demonstration that the agency is working to achieve its targets.		<b>Agility and Resilience.</b> Equip the agency to respond quickly to new legislative requirements.
<b>Public Expectations</b> Increased expectations for transparency and accountability to the public, commercial travelers, elected officials, local units of government and the media create the need for effective communication of performance information.		<b>Transparency.</b> Advance efforts to communicate agency performance to agency stakeholders and the general public.

**Change Forces.** A table detailing the change forces that can be addressed by this role, and how this role works to address them

### Strategies and Resources

What strategies can you apply now to meet today's challenges and prepare for future opportunities? What resources are available to help support these efforts?

#### Where to Begin

- Monitor federal requirements and integrate them with business processes and practices
- Track new data sources and assess how they might be used to strengthen performance management
- Incorporate scenario-building and forecasting to respond to legislative requirements related to performance-based planning and programming
- Establish a mechanism for continuous performance and process improvement
- Monitor and measure results to improve linkages between performance targets and investment outcomes
- Assess current data visualization and determine better ways to communicate that will support transparency and accountability

#### Strategies

**Organizational Management**

- Performance Management - to ensure the agency is able to measure and achieve outcomes that make progress toward its evolving goals and objectives
- Lean and other process improvements to close the loop between targets and results to respond to legislative requirements

**Information and Data Management**

- Information Technologies - to capture, analyze and visualize performance information.

**Knowledge Management**

- Learning Organization - to align staff activities with agency goals, create a performance system feedback loop and create a culture of transparency and accountability for results

#### Resources

- TRB NCHRP Web-Only Document 226, "Data Visualization Methods for Transportation Agencies" <http://www.trb.org/NCHRP/Blurbs/175902.aspx>
- AASHTO Committee on Performance Based Management information on TPM Portal <https://www.tpm-portal.com/community/cpbm/>
- FHWA TPM website <https://www.fhwa.dot.gov/tpm/>
- TRB 03-128 (active) This report will address the impacts of federal funding uncertainty and strategies to mitigate its impact on the transportation system <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4352>
- AASHTO TPM Portal Online resource for TPM practitioners that includes noteworthy practices among state DOTs and a link to the Transportation Lean Forum for accessing process improvement resources. <https://www.tpm-portal.com>
- Transportation LEAN Forum on TPM Portal To help promote Lean business management and provide support to each other, several transportation agencies have formed the "Forum for Lean Process Improvement in Governmental Highways/Transportation organizations," also referred to as the Transportation Lean Forum (TLF). The TLF Toolkit collects resources, links, and targeted background information <https://www.tpm-portal.com/community/tlf-home/>
- AASHTO Benchmarking Tool on TPM Portal Tool to facilitate continuous benchmarking among state DOTs. Practitioners can compare performance across a number of measures and connect with others in the field <http://benchmarking.tpm-portal.com>
- AMPO Performance Measurement <http://www.ampo.org/resources-publications/best-practices/performance-measurements/2>

**Strategies and Resources.** A view of helpful strategies and resources designed to aid people in this role.

Figure 5. Sample Role-based guidance

## Sample Situation Page

The situation pages are also designed to imitate their respective print version pages. Like the role page, any ACB framework component or resource associated with the situation is shown on the page and is hyperlinked. Users can click on any of the highlighted links to learn more.



### Features of the Situation Page

#### Context

The state DOT is faced with more frequent flooding events. Environmental emergencies like flooding pose a threat to the public, DOT staff and transportation infrastructure and may result in detours, congestion and closures. They have economic impacts and are difficult to address programmatically because they occur without much warning, although some locations are starting to experience recurring flooding events. In addition, they require coordination among multiple organizations and agencies.

**Context.** A brief definition of the situation.

#### Change Forces

**Shift in Role and Focus.** The changing DOT role creates a shared responsibility for emergency response with multiple other entities playing a first responder role, and the DOT involved as a part of the emergency response team before, during and after emergencies occur. This requires integrated flood warning and response systems among response partners.

**Public Expectations.** The public generally has little understanding of steps needed to prepare for an emergency, but an expectation for a seamless public infrastructure. They need to get event warnings for transportation and non-transportation issues via a coordinated and multi-faceted approach that includes sensors, media alerts, websites, and closure of at-risk or compromised facilities.

**Technology Advancement.** Technology for flood monitoring has been implemented to provide advanced warning capabilities, extending the amount of time for mounting a response effort.

#### What Capabilities Are Needed?

**Transparency.** The agency needs to communicate with the public and other stakeholders to provide warnings, directives and to coordinate on response efforts.

**Agility and Resilience.** An organizational capability for agility and resilience is needed to adjust for emerging issues before, during and after the event and for adjusting construction approaches to improve future resilience.

**Technology Adoption.** The agency can use Unmanned Aerial Vehicles for flood assessment, and implement information systems and tools for predictive modeling, risk assessment, integration with inventories of critical assets, facilitation of active flood response, and support for post-disaster recovery and reimbursement activities.

**Partnerships.** In times of emergency, the public relies on multi-agency teams to restore their access to infrastructure networks for communications and transportation. Emergency response depends on coordination among federal agencies (for flooding, this includes the National Weather Service, US Geological Survey, the Army Corps of Engineers, NOAA and FEMA), climate and research organizations and other public sector stakeholders (such as the State Emergency Management Offices, local units of government, law enforcement agencies and the State DOT).

**Change Forces and Capabilities.** The change forces that can be addressed in this situation

**What to do.** A view of helpful strategies and resources designed to help address this situation.

#### What can you do about it?

**Organizational Management**

- Strategic Planning – to establish clear and comprehensive direction among multiple response agencies for oversight, operational support and funding mechanisms
- Change Management – to coordinate, resource and sequence the implementation of the emergency response
- Process Improvement – to improve processes and methods and create improved infrastructure resilience in anticipation of future events

**Knowledge Management**

- Knowledge Capture and Transfer – to improve communication among response agencies and with the public

**Information and Data Management**

- IT and Data Governance – to establish roles and responsibilities, structures and processes for IT integration and support for emergency response among multiple agencies
- IT Systems – to support incident operations and management activities

**Partnerships**

- Interagency agreements – to coordinate and collaborate across jurisdictions and organizations and to document responsibilities and acceptable levels of effort

#### What resources will help?

- NCHRP Synthesis 20-05/Topic 51-10 (Active Synthesis)**  
<https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4723>
- TRB Webinar, "Road Weather and Flood Monitoring with the National Water Model"**  
<http://www.trb.org/Main/Blurbs/178840.aspx>
- NCHRP Project 20-59(53) Floodcast Resource Page**  
<http://floodcast.info/wordpress/>
- RISE – 2018 Transportation Resilience Innovations Summit and Exchange**  
[http://onlinepubs.trb.org/onlinepubs/conferences/2018/RISE/2018\\_RISE\\_Presentations\\_Addendum\\_v02.pdf](http://onlinepubs.trb.org/onlinepubs/conferences/2018/RISE/2018_RISE_Presentations_Addendum_v02.pdf)
- Government Accountability Office (GAO) Disaster Assistance** Part of the 2019 GAO high risk list of issues.  
[https://www.gao.gov/key\\_issues/disaster\\_assistance](https://www.gao.gov/key_issues/disaster_assistance)
- DOT Emergency Preparedness, Response and Recovery Information** USDOT site established to publish electronic information of use during emergencies.  
<https://www.transportation.gov/emergency>
- FHWA Emergency Transportation Operations (ETO) Site** aimed at ETO for disasters, traffic planning for special events, and traffic incident management.  
[https://ops.fhwa.dot.gov/eto\\_tim\\_pse/index.htm](https://ops.fhwa.dot.gov/eto_tim_pse/index.htm)
- NCHRP Report 525: A Guide to Emergency Management at State Transportation Agencies, Second Edition** Report aimed at helping executives and emergency response personnel assess and identify gaps in their emergency response plans.  
<https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4071>
- AASHTO Special Committee on Transportation Security and Emergency Management (SCOTSEM)** Site includes five "fundamentals" reports intended to provide comprehensive all-hazards guidance for security and emergency management  
<https://security.transportation.org/about/scotsem-fundamentals/>

Figure 6. Sample Situation-based guidance

## Shared Practices Landing Page

This landing page collects events, job descriptions, and tool to help practitioners build capability within their organization.

The screenshot shows the Shared Practices landing page with three main sections: 'Connect and Learn at Upcoming Events', 'Build Better Job Descriptions', and 'Discover Tools for Practitioners'. Annotations with arrows point to specific content:

- Event view.** Displays upcoming events of interest. (Points to the 'Upcoming Events' section)
- Job description view.** Displays latest job descriptions added to the library. (Points to the 'Recently Posted Examples' section)
- Tools view.** Shows relevant tools and portals. (Points to the 'Discover Tools for Practitioners' section)

The 'Upcoming Events' section lists:

- 27 FEB: TRB WEBINAR: DAMAGE DUE TO EMERGENCY EVENTS
- 11 MAR: TRB WEBINAR: RIGHT-SIZING TRANSPORTATION INVESTMENTS
- 02-05 AUG: 59TH ANNUAL WORKSHOP ON TRANSPORTATION LAW

The 'Recently Posted Examples' section lists:

- Organizational Performance Analysts and Specialists
- Chief Data/Knowledge Management Officer
- IT Budget Analyst (VDOT's Information Technology IT)

The 'Discover Tools for Practitioners' section shows a 'Coming Soon!' button.

Figure 7. Shared Practices Landing Page

## Events Landing Page

This page displays upcoming events relative to an organization interested in capability building. Event details can be obtained by clicking on the title of the event.

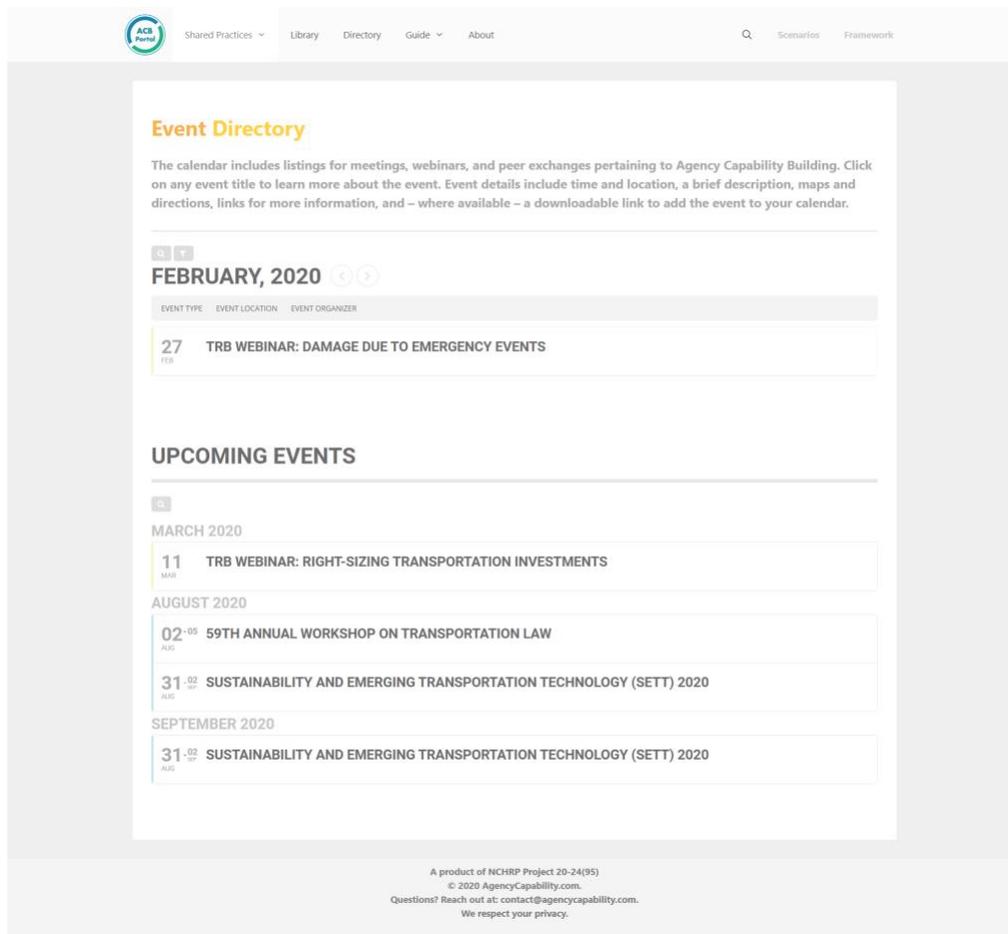
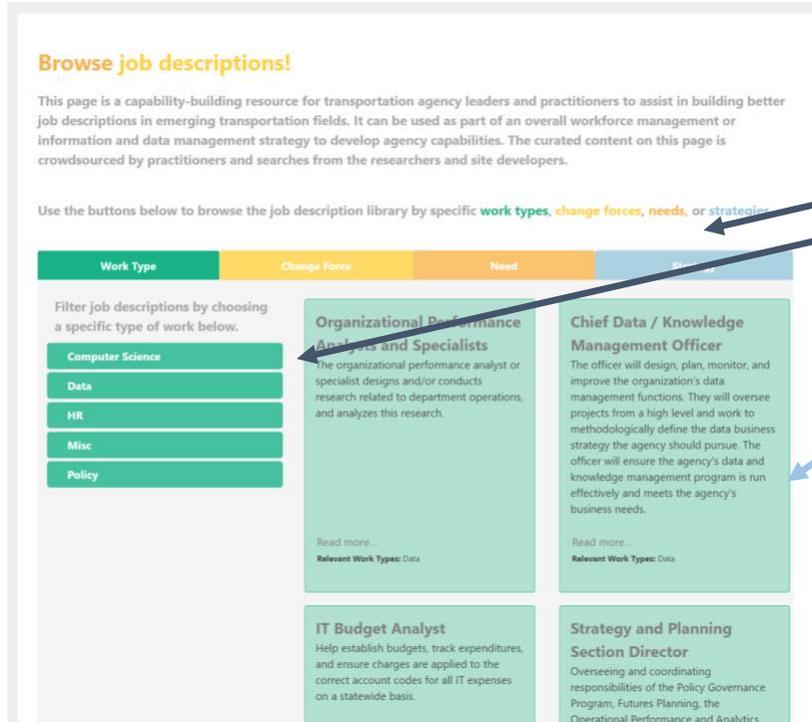


Figure 8. Events Directory Landing Page

## Job Description Library

This page features a library of job descriptions for organizations looking to build better job descriptions in emerging fields.



### Features of the Job Description Page

**Navigation.** Filter jobs by relevant work type, change force, need, or strategy.

**Results view.** A brief view of each job description meeting the results of the selected filters. These can be clicked to view more detail.

Figure 9. Browsing job descriptions by work type

## Job Summary

## Section Page Elements

The screenshot shows a job description page for a 'Chief Data / Knowledge Management Officer'. The page includes a 'Data' section with a brief summary, typical responsibilities, and typical qualifications. A right-hand sidebar lists 'Change Force(s)', 'Need(s)', and 'Strategy/Strategies'. At the bottom, there are expandable buttons for 'Chief Data Officer' and 'Chief Data Governance & Knowledge Management Officer'. Annotations with arrows point to these elements, explaining their purpose.

**Job Title and Work Type.** Points to the job title 'Chief Data / Knowledge Management Officer'.

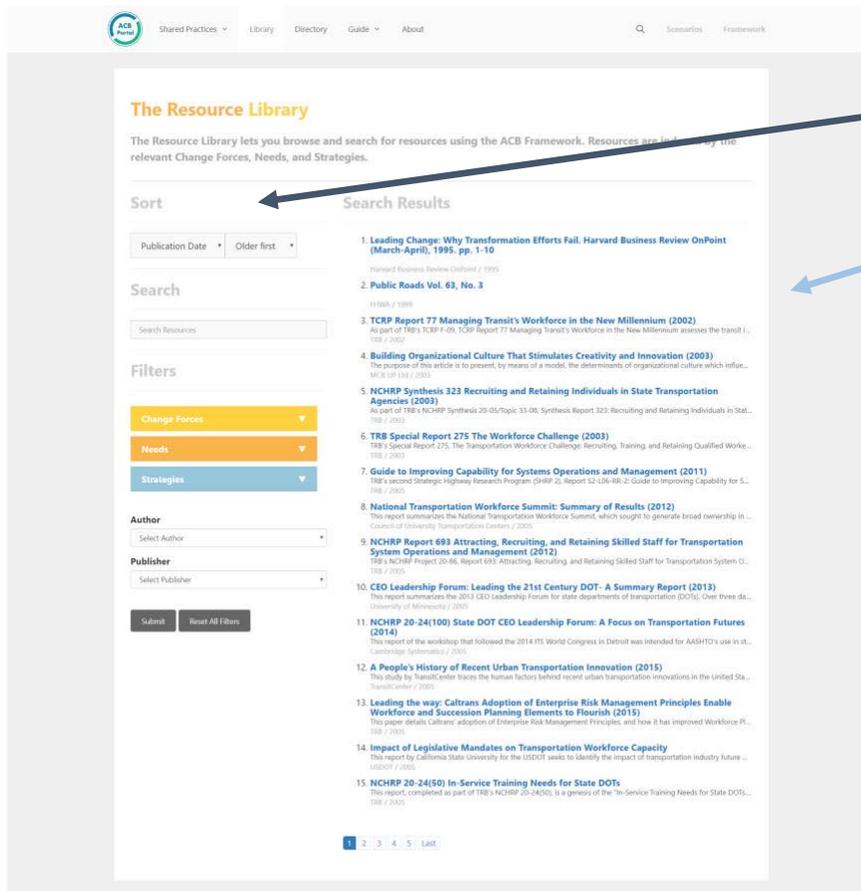
**Job Details.** Brief summary, responsibilities, and qualifications for the position. Points to the 'Data' section.

**Relevant tags.** Shows the framework components relevant to this position. Points to the 'Change Force(s)', 'Need(s)', and 'Strategy/Strategies' sidebar.

**Expandable sample job descriptions.** Clicking the bottom grey buttons will move you between consecutive section pages. Points to the expandable buttons at the bottom.

Figure 10. Job description summary page

## Resource Library



## Resource Library Elements

**Sort and Filter.** Filter results in the library according to the framework, or the author or publisher of the resource.

**Results.** A list of resources matching the criteria of the filter/search controls.

Figure 11. Resource library page

## Practitioner Directory

Expand the checklist/how-to guide tab and click on the desired checklist or how-to guide title.

**The Practitioner Directory**

The Practitioner Directory developed through NCHRP Project 20-24(95): Ensuring Essential Capability for the Future Transportation Agency provides access to a voluntary list of transportation professionals who are willing to support the transportation community by sharing their expertise related to their experiences with various strategies for capability-building. Please contact [contact@agencycapability.com](mailto:contact@agencycapability.com) with any updates to the existing directory entries or new requests to include your information in the directory.

Search by name:

Filters:

- Company/Agency
- State
- Country
- Area of Expertise
- Other Areas of Expertise

Search  Clear

Want to join the practitioner directory? [Register here.](#)

Forgot your private link? [Click here to have it emailed to you.](#)

FIRST	COMPANY/AGENCY	EMAIL	PHONE	
Brad	Allen Applied Pavement Technology, Inc.	<a href="mailto:brallen@appliedpavement.com">brallen@appliedpavement.com</a>	518-282-2111	<a href="#">More Info</a>
Clinton	Berch UCLA Transportation	<a href="mailto:cberch@ucla.edu">cberch@ucla.edu</a>	310-825-8374	<a href="#">More Info</a>
Dave	Begner Monte Vista Associates, LLC	<a href="mailto:dbegner@gmail.com">dbegner@gmail.com</a>	480-699-4543	<a href="#">More Info</a>
Russ	Buchholz NDDOT	<a href="mailto:rbuchholz@nd.gov">rbuchholz@nd.gov</a>	701-328-2561	<a href="#">More Info</a>
Catherine	Cagle City of Waltham Massachusetts	<a href="mailto:catherine.cagle@mac.com">catherine.cagle@mac.com</a>		<a href="#">More Info</a>
Yvonne	Carney WSCC Water	<a href="mailto:yvonne.carney@wascouter.com">yvonne.carney@wascouter.com</a>	301-206-8966	<a href="#">More Info</a>
Pamela	Cotter Rhode Island Department of Transportation	<a href="mailto:pamela.cotter@dot.ri.gov">pamela.cotter@dot.ri.gov</a>	401-563-4004	<a href="#">More Info</a>
Patrick	Covley State of Utah / Department of Transportation	<a href="mailto:patrickcovley@utah.gov">patrickcovley@utah.gov</a>	801-648-5459	<a href="#">More Info</a>
Rui	Dinis Metro de Lisboa	<a href="mailto:raulm.dinis@gmail.com">raulm.dinis@gmail.com</a>	351-966-930-212	<a href="#">More Info</a>
Cecilia	Galvan Texas A&M University Galveston	<a href="mailto:ceciliagalvan@gmail.com">ceciliagalvan@gmail.com</a>		<a href="#">More Info</a>
Robert	Ginsburg Center on Work and Community Development	<a href="mailto:rginsburg@cwcd.org">rginsburg@cwcd.org</a>	773-505-1004	<a href="#">More Info</a>
Steve	Guenther Caltrans	<a href="mailto:steve.guenther@dot.ca.gov">steve.guenther@dot.ca.gov</a>	916-654-6076	<a href="#">More Info</a>
Tamara	Haas New Mexico Department of Transportation	<a href="mailto:tamara.haas@state.nm.us">tamara.haas@state.nm.us</a>	505-795-2126	<a href="#">More Info</a>
Patricia	Hendren I-95 Corridor Coalition	<a href="mailto:phendren@i95coalition.org">phendren@i95coalition.org</a>		<a href="#">More Info</a>
Tom	Huddeman KPMG LLP	<a href="mailto:thuddeman@kpmg.com">thuddeman@kpmg.com</a>	512-320-5115	<a href="#">More Info</a>

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We respect your privacy.

### Practitioner Directory Elements

**Sort and Filter.** Filter results in the directory according to information about the practitioners.

**Results.** A list of practitioners matching the criteria of the filter/search controls.

Figure 12. Practitioner directory page

## About Page

This is an informational page giving some key background to NCHRP 20-24(95) and the topics included in the portal and the guidance.

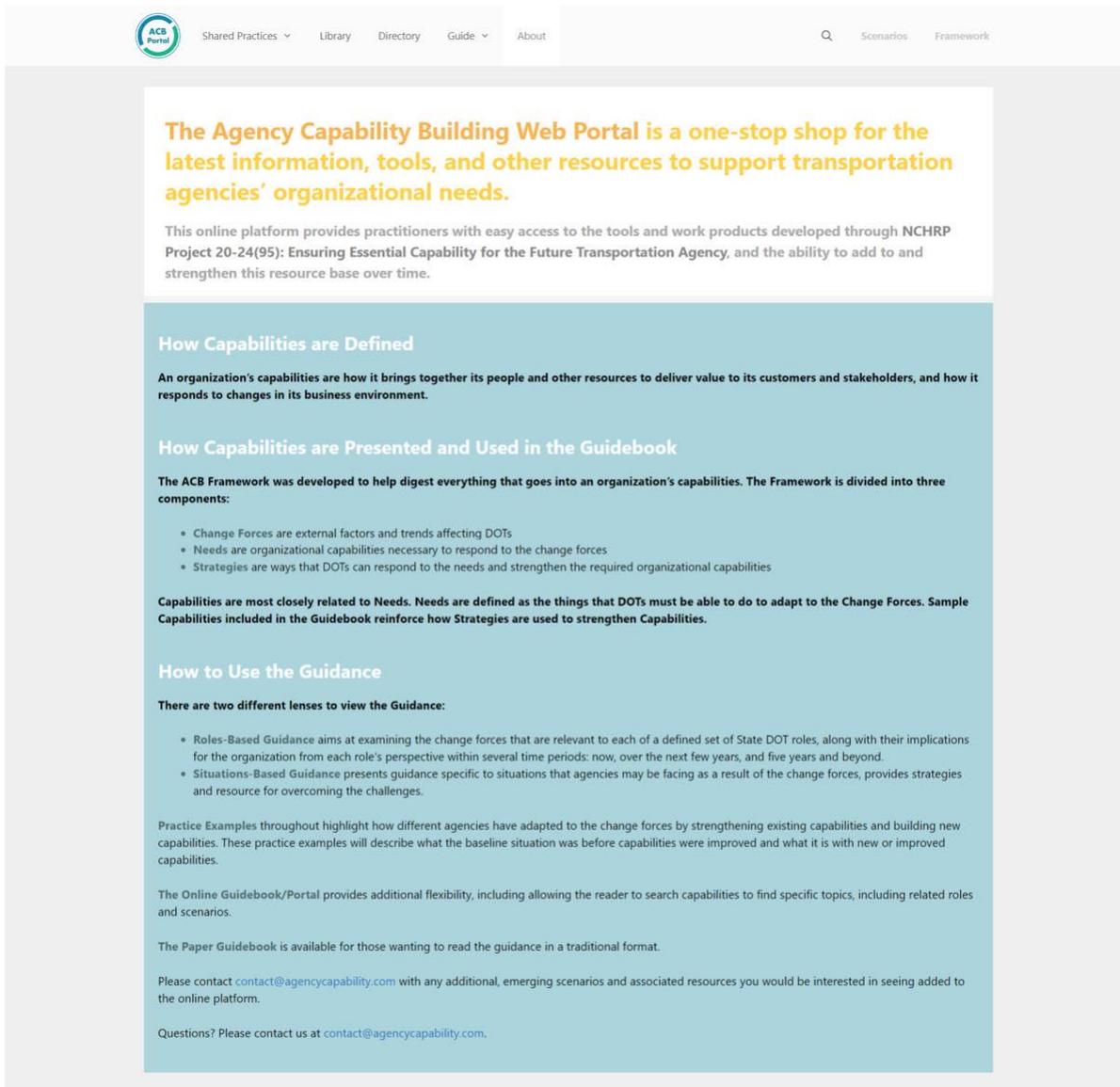
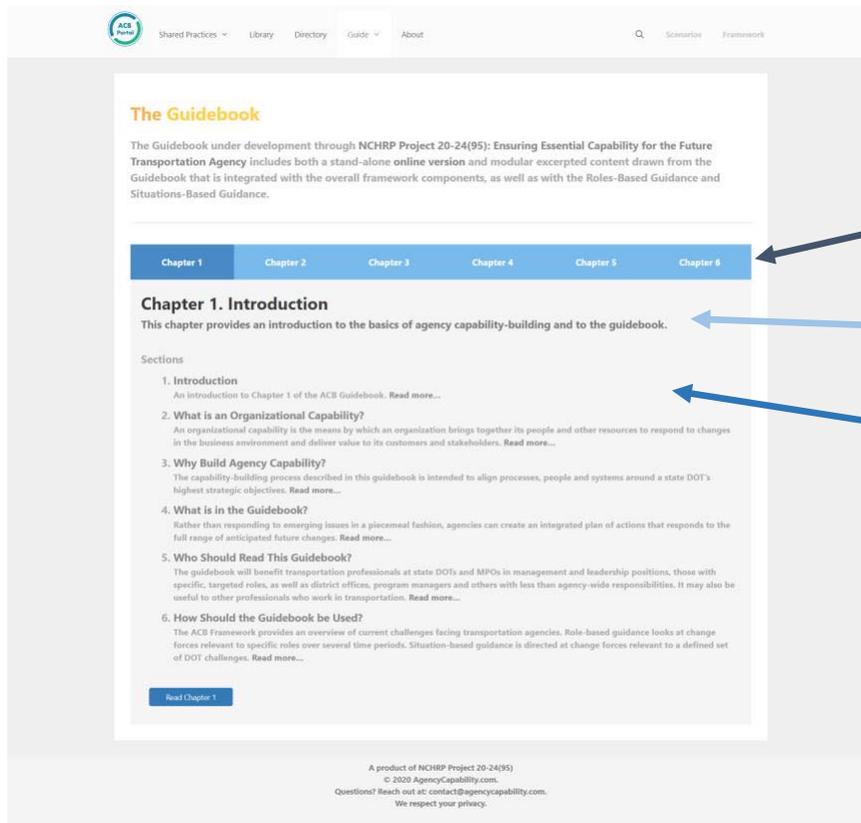


Figure 13. About page

## Guidebook Landing Page

This page serves as the entryway to the content in the print guide. The simple interface allows users to quickly navigate to guidebook content of interest.



## Guidebook Page Elements

**Chapter tabs.** Swap between chapters by clicking a tab.

**Brief description.**

**Chapter sections.** A list of links to the chapter's sections along with a description of each section.

Figure 14. How-To Guide Page Features

# Sample Chapter Page

A single chapter page linearly displays all the content from the print guide, including images, tables, and other features. A simple menu will help quickly navigate the chapter's contents.

## 6. Developing an Agency Capability-Building Action Plan

This chapter provides a step-by-step guide to developing an action plan to build capabilities in response to change forces, needs, and strategies.

**Guidebook Chapter Elements**

### Action Planning Introduction

Action planning is a six-step process consisting:

1. Establishing a clear focus for the capability building effort.
2. Building a vision for achieving the end goal.
3. Researching and finalizing the strategies that will guide the agency's actions.
4. Determining a prioritized set and sequence of actions that will achieve the vision and use the strategies.
5. Building a team that will carry out the plan and finally.
6. Monitoring and adjusting the approach as needed to achieve the goal and create a baseline for future action plans.

This action planning process can be simplified, expanded or adapted to meet an agency's needs and fit within existing processes—the guidance provided in this chapter is intended as a starting point.

### All Sections

- 6.1 Action Planning Introduction
- 6.2 Step 1: Determine Scope
- 6.3 Step 2: Build a Vision
- 6.4 Step 3: Select/Develop Strategies
- 6.5 Step 4: Create Actions
- 6.6 Step 5: Build a Team
- 6.7 Step 6: Monitor and Adjust
- 1 Back to top

Step 1	Determine Scope
Step 2	Build a Vision
Step 3	Select/Develop Strategies
Step 4	Create Actions
Step 5	Build a Team
Step 6	Monitor and Adjust

**Chapter title and description**

**Sticky sidebar navigation.** These links lead to section-level anchors on the page, allowing for fast navigation of the chapter

### Step 1: Determine Scope

Initiate action planning for capability building by determining the scope of the effort, establishing a focus, determining why additional capabilities are needed and how much to take on at once.

**Use the ACB Framework to Determine Scope**

Action planning should start with a determination by senior leadership of desired needs for capability building. It is important to know at this step what is driving the need for change. It may be that a specific, derivative change force is resulting in a capability gap that is driving the effort.

- Technology Advancement
- Legislation, Regulation & Funding
- Workforce Shortage

**Chapter text.** The text from the print chapter is reproduced in full here.

-----Content omitted for brevity-----

the table below:

Considerations	Incremental	Transformational
<b>Scope</b>	Local scope – isolated to one or just a few business areas	Agency-wide
<b>Scale</b>	Will not require major changes to structure or systems	Will significantly change the agency culture, strategy and systems
<b>Resources needed</b>	Low – small implementation team made up of in-house experts	High – structure for large team needed across multiple business areas
<b>Outreach required</b>	limited	Extensive – to high engagement level, including strong leadership support
<b>Time Frame</b>	Short term but iterative	Mid- to long term
<b>Other benefits</b>	Provides a quick win or a transition to future changes	Drives culture change based on agency needs changes to strategy

There are times when it is most appropriate to use an incremental approach such as when there is a high risk associated with making substantive structural or strategic changes across the organization. For example, a DOT conducting the safety-related research and development of a new vehicle safety system. Transformational changes that to introduce innovative devices and tools will be those that require substantial investments in disruptive technology. On the other hand, they may benefit from establishing a task force or small unit focused on generating capabilities to innovate and drive efficiency within the agency.

An incremental approach can often be achieved with a small pool of staff and financial resources, and can build the foundation for additional iterative improvements that build over time as necessary to major transformations over time.

When the capability building effort is critical across the agency and there is low risk of making a systemic change, a transformational approach may be needed. For example, a state DOT faced with a critical safety system requiring employees' personal data may undertake an agency-wide data management initiative to assess and mitigate system change and data loss, and build up capability to secure data in the future. This approach requires mobilization of a significant number of staff and considerable agency-wide business areas. Furthermore, it cannot be achieved without active project management and leadership support. These topics are discussed in more detail in Step 3 of this chapter.

**Chapter table, checklists, etc.** Featured elements of the chapters are reproduced digitally as well.

See the attached Scoping Template for a guide on consulting this step.

#### Step 1 Checklist

Use the ACB Framework to determine scope.
 

- Do we understand what a change forces matter most?
- Do we know which we focus?
- Which strategies are likely to support our selected needs and the capabilities that need to be built?

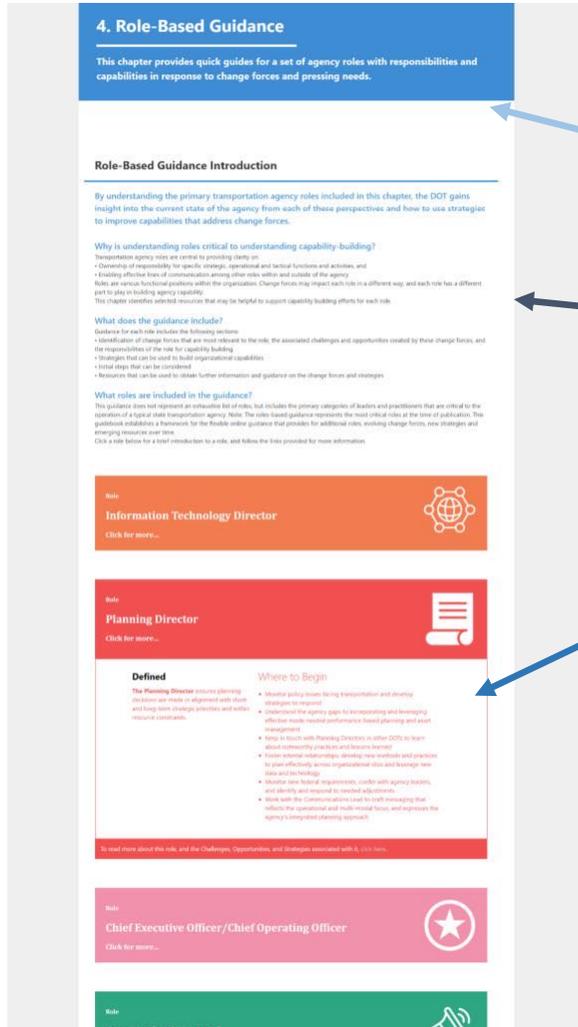
Determine incremental or transformational approach
 

- Is our scope local or agency-wide?
- Do we have the critical resources or data to make operational changes?
- Do we have a high level of leadership support?
- Generally, how much outreach will be needed based on the scope and scale?
- Do we have a general sense of the timeline that will be needed?
- How are we confident about other benefits of our selected approach?

Complete Step 1 – Determine Scope

## Sample Scenario Chapter

Chapters 4 and 5 in the print guide present the Roles and Situations detailed on the Scenario page of the portal. Those chapter are formatted in the digital guide to point users to the views provided on the Scenario page.



### Guidebook Chapter Elements

Chapter title and description

Chapter introduction.

Scenario panels. These panels can be expanded to display a brief description of the relevant scenario. Links are provided to the full scenario view.



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# NCHRP 20-24(95)A

# Ensuring Essential Capability

# for the Future Transportation Agency

# Research Products Overview

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The information contained in this presentation was prepared as part of NCHRP Project 20-24(95)A, National Cooperative Highway Research Program.

**SPECIAL NOTE:** This presentation **IS NOT** an official publication of the National Cooperative Highway Research Program, the Transportation Research Board, or the National Academies of Sciences, Engineering, and Medicine.

## **Acknowledgments**

This study was requested by the American Association of State Highway and Transportation Officials (AASHTO), and conducted as part of National Cooperative Highway Research Program (NCHRP) Project 20-24. NCHRP is supported by annual voluntary contributions from the state departments of transportation (DOTs). NCHRP Project 20-24 provides funds for research studies intended to address specific needs of chief executive officers (CEOs) and other top managers of DOTs. The work was guided by an NCHRP project panel. The project was managed by Dr. Andrew Lemer, NCHRP Senior Program Officer.

## **Disclaimer**

The opinions and conclusions expressed or implied in this report are those of the research agency and are not necessarily those of the Transportation Research Board, the National Research Council, or the program sponsors. This document has not been reviewed or accepted by the Transportation Research Board Executive Committee or the National Academies of Sciences, Engineering, and Medicine; and has not been edited by the Transportation Research Board.

# Presentation Overview

- **Project Objectives and Definitions**
- **Introduction to Agency Capability Building (ACB) Guidebook-  
Print**
- **Introduction to ACB Portal**
- **ACB Portal Management**

# Project Objectives

- **The world around us is changing**
  - Technology advancements
  - Political landscape
  - Funding instability
  - Workforce behavior
- **Organizations need to adapt and prepare for a new reality.**
- **This research project is helping to define the changes transportation agencies face, determine the implications of these changes, and provide guidance on what they can do to **increase agency capabilities** to prepare for the future.**

# Capabilities Definition

*Capabilities are the ways people and resources are brought together to accomplish work.*

- **Organizational capabilities have to do with something an organization is able to do to deliver value**
- **Capabilities are delivered via skills, resources and methods**
- **Some capabilities are related to organizational functions but the emphasis is on ability to deliver, not products and service definitions**

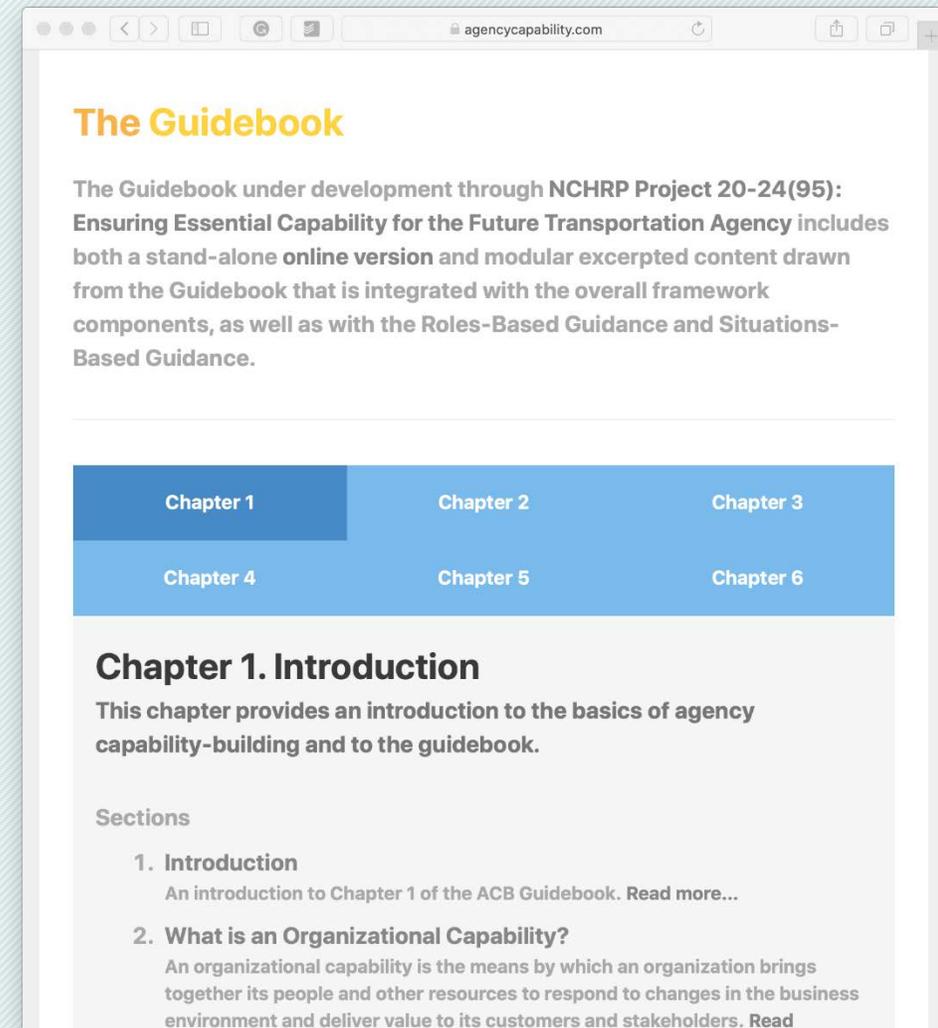


# Agency Capability Building Guidebook – Table of Contents

- **Chapter 1. Introduction**
- **Chapter 2. Agency Capability-Building Framework**
- **Chapter 3. Strategies**
- **Chapter 4. Role-Based Guidance**
- **Chapter 5. Situation-Based Guidance**
- **Chapter 6. Developing an Agency Capabilities Building Action Plan**

# Chapter 1. Introduction

- What is organizational capability?
- Why build organizational capability?
- What is in the Guidebook?
- Who should read this Guidebook?
- How should the Guidebook be used?



The screenshot shows a web browser window with the URL [agencycapability.com](https://agencycapability.com). The page title is "The Guidebook". Below the title, there is a paragraph: "The Guidebook under development through NCHRP Project 20-24(95): Ensuring Essential Capability for the Future Transportation Agency includes both a stand-alone online version and modular excerpted content drawn from the Guidebook that is integrated with the overall framework components, as well as with the Roles-Based Guidance and Situations-Based Guidance." Below this paragraph is a navigation menu with six chapters. Chapter 1 is highlighted in a darker blue. Below the navigation menu, the page content for Chapter 1 is displayed, including the title "Chapter 1. Introduction" and a brief description: "This chapter provides an introduction to the basics of agency capability-building and to the guidebook." Below the description, there is a section titled "Sections" with two items: "1. Introduction" and "2. What is an Organizational Capability?".

**The Guidebook**

The Guidebook under development through NCHRP Project 20-24(95): Ensuring Essential Capability for the Future Transportation Agency includes both a stand-alone online version and modular excerpted content drawn from the Guidebook that is integrated with the overall framework components, as well as with the Roles-Based Guidance and Situations-Based Guidance.

Chapter 1	Chapter 2	Chapter 3
Chapter 4	Chapter 5	Chapter 6

## Chapter 1. Introduction

This chapter provides an introduction to the basics of agency capability-building and to the guidebook.

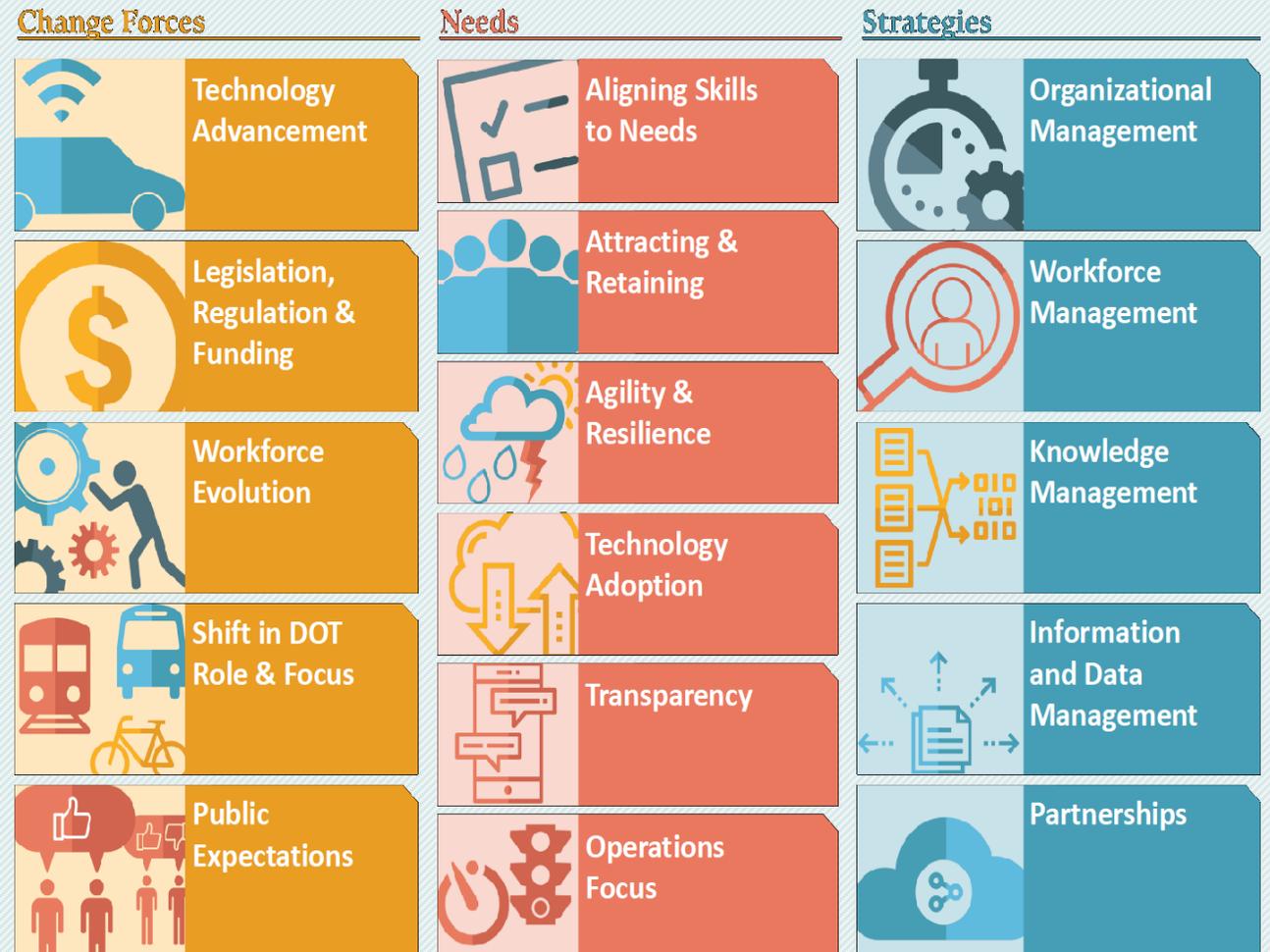
### Sections

- 1. Introduction**  
An introduction to Chapter 1 of the ACB Guidebook. [Read more...](#)
- 2. What is an Organizational Capability?**  
An organizational capability is the means by which an organization brings together its people and other resources to respond to changes in the business environment and deliver value to its customers and stakeholders. [Read](#)



# Chapter 2. Agency Capability-Building Framework

- Change Forces
- Needs and link to capabilities
- Strategies





# Chapter 3. Strategies

- Organizational Management
- Workforce Management
- Knowledge Management
- Information and Data Management
- Partnerships

Table 3.2 Workforce Management Strategies

Strategy subcategory	Sample Activities	Capabilities Addressed
<b>Strategic workforce planning</b>	Summarize likely future retirement trajectory for key position types	Aligning Skills to Needs Technology Adoption Operations Focus
<b>Recruitment and retention</b>	Modify position descriptions and job postings	Aligning Skills to Needs Attracting & Retaining Workforce Technology Adoption Operations Focus
<b>Succession planning</b>	Identify critical positions and potential successors	Aligning Skills to Needs Agility & Resilience Technology Adoption Operations Focus
<b>Employee engagement</b>	Employee satisfaction surveys	Attracting & Retaining Workforce Agility & Resilience Transparency
<b>Professional development</b>	Leadership training	Aligning Skills to Needs Attracting & Retaining Workforce Agility & Resilience Technology Adoption Transparency Operations Focus
<b>Outsourcing</b>	Identify functions to outsource	Aligning Skills to Needs Agility & Resilience Technology Adoption Operations Focus

# Chapter 4. Role-Based Guidance

Agency Capability Building

**Role**  
**Chief Human Resources Officer**



**Role-Based Guidance**

**Defined**  
The **Chief Human Resources Officer** is responsible for managing all human resource planning, management, policies and operations for the agency.

**Challenges and Opportunities**  
In your role, what are the most critical challenges and opportunities? Looking across the agency, what capabilities are required to successfully take them on? How can you help build the necessary capabilities? The first step is to understand these challenges and opportunities in terms of the major change forces that are driving them.

Change Forces	Challenge/Opportunity	Your Responsibility
<b>Workforce Evolution</b>	When tenured staff retire, it creates an experience gap in the agency, as well as opportunities for introducing new skills and perspectives. At the same time, new expectations of millennials in the workforce are creating a need for new ways of selling the benefits of working in a public organization.	<b>Attracting and Retaining.</b> Advance agency talent acquisition and retention strategies to close experience gaps when tenured staff retire and to understand and respond to the needs of the new generation of workers.
<b>Technology Advancement</b>	Technology advancements impact the skills and abilities needed by the agency, but acquiring these new skills is challenging because they are also highly sought after in the private sector.	<b>Aligning Skills to Needs.</b> Lead the agency in developing strategies to improve the agency's competitive advantage to recruit and retain staff with technology-focused skillsets.
<b>Shift in Role and Focus</b>	This shift in role and focus impacts the agency knowledge, skills and abilities needed and may affect the organizational structure.	<b>Operations Focus.</b> Help the agency's workforce to efficiently and effectively deliver on its new business direction.
<b>Legislation, Regulation, and Funding</b>	Responding to new legislative requirements may require new knowledge, skills and abilities.	<b>Agility and Resilience.</b> Lead the agency in developing mechanisms to quickly adapt its workforce to respond to new legislative requirements.

[Read more](#) →

- CEO/CIO
- CFO
- IT Director/CIO
- HR Director
- Operations Lead
- Planning Director
- Performance Management Lead
- Knowledge Management Lead



# Chapter 5. Situation-Based Guidance

- Initiative fatigue/managing multiple initiatives
- Undertaking a major system upgrade
- Budget cuts
- Improving data for decision making
- Response to increased flooding
- Managing workforce transition
- New multi-modal focus that requires partnerships
- Planning for CAVs and other transformational technologies

Agency Capability Building	Situation-Based Guide
<p data-bbox="1765 494 2023 576"><b>Situation Response to Increased Flooding</b></p> 	
<p data-bbox="1765 636 1837 654"><b>Context</b></p> <p data-bbox="1765 665 1956 996">The state DOT is faced with more frequent flooding events. Environmental emergencies like flooding pose a threat to the public, DOT staff and transportation infrastructure and may result in detours, congestion and closures. They have economic impacts and are difficult to address programmatically because they occur without much warning, although some locations are starting to experience recurring flooding events. In addition, they require coordination among multiple organizations and agencies.</p>	<p data-bbox="1989 636 2117 654"><b>Change Forces</b></p> <ul style="list-style-type: none"> <li data-bbox="1989 665 2397 772">• <b>Shift in DOT Role and Focus.</b> The changing DOT role creates a shared responsibility for emergency response with multiple other entities playing a first responder role, and the DOT involved as a part of the emergency response team before, during and after emergencies occur. This requires integrated flood warning and response systems among response partners.</li> <li data-bbox="1989 783 2397 891">• <b>Public Expectations.</b> The public generally has little understanding of steps needed to prepare for an emergency, but an expectation for a seamless public infrastructure. They need to get event warnings for transportation and non-transportation issues via a coordinated and multi-faceted approach that includes sensors, media alerts, websites, and closure of at-risk or compromised facilities.</li> <li data-bbox="1989 902 2397 955">• <b>Technology Advancement.</b> Technology for flood monitoring has been implemented to provide advanced warning capabilities, extending the amount of time for mounting a response effort.</li> </ul>
<p data-bbox="1765 1032 2048 1049"><b>What Capabilities Are Essential?</b></p> <div data-bbox="1765 1061 1972 1143"> <p><b>Transparency.</b> The agency needs to communicate with the public and other stakeholders to provide warnings, directives and to coordinate on response efforts.</p> </div> <div data-bbox="1765 1155 1972 1253"> <p><b>Agility &amp; Resilience.</b> An organizational capability for agility and resilience is needed to adjust for emerging issues before, during and after the event and for adjusting construction approaches to improve future resilience.</p> </div> <div data-bbox="1765 1265 1972 1310"> <p><b>Technology Adoption.</b> The agency can use Unmanned Aerial Vehicles for flood assessment, and implement informa-</p> </div> <div data-bbox="1972 1061 2178 1159"> <p>tion systems and tools for predictive modeling, risk assessment, integration with inventories of critical assets, facilitation of active flood response, and support for post-disaster recovery and reimbursement activities.</p> </div> <div data-bbox="1972 1170 2178 1310"> <p><b>Partnerships.</b> In times of emergency, the public relies on multi-agency teams to restore their access to infrastructure networks for communications and transportation. Emergency response depends on coordination among federal agencies (for flooding, this includes the National Weather</p> </div> <div data-bbox="2178 1061 2397 1196"> <p>Service, US Geological Survey, the Army Corps of Engineers, NOAA and FEMA), climate and research organizations and other public sector stakeholders (such as the State Emergency Management Offices, local units of government, law enforcement agencies and the State DOT).</p> </div>	
<p data-bbox="2244 1293 2346 1315"><a href="#">Read more</a></p> 	



# Chapter 6. Developing an ACB Action Plan



- **Action planning steps**
- **Scalable content**
- **Templates**
- **Tools and resources**

# **Guidebook Highlights**

---



# Strategies, Activities and Capabilities

Table 3.1 Organizational Management Strategies

Strategy subcategory	Sample Activities	Capabilities Addressed
<b>Strategic Planning</b>	Annual strategic planning workshop	Aligning Skills to Needs Attracting & Retaining Workforce Agility & Resilience Technology Adoption Transparency Operations Focus
<b>Organizational Structure</b>	Organizational restructuring initiative	Agility & Resilience Technology Adoption Operations Focus
<b>Process Improvements</b>	Lean events	Agility & Resilience Technology Adoption
<b>Performance Management</b>	Quarterly agency performance reviews with feedback loops	Agility & Resilience Transparency
<b>Change Management</b>	Agency change management function and framework	Agility & Resilience Technology Adoption Operations Focus
<b>Organizational Culture</b>	Leadership culture and strategy retreat	Attracting & Retaining Workforce Agility & Resilience Transparency Operations Focus

# Practice Examples

## The Evolution of Knowledge Management within Washington State DOT

Washington DOT (WSDOT) has established a knowledge management approach for addressing:

- Loss of institutional knowledge due to an aging workforce nearing retirement
- Pressure for increased efficiency in the face of inadequate resources
- Organizational strategic direction to support innovation and knowledge sharing<sup>12, 13</sup>

They have implemented several KM initiatives, including:

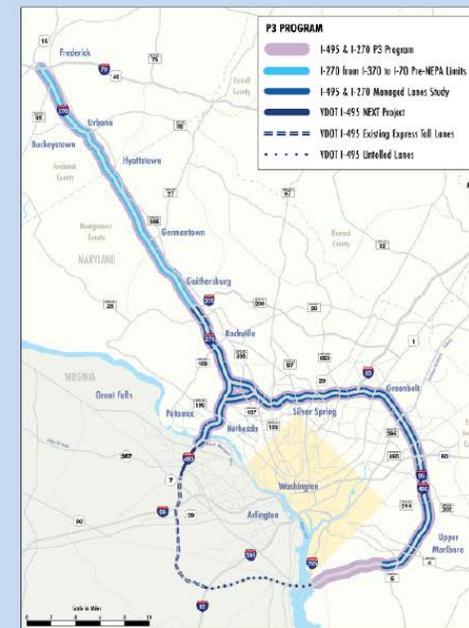
- Communities of practice (CoPs)
- Knowledge Capture interviews of retiring staff
- Knowledge management and information systems to support practical solutions

## Maryland DOT Public Private Partnerships

The I-495 and I-270 P3 Program at the Maryland Department of Transportation leverages public-private partnerships and local input to design, finance and build improvements aimed at reducing severe traffic congestion on 70 miles of interstate and adjacent local roads.<sup>22</sup>

Several components of the program include:

- I-495 & I-270 Managed Lanes Environmental Impact Study to provide users with a choice of paying a toll for reliable, reduced congestion lanes or using the existing lanes toll-free.
- I-270 from I-370 to I-70 Pre-National Environmental Policy Act activities including public input.
- Opportunity MDOT: Resources to encourage P3 participation by small, minority-, women- and veteran-owned businesses and disadvantaged businesses.
- Partnering opportunities with the private sector on designing, financing, building, operating and maintaining improvements.



Previously, the National Capital Region experienced severe traffic congestion.

By leveraging local input and private partnerships, MDOT has been able to achieve time savings of 12 percent on managed lanes. They have increased their capability to create a culture of transparency and accountability by providing the traveling public with travel options, while improving capability to collaborate across jurisdictions.



## Role

# Performance Management Lead



### Defined

The Performance Management Lead is responsible for collecting, measuring, reporting and recommending action related to performance information within the agency.

## Challenges and Opportunities

In your role, what are the most critical challenges and opportunities? Looking across the agency, what capabilities are required to successfully take them on? How can you help build the necessary capabilities? The first step is to understand these challenges and opportunities in terms of the major change forces that are driving them.

Change Forces	Challenge/Opportunity	Your Responsibility
<b>Technology Advancement</b>	New technology impacts the tools, methods and strategies available to use data to maximize business outcomes. Connected and autonomous vehicles may generate new data for understanding system performance.	<b>Technology Adoption.</b> Help the agency leverage business intelligence to improve data-informed decision-making and use performance-based approaches to maximize investments. Anticipate future availability of new data sources for performance measurement.
<b>Shift in Role and Focus</b>	The agency's approach to performance measurement needs to consider people movement across all modes, including passenger and commercial vehicles, bus and light rail, and bicycle and pedestrian travel.	<b>Operations Focus.</b> Advance performance measures that are multimodal and operational in nature.
<b>Legislation, Regulation, and Funding</b>	Responding to new legislative requirements may require new performance measures, modified performance reporting processes, and demonstration that the agency is working to achieve its targets.	<b>Agility and Resilience.</b> Equip the agency to respond quickly to new legislative requirements.
<b>Public Expectations</b>	Increased expectations for transparency and accountability to the public, commercial travelers, elected officials, local units of government and the media create the need for effective communication of performance information.	<b>Transparency.</b> Advance efforts to communicate agency performance to agency stakeholders and the general public.

*Read more*

## Strategies and Resources

What strategies can you apply now to meet today's challenges and prepare for future opportunities? What resources are available to help support these efforts?

### Organizational Management

- Performance Management – to ensure the agency is able to measure and achieve outcomes that make progress toward its evolving goals and objectives
- Process Improvements – to close the loop between targets and results to respond to legislative requirements

### Information and Data Management

- Business Intelligence and Analytics – to capture, analyze and visualize performance information.

### Knowledge Management

- Learning Organization - to align staff activities with agency goals, create a performance system feedback loop and create a culture of transparency and accountability for results

### Where to Begin

- Monitor federal requirements and integrate them with business processes and practices
- Track new data sources and assess how they might be used to strengthen performance management
- Incorporate scenario-building and forecasting to respond to legislative requirements related to performance-based planning and programming
- Establish a mechanism for continuous performance and process improvement
- Monitor and measure results to improve linkages between performance targets and investment outcomes
- Assess current data visualization and determine better ways to communicate that will support transparency and accountability

### Resources

- FHWA Transportation Performance Management (TPM) website, <https://www.fhwa.dot.gov/tpm/>
- AASHTO TPM Portal, <https://www.tpm-portal.com>
- AMPO Performance Measurement website, <http://www.ampo.org/resources-publications/best-practices/performance-measurements/>
- AASHTO Benchmarking Tool on TPM Portal, <http://benchmarking.tpm-portal.com>
- Transportation Lean Forum on TPM Portal, <https://www.tpm-portal.com/community/tlf-home/>
- AASHTO Committee on Performance Based Management information on TPM Portal, <https://www.tpm-portal.com/community/cpbm/>
- TRB NCHRP Project 03-128, "Business Intelligence Techniques for Transportation Agency Decision Making," <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4352>
- TRB NCHRP Web-Only Document 226, "Data Visualization Methods for Transportation Agencies," <http://www.trb.org/NCHRP/Blurbs/175902.aspx>

## Learn More

This guide is also available via the Agency Capability Building Web Portal (ACB Portal) developed through NCHRP Project 20-24(95)A: Ensuring Essential Capability for the Future Transportation Agency.

This online platform provides a one-stop shop for the latest information, tools, and other resources to support transportation agencies' organizational needs.

More information on the role described in this guide, including links to the resources listed above can be found on the ACB Portal at: <https://www.agencycapability.com/>





## Situation

## New Multi-Modal Focus and Partnerships



## Context

**Stakeholder needs for seamless transportation solutions**, and expanding DOT objectives that incorporate societal goals for regional goals and transportation- and non-transportation goals require new partnerships. The organization needs to adapt to develop a common understanding of priorities, to strengthen collaboration, improve data and information and enhance communication and reporting mechanisms. We have additional needs to collaborate with our local partners in ways we have not done in the past.

## Change Forces

- **Shift in DOT Role and Focus.** The shift in emphasis from highway construction to maximizing the capacity of the existing multi-modal transportation system increases the importance of public/private and multi-jurisdictional partnerships.
- **Legislation, Regulation and Funding.** Legislation creates the need for the agency to strengthen integration of community priorities and collaborative processes into its project planning and programming, and to develop performance measures that consider the entire transportation system.
- **Technology Advancement.** New technologies are impacting the tools, methods and strategies available to share data with stakeholders that can be used for customer-facing, traveler information systems incorporating information about multiple modes.
- **Public Expectations.** Travelers are seeking improved intermodal connections.

## What Capabilities Are Essential?

**Agility & Resilience.** An organizational capability for agility is needed for adjusting planning, programming and project development processes to incorporate working with other organizations that have different missions, objectives and decision making timeframes.

**Operations Focus.** Agencies must strengthen their capability to focus on the operation of the multi-modal system. Coordination with other agencies, modes, jurisdictions and organizations is an integral part of this.

**Transparency.** The agency needs to keep modal and other jurisdictional

agency partners engaged, to ensure buy-in for policy initiatives and so external funding agencies are informed about status and schedules.

**Technology Adoption.** The agency needs to strengthen its ability to share data with partners and collaborate in provision of traveler information.

Read more

## Situation

## New Multi-Modal Focus and Partnerships

## What can you do about it?

## Organizational Management

- **Strategic Planning** – to ensure that development of strong partnerships is clearly spelled out as integral to the agency's mission, goals and objectives.
- **Performance Management** – to incorporate a multi-modal perspective into planning and decision-making processes

## Knowledge Management

- **Knowledge Capture and Transfer** – to share information about partner agencies and key contacts within those agencies; and to share information about approaches to integrating multiple modes and intermodal connectivity into plans and projects

## Information and Data Management

- **IT and Data Governance** – to identify and adopt open data standards that enable sharing data with partners

## Partnerships

- **Public/private Partnerships** – to leverage available commercial products and services that provide a platform for information sharing and collaboration
- **Interagency Agreements** – to develop common understanding, coordination and collaboration among multiple agencies

## What resources will help you?

- **AASHTO** – “AASHTO Partnering Handbook.” <https://store.transportation.org> (search by item code APH-2-UL)
- **NCHRP Project 03-131** – “Guidance for Planning and Implementing Multimodal, Integrated Corridor Management.” <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4355>
- **Virginia Transportation Research Council** – “Multimodal Public-Private Partnerships: A Review of the Practices of Other States and Their Application to Virginia.” [http://www.virginia-dot.org/vtrc/main/online\\_reports/pdf/17-r11.pdf](http://www.virginia-dot.org/vtrc/main/online_reports/pdf/17-r11.pdf)
- **TRB Transportation Research Circular** – “Managing Transportation Systems in a Fast-Changing World.” <http://www.trb.org/Publications/Blurbs/179993.aspx>
- **TransitCenter** – “A People's History of Recent Urban Transportation Innovation.” <https://transitcenter.org/publication/a-peoples-history-of-recent-urban-transportation-innovation/-foreword>
- **NCHRP Report 827** – “Navigating Multi-Agency NEPA Processes to Advance Multimodal Transportation Projects.” <http://www.trb.org/Publications/Blurbs/174665.aspx>
- **NCHRP Report 885** – “Guide to Sustaining a Culture of Innovation within Departments of Transportation.” <http://www.trb.org/main/blurbs/178368.aspx>

## Learn More

Visit the Agency Capability Building Web Portal (ACB Portal) for more information: <https://www.agencycapability.com/>



# Resources

## Chapter 3 Resources

### Use this Guidebook's Companion Digital Platform

The digital Agency Capability-Building Portal (ACB Portal) developed in coordination with this guidance incorporates additional resources and updated information. Read Chapter 3 of the Guidebook on the ACB Portal: <https://www.agencycapability.com/chapter/3-strategies/>

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# Strategic Action Planning Process



# Digital Site

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# Visit the Agency Capabilities Building Portal

<https://www.agencycapability.com/>

# ACB Portal Homepage

- **Submit Resources**
- **Access Shared Practices**
- **Sign Up for Updates**
- **Link to Latest Resources**
- **Access ACB Framework**
- **View Electronic Guidebook**

The screenshot displays the ACB Portal homepage. The browser address bar shows 'agencycapability.com'. The navigation menu includes 'Shared Practices', 'Library', 'Directory', 'Guide', and 'About'. A search icon and 'Scenarios' and 'Framework' links are also visible. The main content area features a yellow text block on the left and a pink scenario card on the right. The scenario card is titled 'Explore ACB Scenarios!' and features a white star icon in a circle. Below the title, it reads 'Chief Executive Officer/Chief Operating Officer' and provides a brief description of the role. Two buttons are present: 'Read About This Scenario' and 'Check Out All the ACB Scenarios'. A yellow banner at the bottom of the page contains the text 'The ACB Portal uses scenarios to define specific'.

**The Agency Capability Building Web Portal is a one-stop shop for the latest information, tools, and other resources to support transportation agencies' organizational needs.**

This online platform provides practitioners with easy access to the tools and work products developed through NCHRP Project 20-24(95): Ensuring Essential Capability for the Future Transportation Agency, and the ability to add to and strengthen this resource base over time.

**Explore ACB Scenarios!**

**Chief Executive Officer/Chief Operating Officer**

The Chief Executive Officer (CEO) is the highest-ranking executive in the state DOT. This individual is responsible for overseeing the activities of the entire agency. This person often has the title "Secretary" or "C..."

[Read About This Scenario](#) [Check Out All the ACB Scenarios](#)

The ACB Portal uses scenarios to define specific



# Shared Practices

The screenshot shows a web browser window with the URL `agencycapability.com`. The page title is "Shared Practices - ACB Portal". The navigation menu includes "Shared Practices", "Library", "Directory", "Guide", "About", "Scenarios", and "Framework".

## Shared Practices

The Shared Practices page developed through NCHRP Project 20-24(95): Ensuring Essential Capability for the Future Transportation Agency provides agency leaders and practitioners with access to the latest information and tools to support their organizational capability-building needs.

### Connect and Learn at Upcoming Events

Upcoming Events

- 27 FEB** TRB WEBINAR: DAMAGE DUE TO EMERGENCY EVENTS
- 11 MAR** TRB WEBINAR: RIGHT-SIZING TRANSPORTATION

### Build Better Job Descriptions

Recently Posted Examples

- Organizational Performance Analysts and Specialists
- Chief Data/Knowledge Management Officer
- IT Budget Analyst

### Discover Tools for Practitioners

- Organizational Performance Analysts and Specialists
- Organizational Performance Analysts and Specialists

# Guided Search Resource Library

- Organized by change forces and strategies
- Linked to resources

The screenshot displays the ACB Portal website's Resource Library. The page features a navigation bar with the ACB Portal logo and links for Shared Practices, Library, Directory, Guide, and About. A search bar and links for Scenarios and Framework are also present. The main content area is titled "The Resource Library" and includes a description: "The Resource Library lets you browse and search for resources using the ACB Framework. Resources are indexed by the relevant Change Forces, Needs, and Strategies." Below this, there are sections for "Sort" (with options for Publication Date and Older first), "Search" (with a search input field), and "Filters" (with dropdown menus for Change Forces and Needs). The "Search Results" section lists six articles:

- Leading Change: Why Transformation Efforts Fail.** Harvard Business Review OnPoint (March-April), 1995. pp. 1-10  
Harvard Business Review OnPoint / 1995
- Public Roads Vol. 63, No. 3**  
FHWA / 1999
- TCRP Report 77 Managing Transit's Workforce in the New Millennium (2002)**  
As part of TRB's TCRP F-09, TCRP Report 77 Managing Transit's Workforce in the New Millennium assesse...  
TRB / 2002
- TRB Special Report 275 The Workforce Challenge (2003)**  
TRB's Special Report 275, The Transportation Workforce Challenge: Recruiting, Training, and Retaining Qu...  
TRB / 2003
- Building Organizational Culture That Stimulates Creativity and Innovation (2003)**  
The purpose of this article is to present, by means of a model, the determinants of organizational culture ...  
MCB UP Ltd / 2003
- NCHRP Synthesis 323 Recruiting and Retaining Individuals in State Transportation**



# Practitioner Directory

**The Practitioner Directory**

The Practitioner Directory developed through NCHRP Project 20-24(95): Ensuring Essential Capability for the Future Transportation Agency provides access to a voluntary list of transportation professionals who are willing to support the transportation community by sharing their expertise related to their experiences with various strategies for capability-building. Please contact [contact@agencycapability.com](mailto:contact@agencycapability.com) with any updates to the existing directory entries or new requests to include your information in the directory.

Search

Search by name

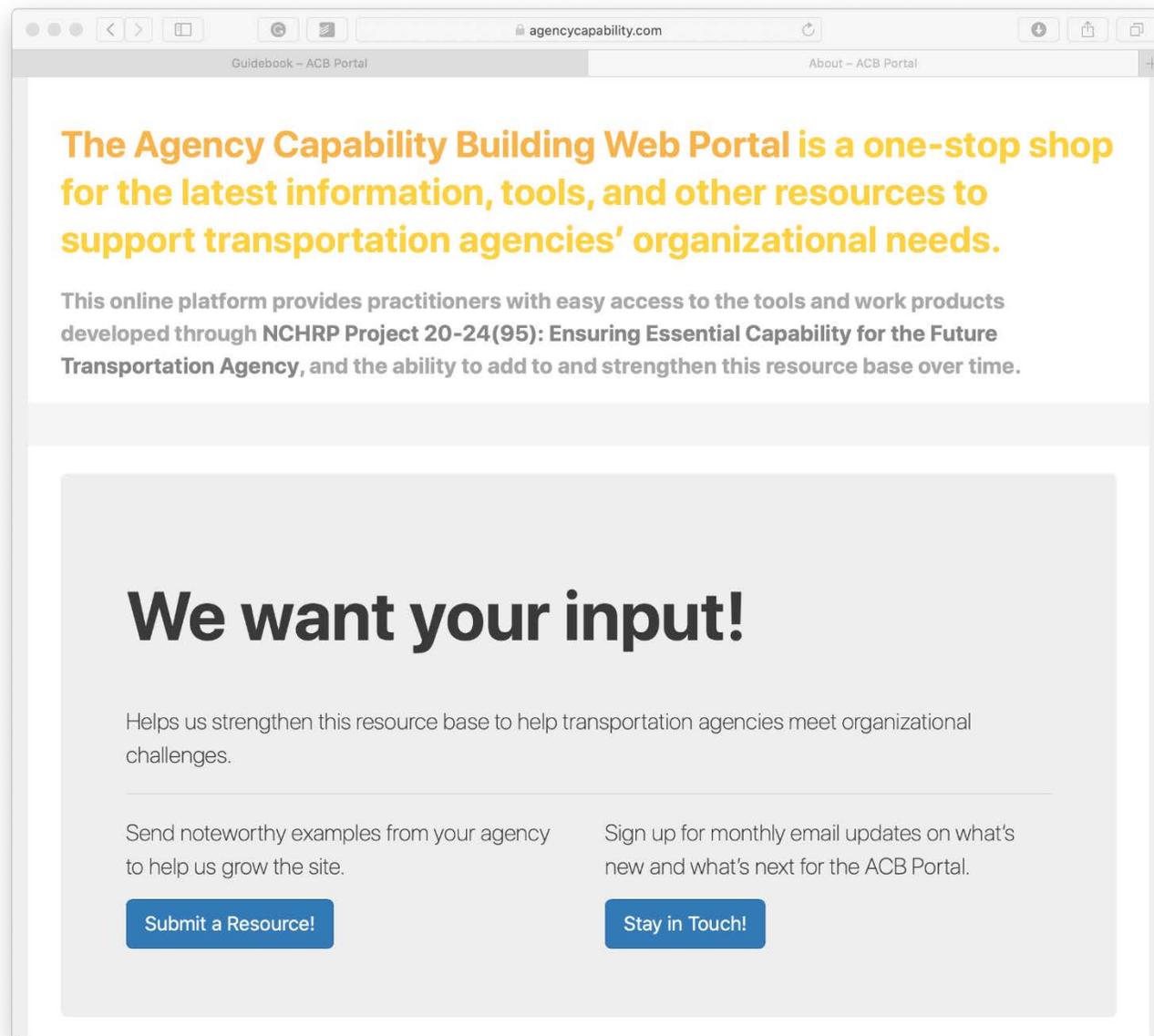
Filters

Filter the results using the controls below

- Company/Agency
- State
- Country
- Areas of Expertise
- Other Areas of Expertise

Search Clear

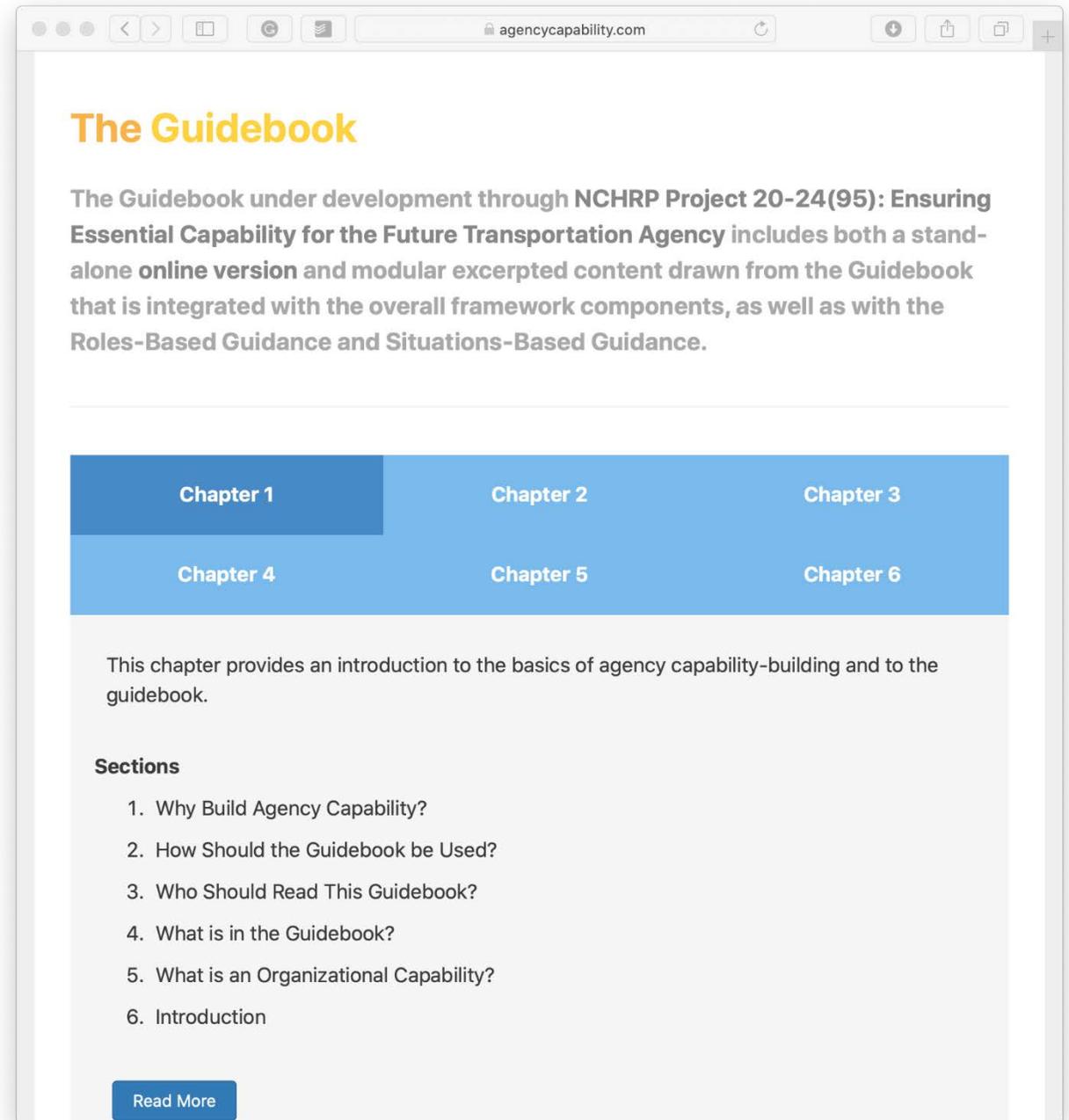
FIRST	LAST	COMPANY/AGENCY	EMAIL	PHONE	
Brad	Allen	Applied Pavement Technology, Inc.	<a href="mailto:ballen@appliedpavement.com">ballen@appliedpavement.com</a>	518-282-2111	<a href="#">More Info</a>
Clinton	Bench	UCLA Transportation	<a href="mailto:cbench@ts.ucla.edu">cbench@ts.ucla.edu</a>	310-825-8374	<a href="#">More Info</a>
Dave	Bergner	Monte Vista Associates, LLC	<a href="mailto:dbergner@gmail.com">dbergner@gmail.com</a>	480-699-4043	<a href="#">More Info</a>
Russ	Buchholz	NDDOT	<a href="mailto:rjbuchholz@nd.gov">rjbuchholz@nd.gov</a>	701-328-2561	<a href="#">More Info</a>
Catherine	Cagle	City of Waltham Massachusetts	<a href="mailto:catherine.cagle@mac.com">catherine.cagle@mac.com</a>		<a href="#">More Info</a>
Yvonne	Carney	WSSC Water	<a href="mailto:yvonne.carney@wsscwater.com">yvonne.carney@wsscwater.com</a>	301-206-8966	<a href="#">More Info</a>
Pamela	Cotter	Rhode Island Department of Transportation	<a href="mailto:pamela.cotter@dot.ri.gov">pamela.cotter@dot.ri.gov</a>	401-563-4004	<a href="#">More Info</a>
Patrick	Cowley	State of Utah / Department of Transportation	<a href="mailto:patrickcowley@utah.gov">patrickcowley@utah.gov</a>	801-648-5459	<a href="#">More Info</a>



# About Page

# Guidebook Homepage

- Chapter by chapter organization
- Links to scenarios
- Links to framework



The screenshot shows a web browser window with the URL [agencycapability.com](https://agencycapability.com). The page title is "The Guidebook". The main text reads: "The Guidebook under development through NCHRP Project 20-24(95): Ensuring Essential Capability for the Future Transportation Agency includes both a stand-alone online version and modular excerpted content drawn from the Guidebook that is integrated with the overall framework components, as well as with the Roles-Based Guidance and Situations-Based Guidance."

Below the text is a navigation bar with six chapters: Chapter 1, Chapter 2, Chapter 3, Chapter 4, Chapter 5, and Chapter 6. Chapter 1 is highlighted in a darker blue, while the others are in a lighter blue.

The content area for Chapter 1 is visible, starting with the text: "This chapter provides an introduction to the basics of agency capability-building and to the guidebook."

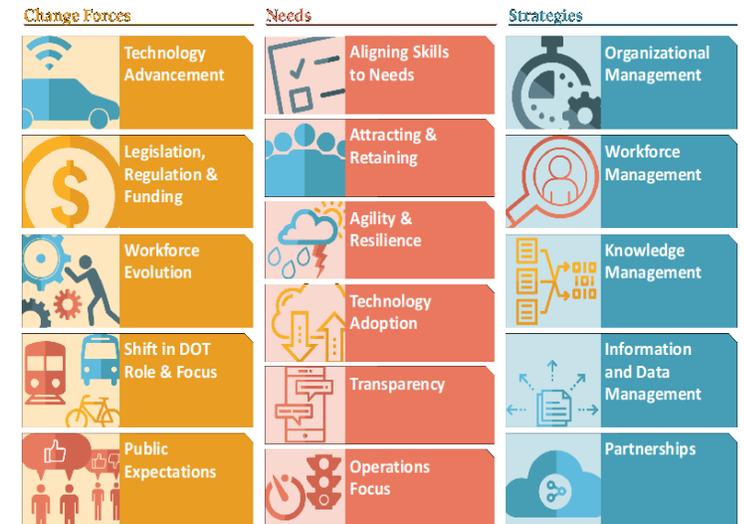
Under the heading "Sections", there is a numbered list:

1. Why Build Agency Capability?
2. How Should the Guidebook be Used?
3. Who Should Read This Guidebook?
4. What is in the Guidebook?
5. What is an Organizational Capability?
6. Introduction

At the bottom of the content area, there is a "Read More" button.

# Portal Management

- Online guidebook content on the portal can be enhanced over time to accommodate new and enhanced:
  - Change forces
  - Needs
  - Capabilities
  - Supporting strategies
- Shared practices, library and practitioner directory can also be enhanced
- AASHTO will first host the site under the CPBM Subcommittee on Organizational Management



# Contact Us

## ■ Via ACB Portal

- Website: [www.agencycapability.com](http://www.agencycapability.com)
- Email:  
[contact@agencycapability.com](mailto:contact@agencycapability.com)

## ■ Hyun-A Park

- [hpark@spypondpartners.com](mailto:hpark@spypondpartners.com)
- 617-875-9614

## ■ Lori Richter

- [lrichter@spypondpartners.com](mailto:lrichter@spypondpartners.com)
- 804-464-8762 ext. 201

## ■ Hannah Groshong

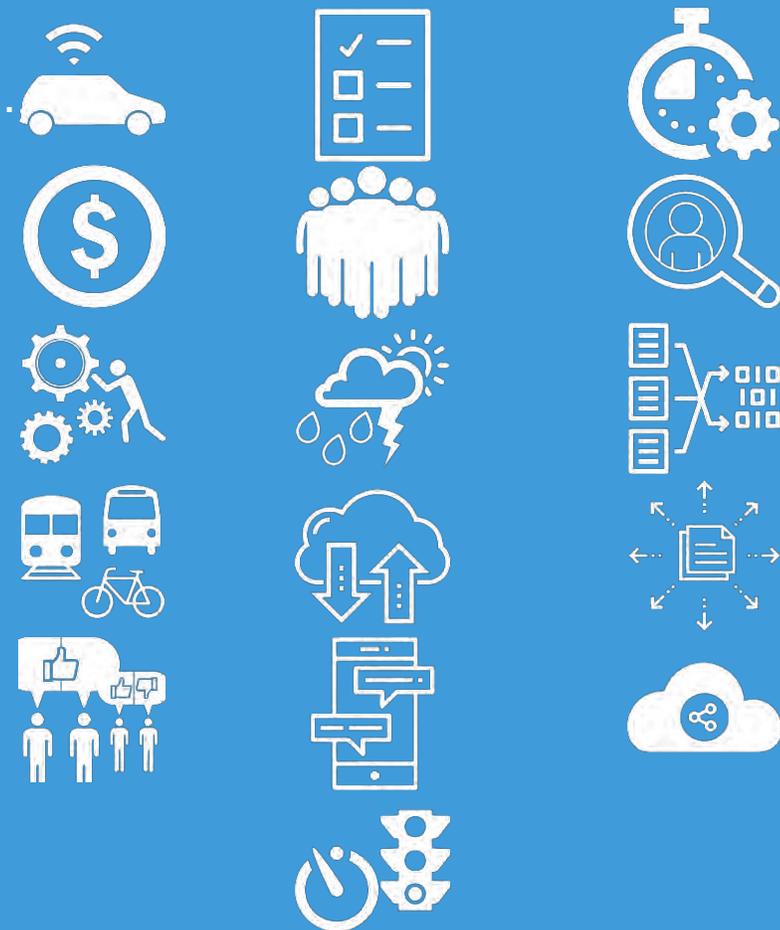
- [hgroshong@spypondpartners.com](mailto:hgroshong@spypondpartners.com)
- 971-230-8922

## ■ Perry Lubin

- [plubin@spypondpartners.com](mailto:plubin@spypondpartners.com)
- 617-909-7197

# Transportation Agency Capability Building Guidebook

A product of NCHRP Project 20-24(95)A —  
Ensuring Essential Capability for the  
Future Transportation Agency



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Spy Pond Partners, LLC

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# 1. Introduction

---

**This chapter provides an introduction to the basics of agency capability-building and to the guidebook.**

# Introduction

Transportation agencies today are being forced to make significant adjustments as financial resources become more limited, career employees retire, and technology reliance increases. These changes are shifting agencies' business landscape.

At the same time, external forces, including technology advancements, legislative requirements and changing public expectations are requiring DOTs to reexamine their mission and role. Together, these trends have important implications for transportation agencies' capabilities.

This guidebook presents a framework and set of supporting resources to help transportation agencies create a plan for building their capabilities to meet future needs. The **Agency Capability-Building (ACB) framework** describes:

- **Change Forces** – disrupters that are impacting transportation agencies' ability to deliver value;
- **Organizational Needs** – specific agency-level **capabilities** required to adapt to changes; and
- **Strategies** that can be used to meet the needs by building agency capabilities.

This chapter introduces the ACB Guidebook by answering the following questions:

## 1. What is an organizational capability?

The guidebook defines an organizational capability as the means by which an organization brings together its people and other resources to respond to changes in the business environment and deliver value to its customers and stakeholders.

## 2. Why build agency capability?

Adapting to changes in funding, expectations, workforce, and technology will require building new capabilities. Agencies that don't adapt to these changes will see diminished effectiveness in delivering value and risk loss of public confidence.

## 3. What is in the Guidebook?

The guidebook presents the ACB framework, including change forces, organizational needs, and strategies. It explains how this framework can be used to understand and

build agency capabilities to respond to change forces, and provides guidance on action planning for building agency capabilities.

#### **4. Who should read this guidebook?**

The guidebook will benefit transportation professionals at transportation agencies who serve the agency in management and leadership positions, as well as agency staff responsible for performance management, data and information management, change management, knowledge management and workforce management. It may also be useful to other professionals who work in transportation.

#### **5. How should the guidebook be used?**

Agencies can use this guidebook to:

- Understand the various change forces that are impacting transportation agencies;
- Understand where agency capabilities need to be strengthened or added in order to adapt to these change forces;
- Identify and plan strategies to build agency capabilities;
- Educate agency leaders on steps they can take to prepare their agencies for success into the future; and
- Create a capability building action plan that will help the agency focus on the actions that will yield the best results in a given timeframe.

The guidebook includes both role-based and situation-based guidance. Role-based guidance looks at how change forces impact specific DOT roles and what individuals in these roles can do to help the agency build needed capabilities. Situation-based guidance highlights common specific challenges that agencies face as a result of the change forces, and presents strategies that can be used to respond to these challenges.

# What is an Organizational Capability?

**An organizational capability is the means by which an organization brings together its people and other resources to respond to changes in the business environment and deliver value to its customers and stakeholders.**

## What is an Organizational Capability?

Organizational capability is a foundational concept for this guidebook. Because this term is used in different ways by different people, this section provides some background on how it is defined in this guidebook – and the basis for this definition.

Webster’s dictionary defines the word “capable” as “having the qualities or abilities that are needed to do or accomplish something”. While one might generally think of a capability is something that an individual has, a capability can also exist at the organizational level.

A 2004 Harvard Business Review article characterizes organizational capabilities as:

*“the collective skills, abilities, and expertise of an organization...” which are “the outcome of investments in staffing, training, compensation, communication, and other human resources areas.”*

This article identifies eleven capabilities of well-managed companies: talent, speed, shared mindset, accountability, collaboration, learning, leadership, customer connectivity, strategic unity, innovation and efficiency.<sup>1</sup>

## Enterprise Architecture View of Capabilities

Organizational capability is a core concept in the Enterprise Architecture (EA) literature. For example, in the TOGAF<sup>2</sup>, a capability is defined as:

*“an ability that an organization, person, or system possesses. Capabilities are typically expressed in general and high-level terms and typically require a combination of organization, people, processes, and technology to achieve...Capabilities are driven by the organization’s business strategy. Defining desired or target state capabilities is integral to an organization’s strategic planning process.”*

The Department of Defense Architectural Framework (DODAF) defines a capability as:

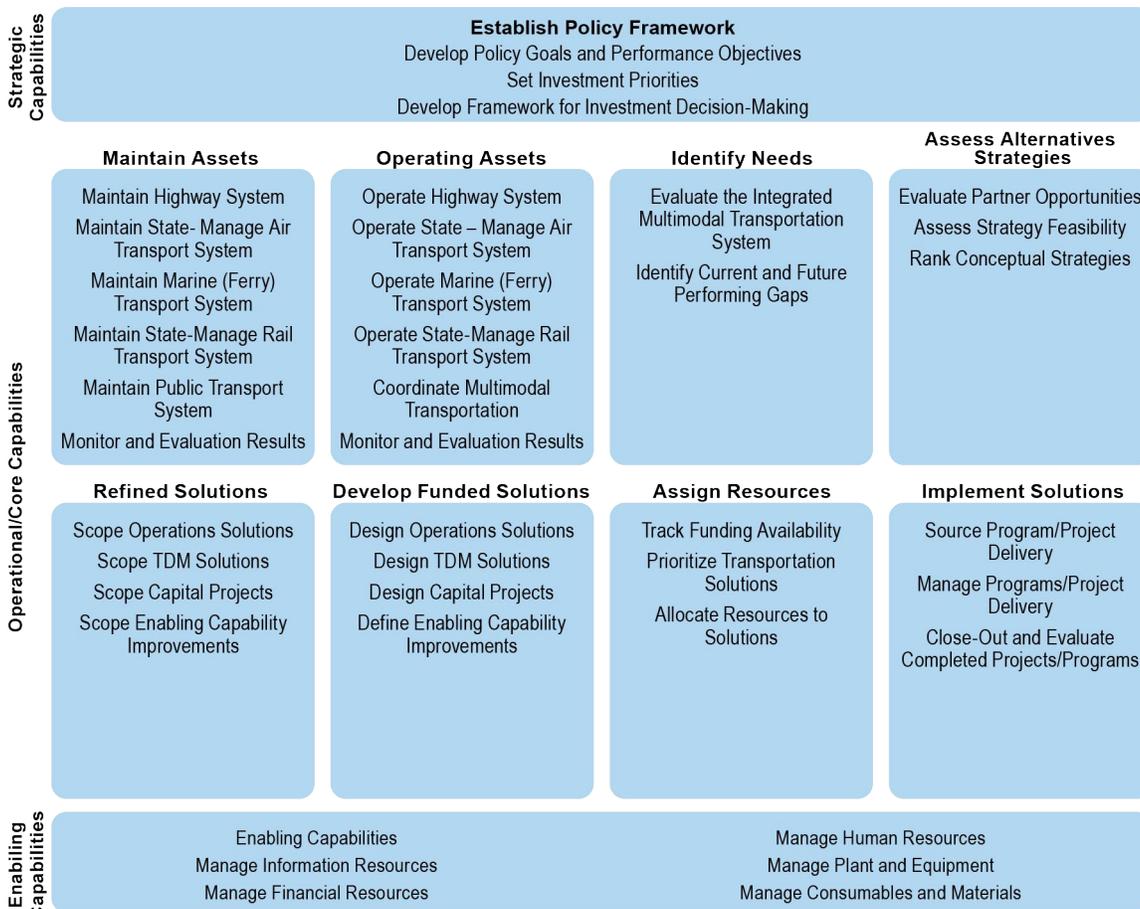
*"the ability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks."*<sup>3</sup>

In the DODAF, capabilities are linked to the agency’s mission, and serve as requirements that drive development of services and operational activities.

Developing a business capability map is one of the initial activities of creating a business architecture (which is one of the components of an enterprise architecture). Capability maps are intended to provide a stable model

that can be used to plan organizational improvements and relate them to value. The business capability map provides “a self-contained view of the business that is independent of the current organizational structure, business processes, information systems and applications, and the rest of the product or service portfolio.”<sup>4</sup>

Figure 1.1 illustrates a capability map for a DOT<sup>5</sup>. In this map, capabilities are segmented into strategic (or business-evolving), core and enabling categories:



**Figure 1.1. Example DOT Capabilities**  
(adapted from WSDOT Research Report WA-RD 896.2)

- **Business-Evolving or Strategic Capabilities** enable the organization to respond to change and plan for future evolution.
- **Core Capabilities** are related to the core operation of the agency – which in a DOT would be things like maintenance management, project delivery and highway operations.
- **Enabling Capabilities** support day to day operations and are common across multiple types of organizations. Examples are financial management, human resources management and information management.

Organizational capabilities can be vertical, aligning with organizational functions, or horizontal, i.e. spanning multiple functions. Whereas many of an organization’s existing capabilities can be discerned from its structure (e.g. highway maintenance or human resource management), cross-cutting (horizontal) capabilities such as change management or innovation are more enterprise in nature.

### Capabilities in this Guidebook

Building on the several views of capabilities presented above, this guidebook uses the following definition of “**organizational capability**”:

*the means by which an organization brings together its people and other resources to respond to changes in the business environment and deliver value to its customers and stakeholders*

This definition focuses the strategic and enabling capabilities that DOTs need to adapt to change, recognizing that these same

capabilities are needed to deliver value to customers and stakeholders on an ongoing basis. The definition also emphasizes that in talking about capabilities, we are interested in not only what the organization is able to do, but also how it is able to do it, through bringing together people and other resources.

### Example Capabilities

Because many of the capabilities needed to adapt to change are intangible, some examples are listed below – along with associated evidence that might be used to determine that they are present in an agency:

- A State DOT has a high **capability for agility** – they have a streamlined management decision making process, they have flexible contracting mechanisms in place, and have a dedicated change management function.
- A State DOT has a well-developed **capability for technology adoption** – they have a strategic plan that is updated regularly and used to guide decision making, strong information technology-business partnerships, a dedicated innovation group whose job it is to experiment, and have set up mechanisms to partner with the private sector and educational institutions to support research and development of cutting edge technology.

See Chapter 2 for further discussion of how organizational capabilities are represented in the Agency Capability Building framework.

# Why Build Agency Capability?

**The capability-building process described in this guidebook is intended to align processes, people and systems around a state DOT's highest strategic objectives.**

## Capability Building and Transportation Agencies

In order to be successful, state DOTs must anticipate future changes, envision a future state for their agencies, and build the organizational capabilities that they will need to adapt to this future state. This guidebook is intended to help DOTs:

- Understand agency strengths and weaknesses
- Make strategic initiatives actionable
- Systematize innovation and continuous improvement, and
- Develop greater agility in the face of change forces

## Understand and address agency strength and weaknesses

When faced with a new challenge, it is natural for an agency to assume that they can address it using its current processes, tools and skillsets. However, by their very nature, disruptive changes present new paradigms that require agencies to move into unfamiliar territory. Agencies may not have existing expertise or resources to draw upon – even if they have been leaders among their peers in the past. It is important to size up current strengths and weaknesses in light of anticipated changes.

## Make strategic initiatives actionable

The capability-building process described in this guidebook is intended to align people, processes, and systems around a state DOT's highest strategic objectives.

Strategic plans create the vision, the destination for staff to know where the agency is going. Capability building enables agencies to transform that vision into action by focusing energy and resources to carry out the plan. This could entail activities such as staff training or enhancing data management capabilities to improve the democratization of data for reporting and improving data-informed decision-making.

## Develop greater agility in the face of change forces

State DOTs are faced with accelerating rates of technology-related changes that impact how people move from point A to point B, how transportation systems are operated and managed and how data are collected, stored and used. These changes directly impact infrastructure, provision and pricing of transportation services and communications networks.

Capability building is not a “one and done” endeavor. It is a process of ongoing transformation to address emerging challenges and opportunities. By building essential capabilities to adjust and adapt to technology and other change forces, transportation agencies can meet transportation needs today while improving their resilience and agility to respond more easily to future change forces they cannot even foresee.

### **Systematize Innovation and Continuous Improvement**

Innovation is not innate to organizations – it must be deliberately cultivated. To adapt to change forces, innovation and continuous improvement must be built into the fabric of the agency and become part of its culture. A culture of continuous improvement creates an environment where staff are empowered and encouraged to make low risk changes to improve productivity and where IT systems are flexible enough to support these changes.

Innovation and continuous improvement are enablers for developing other capabilities. For instance, a DOT that is implementing an action plan to improve its capability to collaborate and coordinate with its partners might take an iterative approach to working with its MPOs. Part of its capability-building effort could include annual reviews of the health and qualitative effectiveness of the collaborative relationship. Adjustments could be made to address any gaps in collaboration based on that annual review process.

# What is in the Guidebook?

**Rather than reacting to emerging issues in a piecemeal fashion, agencies can create an integrated plan of actions that responds to the full range of anticipated future changes.**

## The Agency Capability Building Framework

The guidebook introduces the Agency Capability Building (ACB) framework, which provides a big picture view of the changes that are occurring that impact transportation agencies and the ways in which agencies can respond to these changes in order to continue to successfully deliver on their missions. The ACB framework consists of three components:

- **Change Forces** are factors and trends affecting DOTs. They are either positive or negative disrupters that impact an agency's ability to deliver value to their customers. *Example: MAP-21/FAST introduced new performance-based planning and programming requirements.*
- **Needs** are defined as the essential capabilities that DOTs must strengthen to respond to the change forces. Needs can be interpreted as the gaps between an agency's current capabilities and those required to adapt to change forces. *Example: the MAP21/FAST requirements created the need for state DOTs to develop new capabilities for data-driven decision making..*

- **Strategies** are ways that DOTs can respond to the needs. Strategies are used to strengthen existing capabilities and develop new capabilities to adapt to change forces. *Example: a state DOT might use workforce management approaches to recruit and retain staff with data analysis skills needed to meet the MAP21/FAST requirements.*

The ACB framework provides a structure for considering changes to organizational structure, workforce composition and training, management techniques, and technology using a holistic approach. Rather than reacting to emerging issues in a piecemeal fashion, agencies can create an integrated plan of actions that responds to the full range of anticipated future changes.

## Guidebook Chapters

The guidebook is organized into six chapters, which can be read comprehensively or individually.

**Chapter 1. Introduction** provides a definition of organizational capability, describes how capabilities will be presented and used in the guidebook and provides an overview of the guidebook organization.

**Chapter 2. Agency Capability Building Framework** describes the change forces, needs and strategies and presents examples that highlight the challenges and opportunities agencies face.

**Chapter 3. Strategies** describes the strategies that agencies can use to adapt to the change forces and needs, and points readers to available resources with further information on these strategies.

**Chapter 4. Role-Based Guidance** presents guidance geared to helping people playing specific roles within a transportation agency recognize and respond to change forces.

**Chapter 5. Scenario-Based Guidance** illustrates application of the ACB framework in different situations.

**Chapter 6. Developing an Agency Capability-Building Action Plan** details the steps involved in developing an action plan focused on capability building.

# Who Should Read This Guidebook?

**The guidebook will benefit transportation professionals at state DOTs and MPOs in management and leadership positions, those serving as functional leads, as well as district office lead and program managers. It may also be useful to other professionals who work in transportation.**

The guidebook will benefit transportation professionals at state DOTs and MPOs in management and leadership positions, those serving as functional leads, as well as district office leads and program managers. It may also be useful to other transportation professionals who work in federal agencies, universities and research centers, and private industry. The guidebook can be read cover-to-cover as a comprehensive primer, or individual chapters can be referenced for specific guidance on the capability-building framework, strategies, role- or situation-based guidance or action planning.

Different audiences and users with various needs should be able to find levels of detail that are most pertinent to their situation. A reader who wants information on general aspects of capabilities and agency capability-building can read the introductory section that defines capabilities and describes capability-building in the context of transportation agencies. A reader who wants to understand the mechanics of the ACB

framework can refer to the chapters describing the framework components. An individual who is looking for guidance on how to address the change forces affecting their role over the next 5-10 years can read the role-based guidance most relevant to them, as well as the situation-based guidance that matches the challenges they are facing. Users looking to embark on a capability-building effort can refer to the capability-building action planning chapter.

# How Should the Guidebook be Used?

The ACB Framework provides an overview of current challenges facing transportation agencies. Role-based guidance looks at change forces relevant to specific roles over several time periods. Situation-based guidance is directed at change forces relevant to a defined set of DOT challenges.

## Role- and Situation-Based Guidance

There are two different lenses to view the guidance:

- **Role-Based Guidance** examines the change forces relevant to each of a defined set of State DOT roles, along with their implications for the organization from each role's perspective.
- **Situation-Based Guidance** is directed at the change forces that are relevant to a defined set of existing and anticipated State DOT situations.

The reader can refer to their own or a similar agency role or another role of interest in the guidebook as a reference for change forces relevant to that role.

The roles included in the guidebook are:

- Chief Executive Officer (CEO)/Chief Operating Officer (COO)
- Chief Financial Officer (CFO)
- Information Technology Director/Chief Information Officer (CIO)
- Human Resources (HR) Director
- Operations Lead

- Communications Lead
- Planning Director
- Performance Management Lead
- Knowledge Management Lead

The reader can also look at the guidebook to understand potential current or future situations impacted by change forces.

The situations included in the guidebook are:

- Need to undertake a major system upgrade
- Dealing with budget cuts
- Initiative fatigue
- Increased emphasis on multimodal transportation
- New accountability requirements
- Responding to increased flooding
- Coping with workforce transition
- Planning for CAVs and other transformational technologies

Both the role- and situation-based scenarios incorporate the change forces, needs and strategies described in the ACB Framework to understand trends, identify capability needs and identify strategies that can be directed at

addressing any gaps in the agency’s capabilities.

### Agency Capability-Building Action Planning

An action plan is the document that brings a vision, such in the agency’s strategic plan, to life. An action plan establishes a set and sequence of actions that will achieve a vision.

change forces matter most, what needs to focus on and which strategies are likely to support the selected need(s).

2. **Build a Vision** means determining what needs to be achieved within the scope of the effort, how it aligns with other strategic initiatives and what measures can be used to communicate the vision.



Figure 1.3. Agency Capability Action Planning Steps

An agency capability-building action plan is directed at the use of specific strategies to develop essential capabilities.

The agency capability-building action planning steps are to:

1. **Determine Scope** including using the ACB Framework to determine which
3. **Select/Develop Strategies** includes selecting a set of strategies and adding sufficient detail so that they can be appropriately implemented.
4. **Create Actions** is documenting the set and sequence of actions that will achieve the vision, including who will do what and by when.

5. **Build a Team** includes determining at a tactical level who will conduct the capability building actions, ensuring leadership support, creating an “elevator speech” and other mechanisms to communicate the effort and facilitate change management.
6. **Monitor and Adjust** includes periodic check-ins on the progress of the implementation, designing reporting mechanisms and triggers for adjusting the approach, as well as designing a feedback loop to establish a foundation for future action plans.

Developing an ACB action plan creates a scope for the capability-building effort. It builds a vision for the end goal, incorporates strategies to guide actions, and establishes actions to achieve the vision based on those strategies. It relies on building a team to carry out the plan, and allows for monitoring and adjusting the approach as needed to both achieve the goal and create a baseline for future action plans. While this chapter depicts a six-step action-planning process, it is flexible enough to be scaled back into a less complex process or can be made more detailed if warranted to implement a more comprehensive, transformational action plan.

## Guidance Formats

This guidebook is available for those wanting to read the guidance in a traditional format. The content within this document has been developed using several mechanisms, including crowdsourcing, practitioner interviews and literature searches by the research team.

The online ACB Portal provides additional flexibility, allowing the user to search capabilities to find specific topics, including related roles and scenarios. While this guidebook will remain static, the content on the portal will be enhanced over time as new or more critical change forces and needs are experienced – and as new capabilities and supporting strategies are needed within state DOTs.

The online ACB Portal includes a resource library for browsing and searching for resources using the ACB Framework. Resources on the portal are indexed by their relevant change forces, needs and strategies.

The portal includes a practitioner directory that provides access to a voluntary list of transportation professionals who are willing to support the transportation community by sharing their expertise related to their experiences with various strategies for capability-building.

The portal also includes several shared practices resources to assist in capability-building:

- **An Events Directory** that provides a listing of meetings, webinars and peer exchanges pertaining to capability-building
- **Position Descriptions** for transportation agency leaders and practitioners to assist in building better job descriptions in emerging transportation fields. This resource can be used as part of an overall workforce management or information and data management strategy to develop agency capabilities.
- **Tools** for capability-building, including links to web portals, software tools, online information repositories and other

digital information directly available from online sources as well as other tools submitted by users.



Like the other elements of the ACB Portal, the portal's shared practices, library and practitioner directory provide the ability to add to and strengthen this resource base over time.

# Chapter 1 Resources

## Use this Guidebook's Companion Digital Platform

The digital Agency Capability-Building Portal (ACB Portal) developed in coordination with this guidance incorporates additional resources and updated information. Read Chapter 1 of the Guidebook on the ACB Portal: <https://www.agencycapability.com/chapter/1-introduction/>

## Chapter 1 References

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## 2. Agency Capability Building Framework

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**An introduction to the Agency Capability Building (ACB) Framework, how change forces impact capabilities and why capability-building is critical for successful transportation agencies.**

# Framework Introduction

The guidebook introduces the Agency Capability Building (ACB) framework, which provides a big picture view of the workforce, information, and technology trends and challenges DOTs face in developing and maintaining crucial capabilities for the future. The ACB framework consists of three components: Change Forces, Organizational Needs and Strategies.

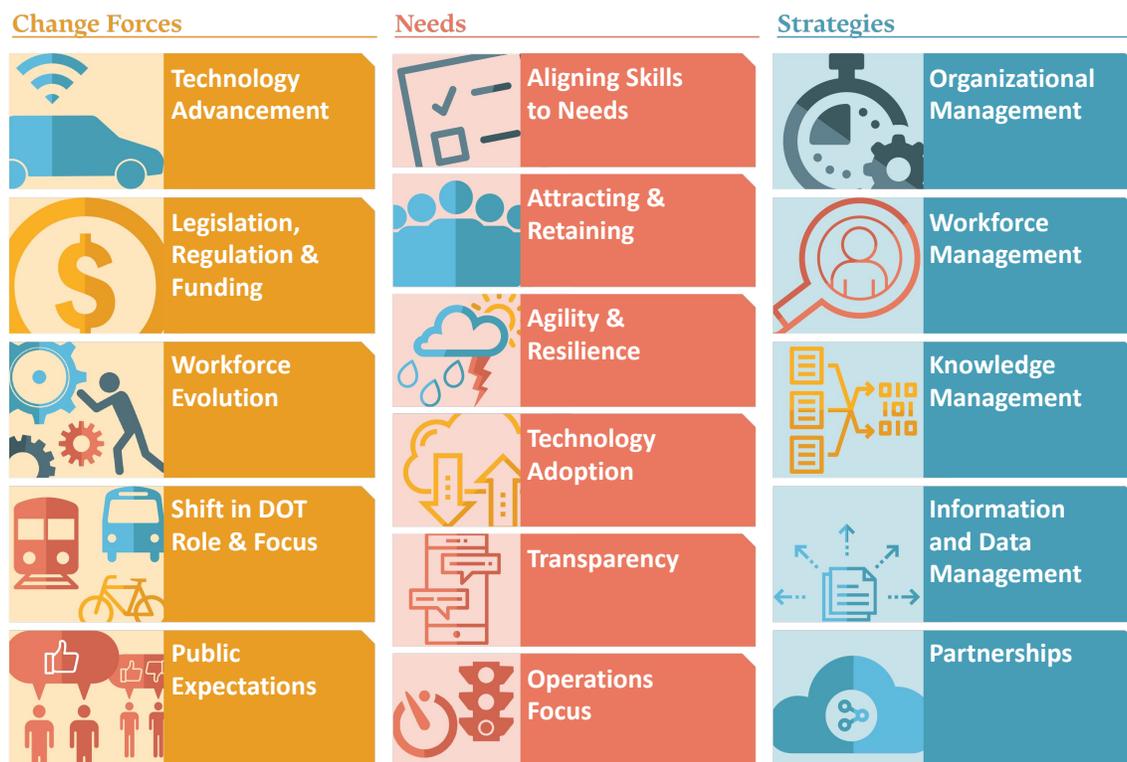


Figure 2.1 ACB Framework

The middle column of Figure 2.1 is the core of the ACB framework. These six Needs represent essential capabilities that transportation agencies must strengthen in order to respond to current and emerging changes in the environment.

# Change Forces

**Change forces are internal and external factors and trends affecting transportation agencies that disrupt the status quo. They are dynamic and evolving, and their impact can be positive or negative.**

Change forces present new challenges and opportunities to an agency that it may not have faced before. Five different types of change forces have been identified in the ACB framework:

- Technology Advancement
- Legislation, Regulation and Funding
- Workforce Evolution
- Shift in DOT Role and Focus
- Public Expectations

Change forces generally impact transportation agencies in one of three ways. First, they may create new requirements or expectations to be met – or opportunities to be realized. For example, increasing public expectations for transparency mean that agencies must step up their communication activities. Second, they may impact the availability or nature of human and financial resources needed to deliver projects and services. For example, reduction in the supply of trained civil engineers means that agencies need to increase recruiting, training and outsourcing. Third, they may impact the validity of long-held assumptions that are at the foundation of planning and engineering methods. For example, the emergence of

Transportation Network Company (TNC) services has had significant impacts on travel behavior.

The five types of change forces should be familiar to most transportation agencies – the role of DOTs has been evolving for the last several decades; each federal transportation funding bill has introduced new eligibility and reporting requirements; agencies have made great strides in taking advantage of new information and communication technologies. However, while the change forces are not necessarily new, they are by nature dynamic. They will be impacting transportation agencies in new and different ways in the future. Agencies that track the change forces and consider their likely impacts will be better equipped to overcome challenges and take advantage of new opportunities.

Each of the five Change Forces is described in detail below.

## Technology Advancement

Adoption of new technologies has (and will continue to have) dramatic impacts on how people travel, how transportation systems operate, and how DOTs collect, create, share

and use information. For example, DOTs have begun to improve the management and operation of transportation networks using techniques enabled by technology such as adaptive traffic signal control, dynamic lane reversal, dynamic shoulder use, adaptive ramp metering, dynamic pricing, integrated electronic payment systems and advanced traveler information systems.

New technology creates challenges and opportunities for transportation agencies that have far-reaching implications. Continued developments are expected in the areas of information technology (IT), data collection, transportation system management, transportation network companies (TNC) and Connected and Automated Vehicle (CAV) technology. In order to respond, agencies will need to rethink how they do business. They will need a multi-faceted plan for introduction of new technology that considers funding, maintenance and support, workforce skills and abilities, change management, partnerships, and internal management structures and methods. Some of the upcoming challenges and opportunities offered by new technology include:

- **Data Collection and Management:** It is now possible to quickly and efficiently collect much higher quality data using mobile scanners, remote sensing, drones, crowd sourcing and other methods. Improved technology enables significant increases in the amount of data available, but at the same time presents challenges in data management and makes it necessary for transportation agencies to carefully consider what data to collect and how it will be used to improve decision making.
- **Analytics:** New data sources and advances in data analysis can provide a better understanding of both transportation system and organizational performance for decision support. Advances occurring in artificial intelligence and machine learning, big data analytics and platform architectures offer opportunities for improved efficiency and effectiveness, but require specialized expertise.
- **IT:** Information technology continues to improve, with ever more powerful and compact computers, improved network connectivity, more efficient system deployment models and improved decision support. Social media applications are growing in use and sophistication, offering opportunities for new options for public involvement and knowledge transfer within and across agencies. Given the ease with which people can stay connected through telecommunications and videoconferencing technology, many staff will expect to be able to work from anywhere as well.
- **Technology Infrastructure:** Organizations are increasingly using the cloud for data storage. Information privacy and cybersecurity present growing challenges for agency IT staff. DOTs face an expectation by the public and staff that they will use the latest and most up-to-date technology, despite financial constraints and limited staff resources. Some agencies address this challenge through use of software-as-a-service and bring-your-own-device (BYOD) policies.

- **Ride Sharing:** Technology-enabled ride sourcing and ride sharing services offer travelers new options, and the long-term impacts on travel, transit and equity are not yet well understood.
- **Energy:** Advances in energy technology are changing the habits of drivers and creating new infrastructure needs, particularly for electric vehicles, that agencies need to consider. At the same time, these new energy technologies undermine the effectiveness of traditional transportation user fees such as the gas tax and will require DOTs to identify new methods of funding transportation.
- **CAV:** Agencies are just beginning to grapple with the range of technical and legal challenges associated with emerging CAV technologies and supporting infrastructure needs. Implications for highway design and capacity needs, lane markings, traveler information and cybersecurity are currently being studied. The improvements to safety and energy efficiency that this technology offers are driving the change.

## Legislation, Regulation & Funding

Federal and state legislation and regulations have been and will continue to be significant change forces for DOTs, impacting funding levels, eligibility, flexibility, available financing methods, project planning and development processes, and reporting requirements. Most state DOTs have mechanisms in place to anticipate, prepare for, respond to and even sometimes influence those change forces. They are accustomed to the regular changes that inevitably come with a new

administration, at either the state or federal level.

What is different in the current environment is the growing instability and uncertainty of transportation funding, both at the federal and state levels. Transportation user fees, such as gas taxes and registration fees, have provided stable, reliable and substantial highway and transit funding for decades, but that is no longer the case. It has been more than a decade since federal transportation funding has kept pace with transportation funding needs. That lack of sufficient funding, exacerbated by changing travel habits and increasing fuel efficiency, has repeatedly created federal funding shortfalls. According to the American Association of State Highway and Transportation Officials (AASHTO), since 2008, the federal Highway Trust Fund has been sustained through a series of General Fund transfers now amounting to \$140 billion. The next federal funding gap, expected to reduce available federal transportation funding by 40 percent in 2021, has yet to be addressed. The situation is similar at the state level for many DOTs.

The funding instability transportation agencies face inhibits their ability to plan for the future. Efforts to reduce the size of the work force in response to both funding constraints and political pressure, coupled with new federal or state regulations, puts new pressure on state DOTs. For example, the most recent federal transportation authorization legislation (MAP-21/FAST) included new requirements for performance management and development of transportation asset management plans. Deadlines included in the federal legislation required state DOTs to implement new

methods fairly quickly, straining limited staff resources. The continued layering of regulatory initiatives and process changes creates a challenging environment for DOTs working with limited resources.

Ultimately, the federal role in transportation funding may shift, with state legislation and funding gaining importance. Future federal changes may allow DOTs to use more creative funding arrangements, enable broader implementation of tolling, public/private partnerships, or devolution of the highway program to the states. The uncertainty surrounding these potential future shifts creates tension for DOTs between the relatively short-term planning of legislative bodies and the longer-term view necessary for DOTs to plan transportation systems that function for the future.

## Workforce Evolution

Public agencies face a genuine workforce crisis. The competition for technically strong, management-oriented staff is increasing as technology companies and other sectors outside of transportation seek the same skills in their employees. The current low unemployment rate increases competition for quality staff at all levels, and public agencies are often unable to compete with the private sector in terms of compensation. State DOTs will need to give serious consideration to the factors that make them a preferred work environment in order to continue to attract and retain talent, since a positive work environment is a major factor in the decision to join or stay at an organization.

Shifting demographics require state DOTs to demonstrate a strong sensitivity to and appreciation of the differences inherent in

their workforce, which is becoming increasingly as diverse as the communities the DOTs serve. Many state DOTs work hard to value diversity, and Civil Service rules support such efforts. Growing numbers of women, people of color, people with disabilities, and people from different ethnic backgrounds may bring new management styles with them, and a new sensitivity for aspects of transportation that may have been overlooked in the past. In the future, an emphasis on achieving diversity in the DOT workforce and respecting and valuing different points of view may be increasingly important for recruiting new talent.

Changing age demographics may present one of the greatest and most predictable challenges to the state DOT, as experienced workers retire and new generations with different core values assume their workload. The popular descriptions of the generations predominant in the workforce today are generalizations that do not represent every staff person in those cohorts, but they help in a general way to describe the shifting attitudes to be expected in the workforce of the future:

- **Baby Boomers** (born in the years between WWII and the early 1960s): Many Boomers are now retiring, leaving behind an experience gap. They tend to be long-time employees, loyal to the agency. Even in retirement, they may still have skills to offer the DOT that will require new and creative arrangements outside full-time employment. The retirement of senior staff creates opportunities for the agency to reorganize, working and thinking in new ways.

- **Gen Xers** (those born in the mid to late 1960s and 1970s): Gen Xers are generally hard-working, independent, and resourceful but are skeptical of authority and tend to avoid undue attention. Their entrepreneurial tendencies and desire for work/life balance may challenge organizational norms created in the Interstate era after WWII. Many may be reluctant to take on management authority.
- **Millennials** (born in the 1980s and early 1990s): The Millennials are now the largest cohort in the general workforce. They tend to be highly tech-savvy and collaborative, and value work flexibility and work/life balance. They are motivated by purpose-driven work, which makes them a good fit for public service, if they can adjust to the rules and regulations inherent in government. They are highly competent and ambitious, and eager for greater responsibility. They tend not to stay in one organization for their entire careers, and may question those who do.
- **Gen Z or Zoomers** (born in the late 1990s and 2000s): It is too soon to know much about the work ethic of the newest cohort entering the workforce. However, Zoomers may be characterized by their exposure to global culture and their reliance on internet-connected smart phones and social media. It is likely that they too will value flexibility, work/life balance and early responsibility, but time will tell.

Adapting to shifting age demographics require new approaches. Younger staff bring new expectations for upward mobility and seek

greater clarity and transparency about how to advance within the organization. State DOTs need to develop creative ways to attract them, and may need to adjust their organizational approach in order to keep them. Greater workforce mobility also requires the DOT to develop systematic approaches to build and transfer institutional knowledge.

### Shift in DOT Role & Focus

In the Interstate era, building new infrastructure was the primary task for DOTs across the country. Large-scale construction of new highways was the norm, and their completion provided dramatically improved travel options for drivers and created photo opportunities for the public officials charged with funding those projects.

With the completion of the Interstate well in the past, now comes the challenge of maintaining both the quality of the infrastructure and the high-speed mobility that Interstates provide. Most DOTs are responsible for a large number of other roads as well. Given limited resources, one big challenge facing DOTs is how to maintain appropriate condition and service across the transportation network.

While DOTs continue to deliver capital projects, there is an increasing emphasis on operations and maintenance to make the most efficient use of existing capacity and maximize the life of physical infrastructure. New technology strengthens the DOT's ability to improve mobility and safety without expanding highway capacity. A growing public emphasis on the use and importance of other modes, whether within the right-of-way or outside of it, also challenges traditional

thinking about road construction. Finally, the increasing occurrence of extreme weather events is prompting agencies to consider retrofitting their transportation system to improve resiliency, and to gather condition data on previously under-examined highway elements, such as culverts, that play an important role when storms or flooding occur.

The shift away from new construction and expansion projects has and will continue to affect DOT organizational structures in the years to come. The growing focus on systems management and operations, incorporation of other modes and improving resiliency across modes requires new skills. These broader issues often cannot be addressed solely by the DOT. There is a continuing need to build and maintain partnerships and improve communication and coordination with a wide variety of agencies.

## Public Expectations

Public involvement in project development, project planning, construction implementation and long-range planning have long been part of the DOT's responsibilities. Likewise, the public's expectation for accountability and transparency are not new to DOTs, but those expectations are growing and evolving. The nature of public interactions is changing because of the options presented by new technology. State DOTs need to adapt, employing strategies that make the most effective use opportunities for public input.

For example, in response to increasing public concern about the impact of extreme weather and increased competition for natural resources, some DOTs have begun to adopt goals related to sustainability. Sustainability

seeks to balance social, economic and environmental needs – considering both current and future generations. Meeting this “triple bottom line” requires agencies to rethink their mission(s) and operating principles. Stronger interagency partnerships, expanded public participation, and adoption of risk-based, adaptable decision-making processes are required.

Sustainability isn't the only concern gaining public traction. The increase in the number and presence of other advocacy groups promoting multi-modal options, equity and equality in transportation, and public health initiatives such as active transportation, air quality and access to medical care add to the challenges facing DOTs.

Addressing these growing public expectations can be made easier with the use of technology. However, new technology initiatives must be carefully planned to ensure that supporting process changes and skills are in place. For example:

- **Public Involvement:** Technology offers new ways to involve the public in project development and long-range planning that may be more efficient and cost-effective than traditional “town hall” style public meetings. Legal requirements for public involvement may need an overhaul to allow the use of new methods while still ensuring that everyone in the public has an opportunity for comment. New skills may be needed at the DOT to identify and involve previously uninvolved segments of the public, as well as to gather, analyze and address a wider range of public input.

- **“Real-time” Information:** The public increasingly seeks better information access and real-time data accuracy, given the technology advancements occurring. This can be an opportunity for DOTs to better demonstrate performance progress and the value that transportation adds to the public good. It also presents workload challenges for DOTs and requires improvements to capabilities that enable more agile and efficient information delivery.
- **Social Media:** With the growth of social media such as Facebook and Twitter, state DOTs need to be increasingly customer-responsive. The ability to respond quickly and diplomatically to customer complaints – or kudos – on social media requires specific skills and can occupy a significant amount of staff time.
- **Freedom of Information Act (FOIA)**  
**Requests:** State DOTs have processes in place to respond to the specific requirements for transparency and timing specified by FOIA (as well as state-level public disclosure requirements). These requests are increasing, and some DOTs are putting in place “self-service” access to data and documents in order to reduce the need for staff time to respond to individual requests. However, agencies need to guard against inadvertently exposing private information that would otherwise be exempt from FOIA.

E-mails, databases and electronic documents are all subject to FOIA requests. The DOT may need to update its FOIA processes and policies to ensure exempt information remains private.

DOTs will also need to improve efforts to ensure all staff are aware of the what data and documents can be shared.

- **General Communication:** The transition from paper to electronic information increases information access and can improve efficiency in managing communications. However, it also requires state DOTs to continually improve how they are communicating, keeping online information up to date, sharing information through electronic mailing lists, and expanding those lists to widen and improve communication. It may also require the DOT to update and review publication policies to ensure online information still complies with requirements of the Americans with Disabilities Act (ADA).

# Organizational Needs

**Organizational Needs consider the implications of anticipated changes. They identify the ways in which the agency should strengthen or add capabilities to meet future challenges and harness opportunities offered by these changes.**

The second component of the ACB framework identifies the organizational implications of the various change forces for transportation agencies. They represent capability gaps to be filled in order to adapt to the new environment. There are six categories of needs:

- Aligning Skills to Needs
- Attracting & Retaining Workforce
- Agility & Resilience
- Technology Adoption
- Transparency
- Operations Focus

Collectively, these needs consider workforce skills and abilities; organizational functions supporting technology adoption, communication, business process modification and change management; and management styles that enable innovation and agility.

Creating a list of specific capability gaps helps to define the future target state for the agency, and is a necessary step for identifying suitable strategies for implementation.

Each of the six categories of Organizational Needs is described in detail in this section.

## Aligning Skills to Needs

Adapting to the change forces discussed above will require DOTs to transform their workforces to include a different mix of employee skills and abilities.

Both “hard” and “soft” skills will be needed to handle changes in technology and the shift from capital intensive work to a more operations-centric and multimodal orientation.

- Hard skills include: project, contract, and vendor management; system operations; systems engineering; business process analysis; data analytics and data management; and understanding of federal rules and regulations.
- Soft skills include: collaboration; communication, including cross-generational and cross-cultural communication; adaptability; and conflict management.

General leadership and management skills are key to sustaining morale in the face of change and to managing an increasingly diverse workforce. Hard line management styles of

the past will increasingly become a liability, as new staff seek more sympathetic management styles and mentoring relationships.

Aligning skills to needs is not a one-time effort; DOTs need to put in place an ongoing capability to track changing requirements, assess current and likely future gaps, and implement recruiting, staff development and potentially, outsourcing activities to address the gaps.

### Attracting and Retaining Workforce

In the past, government pensions and health benefits were effective tools to attract and retain quality personnel. Those tools are dwindling; what worked in the past will not work in the future. Given the decline of pension benefits, increased competition for specialized skills, and the greater mobility of younger workers, DOTs need to employ new strategies to attract and retain talent.

State DOTs need to find new ways to “brand” themselves as desirable places to work and to promote the benefits of working for a public organization. To find employees with the skills needed for the future, agencies need to reach out in new and different ways, to new and different groups of people. New job descriptions or job categories are needed to find candidates with the appropriate skills, which may require DOTs to work closely with their state human resources/employment agencies to amend existing rules or practices.

Many state DOTs have already learned how to function with fewer staff, and are operating with limited bench strength for key functions. Because staff are less likely to spend their entire career at the DOT, it is vitally important

that agencies have processes in place to quickly and effectively recruit and hire new people to fill vacancies.

### Agility and Resilience

Agility and resilience are related qualities. Agility means nimbleness and flexibility to adapt to new situations. Resilience is the ability to quickly recover following disruptions.

DOT’s need both of these qualities to respond to each of the change forces. They must be able to secure and deploy resources needed to respond to severe weather events and natural disasters – while continuing to deliver their normal programs and services. They must adapt their workforces to meet changing needs – while operating under tight funding constraints and hiring limitations. They must find ways to better collaborate across traditionally separate functional areas to meet new requirements. They must upgrade older technologies and take advantage of new technologies – while controlling costs, managing risks and minimizing disruption to the organization. They must plan, program and deliver projects while facing uncertainties in the long term funding picture.

While each of these examples is quite different, the common thread is the capability to gracefully adjust to evolving needs. Addressing this need requires multiple ingredients – including a coordinated and responsive leadership team, flexible position descriptions, flexible, task-order contracting vehicles, agile software development disciplines, and organization change management support.

## Technology Adoption

DOTs need to expand their capability to rapidly and cost-effectively adopt new technology to take advantage of opportunities for improved efficiency and decision support.

This takes people with the right skills to both manage and execute technology-related projects, as well as people and processes for making wise technology investment decisions. DOT staff and managers will need the ability to determine whether to adopt the latest technologies based on an understanding of costs, benefits and risks.

Implementing new technology will also require improved collaboration among staff in different parts of the agency to ensure and maintain compatibility across systems and with external contributors or stakeholders.

Finally, it will require careful attention to cybersecurity risks and balancing these risks against delivering business value.

## Transparency

Legislative bodies the public expect public agencies to share information about how they are using taxpayer dollars – and what they are accomplishing. For the DOT, improved transparency can help to build public understanding, trust and support for the DOT's work.

DOTs need to continue to improve how they communicate with the public, stakeholders and internal staff. They need to share information about how investment decisions are made, and report on the outcomes of those decisions. They also need to respond to the growing number of information requests. Building the capability for transparency

requires a combination of leadership, communications expertise and infrastructure, process improvement supporting information sharing and dissemination, and staff training.

## Operations Focus

As DOTs put more emphasis on system operations and maintenance, they need to shift organization responsibilities and build staff competencies in system operations and supporting technologies. They also need to strengthen their ability to forge partnerships with other state agencies, other transportation agencies and operators, advocacy groups and the private sector.

# Strategies

**Strategies are the means by which an agency can actively manage its organization, workforce, knowledge, information, data and relationships with stakeholders. They are the ways that DOTs can strengthen or build the organizational capabilities needed to deliver value to customers and stakeholders in a changing environment.**

The third and final component of the ACB framework identifies strategies that can be used to build desired capabilities. Five broad categories of strategies are included:

- Organizational Management
- Workforce Management
- Knowledge Management
- Information and Data Management
- Partnerships

Each of these categories represents an individual discipline with a vast body of knowledge and many existing resources dedicated to its implementation. Therefore, the descriptions below are not intended to be comprehensive, but rather to provide practitioners with a general understanding of what they are and when they are helpful in building agency capabilities.

## Organizational Management

Organizational management strategies involve changes to organizational structure, roles, responsibilities or business processes. Some of these strategies can result in changes to the organizational structure, such as changing the ratio of staff, consultants and

management personnel in an agency's workforce. Some examples include:

- Reorganization of agency functions and creation of new organizational units
- Shifting of staff and resources to better where they are most needed
- Adoption of lean business processes to improve efficiency and effectiveness
- Deliberate change management to help the workforce adjust to new processes or systems
- Organizational performance monitoring and management using frameworks such as Baldrige or Balanced Scorecard
- Organizational culture change initiatives involving training, leadership modeling and reinforcement to support learning, innovation, and/or collaboration.

## Workforce Management

Workforce management strategies seek to align the workforce with the needs and goals of the organization. They are developed based on an understanding of current staffing, likely future changes due to retirement and

attrition, and future needs. These strategies include:

- Workforce planning and position management to identify gaps in skills, and ensure that position descriptions reflect current job requirements.
- Professional development and training to improve and expand the skills of existing staff, including management personnel
- Recruiting and retention plans to attract staff with needed skills and retain them long-term
- Succession planning to minimize disruption caused by retirements and to eliminate key person dependencies
- Employee engagement efforts to improve staff morale and performance

## Knowledge Management

Knowledge management includes strategies and methods for building and sustaining knowledge and experience of both employees and partners that will enable the agency to continue to carry out its mission efficiently and effectively despite disruptions or staff turnover. Common knowledge management strategies include:

- Mentoring, shadowing and apprenticeships to broaden staff skills and understanding
- Knowledge capture through expert interviews and after-action reviews
- Knowledge documentation such as desk manuals, business process diagrams and an archive of lessons learned
- Electronic knowledge bases such as portals, wikis, or content management systems

- Social and learning communities organized around specific topics of interest
- Coaching and training to cultivate a learning culture

## Information and Data Management

Information and data management strategies need to address the full data and information life cycle, including planning, collection, creation, organization, use, storage, dissemination and disposal. Strategic planning related to data and information management can ensure that transitions to new data sources and adoption of new systems are accomplished in a coordinated fashion. Key information and data management strategies include:

- Developing a well-defined data governance structure to oversee data management policy, strategy and tactics
- Creation of strategic plans for information technology and data
- Establishment of an information architecture and standards to ensure consistency across the organization
- A plan for deployment of systems and processes for data integration to ensure implementation proceeds smoothly and involves all stakeholders
- Efforts to improve data access across the agency to reduce duplication and derive maximum value from data
- Improvements to reporting and analysis tools and methods
- Consistent management of records and content, incorporating search capabilities to facilitate information access

## Partnerships

Building and managing external partnerships is a key strategy for state DOTs to access specialized skills, provide agility, leverage new technologies, share data, collaborate on special initiatives and maximize resources in a constrained funding environment. Partnership strategies can include:

- Use of public-private partnerships for specific types of work or projects; some DOTs have created a special office to facilitate innovative public/private partnerships
- Development of interagency agreements or Memoranda of Understanding to combine or leverage resources for a variety of purposes
- Development of data sharing agreements between agencies to reduce collection costs
- Establishment of partnerships with Universities or private firms to provide capabilities that would be difficult to develop or sustain within the DOT

# Chapter 2 Resources

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## Use this Guidebook's Companion Digital Platform

The digital Agency Capability-Building Portal (ACB Portal), developed in coordination with this guidance, incorporates additional resources and updated information. Read Chapter 2 of the Guidebook on the ACB Portal: <https://www.agencycapability.com/chapter/2-framework/>

# 3. Strategies

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This chapter provides a guide to common methodologies, practices, and approaches used to build agency capabilities.

# Strategies Introduction

Strategies are the third element of the ACB framework. They are the means by which transportation agencies can strengthen their capabilities to respond to change forces. A given strategy may involve people, process and/or technology components.

The strategies covered in this chapter are major topics in management science and a wealth of resources about them is readily available. This chapter provides a brief overview of each strategy and includes illustrative practice examples. References with additional information can be found at the end of the chapter.

Capability-building is an ongoing process and agencies vary with respect to their maturity levels. Organizations at lower levels of maturity may not be able to employ the same strategies as those at higher levels of maturity because they have a bigger gap to close to get where they want or need to be. Each agency can develop a roadmap with appropriate strategies for closing gaps.

# Organizational Management

**Organizational management is a mechanism for building an efficient and effective organization through the optimal use of available assets and resources.**

## What is Organizational Management?

Organizational management strategies strive to achieve organizational excellence.

Organizational excellence is “the ongoing efforts to establish an internal framework of standards and processes intended to engage and motivate employees to deliver products and services that fulfill customer requirements within business expectations. It is the achievement by an organization of consistent superior performance—for example, outputs that exceed meeting objectives, needs, or expectations.”<sup>1</sup>

Organizational management includes: the development and adjustment of organizational structures; deployment of Lean and other process improvement methodologies; management of performance and change within the organization; the culture and strategies of the organization; and practices the organization uses to address shifts and trends in the use of its resources.

According to the International City Management Association (ICMA), the 8 keys to organizational excellence are:

- Delight your customers
- Get results from vision and strategic planning
- Create a culture from your values
- Understand and incorporate both leadership and management
- Pay attention to engagement and passion
- Maximize performance
- Measure progress
- Manage change<sup>2</sup>

Organizational management provides a strategic framework to ensure the agency focuses on developing capability in these areas.

## How Does Organizational Management Support Capability-Building?

Organizational management strategies are foundational to helping agencies adapt to change. They ensure ongoing alignment between the organization’s objectives and its structure, workforce, business processes, and resource allocation. By actively incorporating organizational management strategies, the agency is able to stay aware of its strengths and weaknesses and can respond as changes occur.

## What Does Organizational Management Look Like in Practice?

Organizational management strategies include:

- Aligning organizational structure to strategy
- Incorporating Lean and other business process improvements to improve efficiency and effectiveness
- Creating a feedback loop to continue to check and adjust performance
- Developing a system to manage change within the organization

- Facilitating a leadership culture that is conducive to carrying out agency strategies
- Formalizing the agency’s organizational approach to adjust resources to align with shifting needs

Table 3.1 below lists examples of the subcategories within organizational management, along with the associated activities and organizational capabilities that are addressed through organizational management.

**Table 3.1 Organizational Management Strategies**

Strategy subcategory	Sample Activities	Capabilities Addressed
<b>Strategic Planning</b>	Annual strategic planning workshop	Aligning Skills to Needs Attracting & Retaining Workforce Agility & Resilience Technology Adoption Transparency Operations Focus
<b>Organizational Structure</b>	Organizational restructuring initiative	Agility & Resilience Technology Adoption Operations Focus
<b>Process Improvements</b>	Lean events	Agility & Resilience Technology Adoption
<b>Performance Management</b>	Quarterly agency performance reviews with feedback loops	Agility & Resilience Transparency
<b>Change Management</b>	Agency change management function and framework	Agility & Resilience Technology Adoption Operations Focus
<b>Organizational Culture</b>	Leadership culture and strategy retreat	Attracting & Retaining Workforce Agility & Resilience Transparency Operations Focus

### Lean Everyday Ideas at CDOT leverages economies of scale to spread innovation

CDOT has a long history of process improvement through Lean events and other process improvement mechanisms in alignment with their vision of "everyone, every day, improving every process and every product, to benefit every customer."

CDOT's Lean Everyday Ideas (LEI) innovations and improvements were named a Top 25 program for the Innovation in American Government Award by the Ash Center for Democratic Governance and Innovation at Harvard University.

CDOT's process improvement success can be attributed to the agency's ability to drive a culture of learning and to encourage the spread and "borrowing" of innovations throughout the agency.

By publicizing innovative ideas, CDOT has enhanced its capability to create a learning culture by engaging its 3,000 employees and 5 regions to "...make someone else's idea work for them."<sup>3</sup>

# Workforce Management

**Workforce management ensures the appropriate level of knowledge, skills and abilities are available in the agency to carry out its critical activities today and in the future.**

## What is Workforce Management?

Workforce planning is defined as “the organization's coherent framework of human capital policies, programs, and practices to achieve human capital requirements that are directly tied to and supportive of the goals, objectives and outcomes of the agency's strategic plan. It is the planning mechanism for assuring that the organization has the right people, with the right competencies, in the right place, at the right time.”<sup>4</sup>

Workforce management includes: the development of new job descriptions aligned with critical needs; deployment of programs related to employee compensation and rewards; succession planning; leadership development; and training programs to develop soft skills and cultural competencies, as well as cross-training.

## How Does Workforce Management Support Capability-Building?

Workforce management creates and develops the human resources needed to carry out the strategies, goals and objectives of the agency. By actively incorporating workforce management, the agency has the knowledge, skills and abilities necessary to deploy its most

critical activities today, and quickly respond to future human capital needs.<sup>5</sup>

Ten key DOT workforce needs are:

- Attracting and retaining talent
- Retooling the workforce to meet evolving business needs
- Developing the next generation of leaders
- Downsizing
- Preserving institutional knowledge
- Employee conflicts and performance issues
- Outsourcing
- Organizational change – reengineering and reorganizing
- Improving HR efficiency and effectiveness<sup>6</sup>

By employing workforce management, transportation agencies can reflect on the gaps created by these workforce needs and create additional capability in these areas.

## What Does Workforce Management Look Like in Practice?

Workforce management refers to activities engaging in:

- Strategic workforce planning
- Recruitment and retention practices
- Ensuring seamless transition of processes, roles and responsibilities
- Supporting staff engagement
- Developing talent
- Strategic outsourcing to build specialized skills or handle temporary needs

Table 3.2 below includes examples of the subcategories within workforce management, along with the associated activities and organizational capabilities that are built through workforce management.

**Table 3.2 Workforce Management Strategies**

Strategy subcategory	Sample Activities	Capabilities Addressed
<b>Strategic workforce planning</b>	Summarize likely future retirement trajectory for key position types	Aligning Skills to Needs Technology Adoption Operations Focus
<b>Recruitment and retention</b>	Modify position descriptions and job postings	Aligning Skills to Needs Attracting & Retaining Workforce Technology Adoption Operations Focus
<b>Succession planning</b>	Identify critical positions and potential successors	Aligning Skills to Needs Agility & Resilience Technology Adoption Operations Focus
<b>Employee engagement</b>	Employee satisfaction surveys	Attracting & Retaining Workforce Agility & Resilience Transparency
<b>Professional development</b>	Leadership training	Aligning Skills to Needs Attracting & Retaining Workforce Agility & Resilience Technology Adoption Transparency Operations Focus
<b>Outsourcing</b>	Identify functions to outsource	Aligning Skills to Needs Agility & Resilience Technology Adoption Operations Focus

## California Statewide Workforce Planning

In 2013, the Department of Government Operations started an initiative to understand and modernize the civil service system in California. updating human resources processes, websites and other tools to consolidating obsolete job titles and update processes. As part of their ongoing Civil Service Improvement effort, California conducted an evaluation of challenges and trends. The results are summarized in the 2016 Statewide Workforce Planning Report, which details a number of issues related to its workforce, including:

- Inability to recruit qualified candidates
- Complex civil service hiring process
- Lack of essential competencies
- Lack of diversity
- Retention issues
- Lack of advancement opportunities<sup>7</sup>

In response to the report, the California Department of Human Resources (CalHR) developed a Statewide Strategic Plan and required agency plans. Since then, CalHR has developed a comprehensive set of workforce planning tools to help the state's agencies, including the California Department of Transportation (CalTrans), manage workforce and succession planning.<sup>8</sup>

Their Workforce Planning Toolkit for State Supervisors and Manager includes:

- Strategic Workforce Plan
- Strategic Succession Plan
- Guides and templates
- Statewide Onboarding Program
- Articles
- Leadership competency model
- Mentoring Handbook

They also provide a set of tools by category to assist practitioners in:

- Analyzing workforce data
- Reviewing noteworthy practices in other states
- Implementing a workforce plan
- Evaluating a workforce plan
- Networking with other HR professionals
- Understanding current workforce trends

By incorporating statewide workforce planning, California has increased their agency capability to recruit and retain staff with skills needed for the future, developed capability to manage workforce change and incorporated a workforce management system to facilitate the capability to create and support a learning culture.

# Knowledge Management

**Knowledge Management ensures the agency effectively creates, stores and uses existing knowledge to help it carry out its organizational goals and objectives.**

## What is Knowledge Management?

Knowledge management is an established field that recognizes the intellectual capital of an organization as an asset to be managed to advance the organization's objectives.

Knowledge management refers to a variety of techniques for building, leveraging and sustaining the agency's body of knowledge and the experience of its employees and partners, which enables it to act in an intelligent way. It includes both tacit "know-how" as well as access to explicit knowledge that has been codified.<sup>9</sup>

As illustrated in figure 3.1, knowledge is developed through learning – which can happen when an individual reads a document, participates in a training course, shadows another employee, or collaborates with his/her peers. Knowledge management is closely related to information management. Whereas information management considers how information is stored, categorized, organized and accessed, knowledge management is more about what people know and how this knowledge can be leveraged by the organization.

Knowledge management includes mechanisms to capture and transfer

knowledge, reuse existing knowledge, participate in communities of common practice and other opportunities for collaboration and knowledge sharing, and the use of IT and management systems for maintaining knowledge bases.

## How Does Knowledge Management Support Capability-Building?

Knowledge management strategies are integral to agency capability-building. They help agencies to better respond to a rapidly changing environment through identifying, creating, capturing and sharing relevant knowledge.

Done well, knowledge management offers a repeatable, proven way to conduct business and meet customer needs that takes into account historical context, experiences and lessons learned.

Other organizational benefits of knowledge management include:

- Systematically understanding and addressing an organization's knowledge gaps
- Improving collaboration
- Providing opportunities for learning and problem solving

- Improving productivity by helping employees to avoid mistakes that others have learned from

### What Does Knowledge Management Look Like in Practice?

The cycle of knowledge from creation and organization through sharing and reuse is well documented in the literature. As shown in Figure 3.1, this cycle includes:

- Learning – as a result of accessing knowledge through information discovery and review or interactions with other people
- Using or applying knowledge
- Capturing knowledge by writing down lessons learned or creating documentation
- Managing codified information so that it can be discovered<sup>10</sup>

Knowledge management includes:

- cultivating social and learning communities,
- providing knowledge codification and dissemination or transfer,
- creating a learning organization,
- mentoring less tenured employees, and
- creating expertise directories to help make connections across employees

Table 3.3 below lists examples of the subcategories within knowledge management, along with the associated activities and organizational capabilities that are built through this strategy.

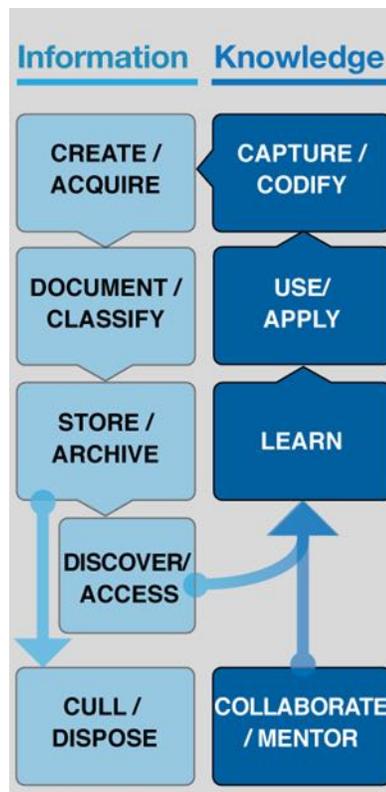


Figure 3.1. The Information and Knowledge Life Cycle<sup>11</sup>

**Table 3.3 Knowledge Management Strategies**

Strategy subcategory	Sample Activities	Capabilities Addressed
<b>Social and Learning Communities</b>	Facilitating Communities of Practice that meet periodically to share experiences and brainstorm about solutions to common problems	Aligning Skills to Needs Attracting and Retaining Workforce Agility & Resilience Technology Adoption Operations Focus
<b>Knowledge Capture and Transfer</b>	Creating a curated, validated lessons learned database	Aligning Skills to Needs Agility & Resilience Technology Adoption Operations Focus
<b>Knowledge Audits</b>	Conducting an employee survey to discover and catalog where certain types of expertise exist in the agency	Aligning Skills to Needs Agility & Resilience Technology Adoption Operations Focus
<b>Learning Organization</b>	Leadership training to model behaviors conducive to learning and innovation	Aligning Skills to Needs Attracting and Retaining Workforce Agility & Resilience Technology Adoption Operations Focus
<b>Mentoring</b>	Matching up less experienced employees with more senior employees to meet periodically and discuss challenges	Aligning Skills to Needs Attracting and Retaining Workforce Agility & Resilience Technology Adoption Operations Focus
<b>Expertise Directories</b>	Creating a directory of employees with expertise in certain specialized areas	Aligning Skills to Needs Agility & Resilience Technology Adoption Operations Focus

## The Evolution of Knowledge Management within Washington State DOT

Washington DOT (WSDOT) has established a knowledge management approach for addressing:

- Loss of institutional knowledge due to an aging workforce nearing retirement
- Pressure for increased efficiency in the face of inadequate resources
- Organizational strategic direction to support innovation and knowledge sharing<sup>12, 13</sup>

They have implemented several KM initiatives, including:

- Communities of practice (CoPs)
- Knowledge Capture interviews of retiring staff
- Knowledge management and information systems to support practical solutions

# Information and Data Management

**Information management and data management are two related strategies for transforming data into useful information that can inform agency decision making.**

## What are Information and Data Management Strategies?

Information management is defined by the Association for Project Management (APM) as “the collection, storage, dissemination, archiving and destruction of information.”<sup>14</sup>

Federal Highway Administration (FHWA) Transportation Performance Management (TPM) Toolbox defines data management as “... encompass[ing] a set of coordinated activities for maximizing the value of data to an organization. It includes data collection, creation, processing, storage, backup, organization, documentation, protection, integration, dissemination, archiving and disposal.”<sup>15</sup>

Data management is necessary, but not sufficient, to inform decision making in the absence of closely related information management strategies. As described in NCHRP Research Report 920 – Management and Use of Data for Transportation Performance Management: Guide for Practitioners: *“For many agencies, the problem is not a lack of data; it is a lack of capabilities to transform available data into useful information. This requires deliberate effort at all stages of the data life cycle, from*

*specification through analysis to make sure that data is of sufficient quality; and that it can be integrated, visualized and used to provide insights. Having people with the right skills and experience to carry out these activities is essential.”*

In this guidebook, we include strategies for information technology (IT) management under the “information management” umbrella because IT management improvements are integral to getting more value from data and information.

## How Do Information and Data Management Support Capability-Building?

Information and data management strategies ensure the effective and efficient use of information and data to inform agency decision-making and outcomes. These strategies include the processes, systems, policies, practices and procedures associated with managing the agency’s critical information and data throughout their lifecycle.<sup>16</sup>

By actively managing its information and data, the agency can ensure good data stewardship,

and valid, reliable and accessible information for fully informed decision making across the organization.

### What Do Information and Data Management Look Like in Practice?

Information and data management strategies include:

- Strategic planning for IT initiatives
- Information Technology and data governance
- Data integration platforms and processes
- Data services for enabling access to data that exists in various locations
- Business intelligence and analytics solutions and services for data visualization, analysis and communication
- Agile software development methodologies
- Cloud solutions such as software-as-a-service
- IT project and service portfolio management tools and processes to track and prioritize efforts

Table 3.4 lists examples of the subcategories of information and data management, along with the associated activities and the organizational capabilities that are built using them.

**Table 3.4 Information and Data Management Strategies**

Strategy subcategory	Sample Activities	Capabilities Addressed
<b>IT Strategic Planning</b>	Creating an IT strategic plan linked to the agency strategic plan	Aligning Skills to Needs Agility & Resilience Technology Adoption Transparency Operations Focus
<b>IT and Data Governance</b>	Establishing information- and data-related governance structures and processes	Agility & Resilience Technology Adoption Transparency Operations Focus
<b>Enterprise Data Integration/Data Services</b>	Creating a data warehouse  Creating Application Programming Interfaces (APIs) for open data access	Agility & Resilience Technology Adoption Transparency Operations Focus
<b>Business Intelligence/Analytics</b>	Establishing an Analytics Center of Excellence to provide services and training to business units	Aligning Skills to Needs Agility & Resilience Technology Adoption Transparency Operations Focus
<b>Agile Development</b>	Establishing Agile software development processes featuring a series of incremental “sprints” based on prioritized user stories	Agility & Resilience Technology Adoption
<b>Cloud Solutions</b>	Pursuing software as a service (SaaS) and platform as a service (PaaS) solutions for selected applications to provide flexibility and facilitate maintenance and updates.	Agility & Resilience Technology Adoption Transparency Operations Focus
<b>Project and Services Portfolio Management</b>	Tracking the status of technology projects and services and prioritizing additions based on business needs and available resources.	Agility & Resilience Technology Adoption Transparency

## Texas DOT Data and Information Management Approach

Texas DOT (TxDOT) has developed a comprehensive data and information management system and collaborative performance implementation approach to overcome siloes that limited information-sharing in the past and to address MAP-21 performance requirements in collaboration with its MPOs.

The agency's Information Management Division provides innovative IT and strategic information resource planning services.

Their "OneDOT Data Shop" provides a coordinated inventory of information and data sets used by the agency and its MPOs for collaborating on planning and decision making. This resource includes:

- State and federal financial information
- Census data
- Economic trends
- Letting and work plans
- Program reports
- Project statuses<sup>17, 18</sup>

# Partnerships

**Partnership management is a mechanism to create mutually beneficial outcomes compared with operating alone or separately from external partners.**

## What is Partnership Management?

Strategic partnerships provide opportunities to achieve more than is possible for an individual agency working in isolation. Partnerships ensure broader stakeholder interests are considered and reduce the risk of misalignment and working at cross purposes. By actively managing partnerships among public agencies and with the private sector and academia, transportation agencies can potentially achieve greater outcomes with the same resources.

Partnerships include activities for preparing and promoting public-private partnerships, contracting in new and innovative ways; and collaborating on data-sharing agreements and other initiatives of joint interest.

Developing mutually beneficial relationships outside of the agency is not always easy, and fostering ongoing partnerships requires thoughtful care and mutual respect. According to a recent poll by McKinsey & Company, the biggest risks for strategic partnerships include:

- Misalignment on objectives
- Poor communication and lack of trust
- Poor governance practices
- Inability to adjust to change<sup>19</sup>

Figure 3.2 shows four factors critical to fostering a positive partnership. These include:

- Establishing roles and responsibilities ensures common expectations for who is responsible for what and when and enables communication.
- Building trust enables teams to experience a feeling of reduced risk when relying on other parties.
- Developing clear communication channels improves productivity and morale among parties working toward a common goal.
- Monitoring and evaluating results establishes measures for and progress toward success.

Despite the inherent challenges associated with partnership management, when done correctly partnerships can provide a win-win for both parties. For example, public/private partnerships can shift some project risks, such as financial, construction or infrastructure operation to the private sector, and benefits the public sector by accelerating innovations, speeding up development and delivery of new technologies and mitigating financial, organizational and cultural transportation agency barriers to implementation.<sup>20, 21</sup>

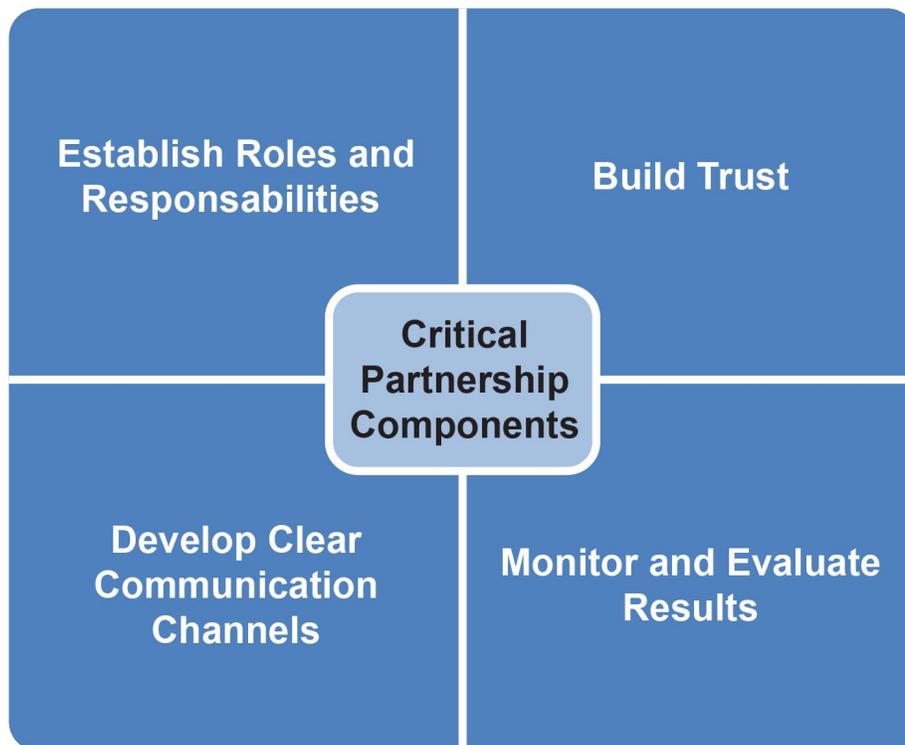


Figure 3.2 Partnership Components

### How Do Partnerships Support Capability-Building?

Partnership management supports capability building in several ways. First, it enhances existing agency capabilities with the complementary or supplementary capabilities of partner agencies. In the example described above, a state DOT may enhance its ability to adopt new technologies that would otherwise be out of reach given the agency’s existing financial or human resources.

In addition, the shared vision that develops through strong partnerships speeds up innovation and collaboration by establishing “what good looks like” and setting a clear course for successful implementation. In this way, partnerships enable new capabilities and also help improve the efficacy of existing capabilities, while promoting capability maturity development in these areas.

### What Does Partnership Management Look Like in Practice?

Partnership management refers to activities related to:

- collaborating with private sector partners,
- being flexible and innovative in project contracting methods, and
- collaborating with partners and stakeholders, such as on IT agreements.

Table 3.5 below includes examples of the subcategories within partnership management, along with the sample activities and organizational capabilities that are built through partnerships.

**Table 3.5 Partnership Strategies**

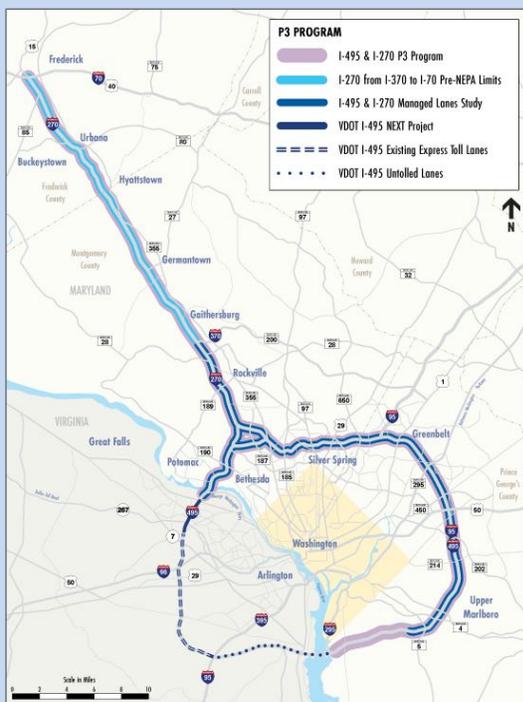
Strategy subcategory	Sample Activities	Capabilities Addressed
<b>Public/private partnerships</b>	Partnering with private firms to implement new connected vehicle technology in a corridor	Aligning Skills to Needs Agility & Resilience Technology Adoption Operations Focus
<b>Interagency Agreements</b>	Executing data sharing agreements with partner agencies	Agility & Resilience Technology Adoption Operations Focus
<b>Innovative Contracting Methods</b>	Putting contracting methods in place that enable flexibility (such as task order contracts) or enable the contractor to operate a new system for a period prior to turning it over to the agency.	Aligning Skills to Needs Agility & Resilience Technology Adoption Operations Focus

## Maryland DOT Public Private Partnerships

The I-495 and I-270 P3 Program at the Maryland Department of Transportation leverages public-private partnerships and local input to design, finance and build improvements aimed at reducing severe traffic congestion on 70 miles of interstate and adjacent local roads.<sup>22</sup>

Several components of the program include:

- I-495 & I-270 Managed Lanes Environmental Impact Study to provide users with a choice of paying a toll for reliable, reduced congestion lanes or using the existing lanes toll-free.
- I-270 from I-370 to I-70 Pre-National Environmental Policy Act activities including public input.
- Opportunity MDOT: Resources to encourage P3 participation by small, minority-, women- and veteran-owned businesses and disadvantaged businesses.
- Partnering opportunities with the private sector on designing, financing, building, operating and maintaining improvements.



Previously, the National Capital Region experienced severe traffic congestion.

By leveraging local input and private partnerships, MDOT has been able to achieve time savings of 12 percent on managed lanes. They have increased their capability to create a culture of transparency and accountability by providing the traveling public with travel options, while improving capability to collaborate across jurisdictions.

# Chapter 3 Resources

## Use this Guidebook's Companion Digital Platform

The digital Agency Capability-Building Portal (ACB Portal) developed in coordination with this guidance incorporates additional resources and updated information. Read Chapter 3 of the Guidebook on the ACB Portal: <https://www.agencycapability.com/chapter/3-strategies/>

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# 4. Role-Based Guidance

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**This chapter provides quick guides for a set of agency roles with responsibilities and capabilities in response to change forces and pressing needs.**

# Role-Based Guidance

## Introduction

By understanding the primary transportation agency roles included in this chapter, the DOT gains insight into the current state of the agency from each of these perspectives and how to use strategies to improve capabilities that address change forces.

### Why is understanding roles critical to understanding capability-building?

Transportation agency roles are central to providing clarity on:

- Ownership of responsibility for specific strategic, operational and tactical functions and activities, and
- Enabling effective lines of communication among other roles within and outside of the agency.

Roles are various functional positions within the organization. Change forces may impact each role in a different way, and each role has a different part to play in building agency capability.

### What does the guidance include?

Guidance for each role includes the following sections:

- Identification of change forces that are most relevant to the role, the associated challenges and opportunities created by these change forces, and the responsibilities of the role for organizational capability building

- Strategies that can be used to build organizational capabilities
- Initial steps that can be considered
- Resources that can be used to obtain further information and guidance on the change forces and strategies

### What roles are included in the guidance?

This guidance does not represent an exhaustive list of roles, but includes the primary categories of leaders and practitioners that are critical to the operation of a typical state transportation agency.

The following roles are covered:

- **Chief Executive Officer (CEO)/Chief Operating Officer:** The highest-ranking executives in the state DOT. These individuals are responsible for overseeing the activities of the entire agency.
- **Chief Financial Officer (CFO):** This individual has primary responsibility for financial planning, management and reporting for the agency.
- **Information Technology Director/Chief Information Officer (CIO):** This role is a composite of what may in practice be

several individual roles within a DOT that are responsible for technology, information, and data management.

- **Human Resources (HR) Director:** This role manages all human resource planning, management, policies and operations for the agency.
- **Operations Lead:** This role is responsible for system operations and maintenance. They may be the Chief Engineer or a Deputy Director for Maintenance and Operations.
- **Communications Lead:** This role leads and directs strategic communications and outreach functions for the agency.
- **Planning Director:** This role is responsible for the transportation planning function within the agency.
- **Performance Management Lead:** This role is responsible for collecting, measuring, reporting and recommending action related to performance information within the agency.
- **Knowledge Management Lead:** This role leads the creation, dissemination and management of knowledge and information within the organization.

The roles-based guidance includes some of the most critical roles at the time of publication. This guidebook establishes a framework for the flexible online guidance that provides for additional roles, evolving change forces, new strategies and emerging resources over time.

Role

# Knowledge Management Lead



**Defined**

**The Knowledge Management Lead** leads the creation, capture, sharing and dissemination of knowledge within the organization.

## Challenges and Opportunities

**In your role, what are the most critical challenges and opportunities?** Looking across the agency, what capabilities are required to successfully take them on? How can you help build the necessary capabilities? The first step is to understand these challenges and opportunities in terms of the major change forces that are driving them.

<i>Change Forces</i>	<i>Challenge/Opportunity</i>	<i>Your Responsibility</i>
<b>Technology Advancement</b>	New technology like connected and autonomous vehicles, unmanned aerial vehicles, and machine learning impacts the types of knowledge needed by the organization.	<b>Aligning Skills to Needs.</b> Understand the likely future needs of your organization over the next 5-10 years and help to develop a strategy for building new knowledge – through partnerships, workforce development or recruiting efforts.
<b>Legislation, Regulation, and Funding</b>	The agency must develop or tap into knowledge, skills and abilities to respond to new requirements.	<b>Aligning Skills to Needs.</b> Facilitate the agency’s response to new requirements to rapidly tap into available expertise.
<b>Workforce Evolution</b>	New generations of workers are generally more open to collaboration and more comfortable with technology than their predecessors. However, they tend to change jobs more frequently.	<b>Aligning Skills to Needs, Technology Adoption.</b> Leverage the skills of early-career employees to move the organization forward with respect to technology use. Advance collaboration and knowledge capture techniques to minimize knowledge loss associated with employee turnover.
<b>Shift in DOT Role and Focus</b>	Growing focus on systems management and operations, incorporation of other modes and improving resiliency across modes requires new skills.	<b>Aligning Skills to Needs, Operations Focus.</b> Work to enhance the agency’s knowledge base in these areas, facilitate opportunities for employees to learn from both internal and external experts.
<b>Public Expectations</b>	Increased expectations for transparency create the need for employees to build communication and collaboration skills. Increased frequency and complexity of public information requests puts pressure on the agency to find and share requested information.	<b>Aligning Skills to Needs, Transparency.</b> Facilitate mentoring or shadowing opportunities to strengthen communication and collaboration skills. Work to improve content management practices and search capabilities to reduce time requirements associated with public information requests.

## Strategies and Resources

**What strategies can you apply now to meet today's challenges and prepare for future opportunities?** What resources are available to help support these efforts?

### Knowledge Management

- Knowledge Audits - to understand existing workforce skills and abilities
- Communities of Practice - to share knowledge and develop new practices required to respond effectively to change forces
- Mentoring – including “reverse mentoring” to enable newer, more “tech savvy” employees to share their knowledge with employees who are not as comfortable with technology
- Knowledge Capture and Transfer - to gather guidance and examples of successful practices at other organizations that would help the agency to implement changes.
- Expertise Directories - to facilitate connections to employees and outside experts with specialized expertise.

### Where to Begin

- Review relevant knowledge management guidance documents
- Make contact with knowledge management leads in other DOTs to get ideas and guidance on successful practices
- Conduct a risk assessment to identify the most pressing concerns to be addressed
- Interview agency managers to understand emerging skills gaps (in collaboration with HR leads)
- Identify existing knowledge management initiatives in the agency that may not be explicitly called “knowledge management”
- Create an implementation plan to address key risks

### Resources

- NCHRP Report 813, “A Guide to Agency-Wide Knowledge Management for State Departments of Transportation” <http://www.trb.org/Publications/Blurbs/173082.aspx>
- TCRP Report 194, “Knowledge Management Resource to Support Strategic Workforce Development for Transit Agencies” <http://www.trb.org/TCRP/Blurbs/176944.aspx>
- NCHRP Project 20-68A, Scan 12-04, “Advances in Transportation Agency Knowledge Management, [http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-68A\\_12-04.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-68A_12-04.pdf)
- AASHTO Committee on Knowledge Management website, <https://km.transportation.org/>
- TRB Knowledge Management Committee website, [www.trbkm.org](http://www.trbkm.org)

## Learn More

This guide is also available via the **Agency Capability Building Web Portal (ACB Portal)** developed through NCHRP Project 20-24(95)A: Ensuring Essential Capability for the Future Transportation Agency.

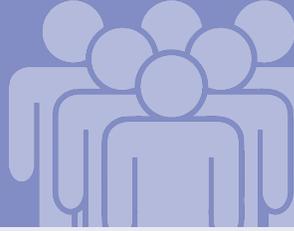
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Role

# Chief Human Resources Officer



**Defined**

**The Chief Human Resources Officer** is responsible for managing all human resource planning, management, policies and operations for the agency.

## Challenges and Opportunities

**In your role, what are the most critical challenges and opportunities?** Looking across the agency, what capabilities are required to successfully take them on? How can you help build the necessary capabilities? The first step is to understand these challenges and opportunities in terms of the major change forces that are driving them.

*Change Forces*

*Challenge/Opportunity*

*Your Responsibility*

**Workforce Evolution**

When tenured staff retire, it creates an experience gap in the agency, as well as opportunities for introducing new skills and perspectives. At the same time, new expectations of millennials in the workforce are creating a need for new ways of selling the benefits of working in a public organization.

**Attracting and Retaining.** Advance agency talent acquisition and retention strategies to close experience gaps when tenured staff retire and to understand and respond to the needs of the new generation of workers.

**Technology Advancement**

Technology advancements impact the skills and abilities needed by the agency, but acquiring these new skills is challenging because they are also highly sought after in the private sector.

**Aligning Skills to Needs.** Lead the agency in developing strategies to improve the agency’s competitive advantage to recruit and retain staff with technology-focused skillsets.

**Shift in Role and Focus**

This shift in role and focus impacts the agency knowledge, skills and abilities needed and may affect the organizational structure.

**Operations Focus.** Help the agency’s workforce to efficiently and effectively deliver on its new business direction.

**Legislation, Regulation, and Funding**

Responding to new legislative requirements may require new knowledge, skills and abilities.

**Agility and Resilience.** Lead the agency in developing mechanisms to quickly adapt its workforce to respond to new legislative requirements.

## Strategies and Resources

**What strategies can you apply now to meet today's challenges and prepare for future opportunities?** What resources are available to help support these efforts?

### Workforce Management

- Strategic Workforce Planning – to support organizational changes made to align the agency organizational structure with its business objectives
- Recruitment and Retention – to improve the agency's ability to attract and retain talent
- Succession Planning – to ensure seamless transition of processes and staff turnover
- Employee Engagement – to improve productivity and effectiveness to adapt to change forces
- Professional Development – to close gaps in competencies, capabilities, knowledge, skills and abilities

### Organizational Management

- Organizational Structure – to improve the efficiency and effectiveness of the organization to meet new challenges and leverage opportunities to improve
- Performance Management - to ensure the agency is able to measure and achieve recruitment and retention outcomes

### Knowledge Management

- Knowledge Audits – to understand current workforce skills and gaps

### Where to Begin

- Interview agency managers to understand emerging skills gaps (with KM Lead)
- Monitor leadership and staff bench strength and provide guidance on organizational adjustments that may be needed to align skills with strategies (in collaboration with CEO/COO)
- Review workforce management and succession planning guidance documents
- Investigate noteworthy practices for understanding and addressing competencies, capabilities, knowledge, skills and abilities needed in the future
- Develop new or modified position descriptions for future workforce needs
- Develop new recruitment strategies to appeal to a new generation of workers, consider career changers and non-traditional applicants, emphasize work life balance and other advantages of public agency work
- Talk with HR Leads in other DOTs about noteworthy practices and lessons learned
- Monitor new federal requirements, confer with agency policy leaders, and identify and close related workforce gaps

### Resources

- Georgia DOT, "STEM and Our Future Transportation Leaders," <https://www.agencycapability.com/library/>
- NCHRP Report 693, "Attracting, Recruiting and Retaining Skilled Staff for Transportation System Operations and Management," <http://www.trb.org/Publications/Blurbs/166342.aspx>
- AASHTO Committee on HR, <https://humanresources.transportation.org>
- NCHRP 08-125, "A Comprehensive Study of Future Competencies for Transportation Planners," (Active Project), <https://www.agencycapability.com/library/>
- AASHTO Committee on Human Resources: Workforce Toolkit, <http://toolkit.ashr.transportation.org/NCHRP.aspx>
- NCHRP Synthesis 323, "Recruiting and Retaining Individuals in State Transportation Agencies," <http://toolkit.ashr.transportation.org/StatePracticesRecruit.aspx>
- NCHRP Synthesis 362, Training Programs, Policies and Practices, <http://toolkit.ashr.transportation.org/StatePracticesTraining.aspx>
- US Bureau of Labor Statistics, <https://www.bls.gov>

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Role

# Operations Lead



**Defined**

**The Operations Lead** for the State DOT. This role is typically played by a Deputy Director with responsibility for traffic engineering, operations, and maintenance, or the Chief Engineer.

## Challenges and Opportunities

**In your role, what are the most critical challenges and opportunities?** Looking across the agency, what capabilities are required to successfully take them on? How can you help build the necessary capabilities? The first step is to understand these challenges and opportunities in terms of the major change forces that are driving them.

<i>Change Forces</i>	<i>Challenge/Opportunity</i>	<i>Your Responsibility</i>
<b>Shift in Role and Focus</b>	Maintenance and operations are increasingly important and visible agency functions.	<p><b>Operations Focus.</b> Strengthen the system operations function of the agency to make best use of available capacity.</p> <p><b>Attracting and Retaining.</b> Build a team with the skills and background needed for Transportation Systems Management and Operations (TSMO) strategy planning and implementation.</p>
<b>Public Expectations</b>	The traveling public expects reliable travel and seamless connections across modes. Public expectations are growing for real time information about the status of the system.	<p><b>Operations Focus.</b> Implement programs targeting improvements to travel reliability (e.g. incident management), and work with partner agencies to enhance intermodal transfers.</p> <p><b>Transparency.</b> Partner with other agencies and with private sector data providers to make real time information available to the public.</p>
<b>Technology Advancement</b>	A wide array of transportation technologies, including those related to connected and autonomous vehicles offer opportunities for improvements to safety and operational efficiency.	<p><b>Technology Adoption.</b> Monitor early adoption efforts and proactively develop a strategy for taking advantage of new technologies.</p> <p><b>Aligning Skills to Needs.</b> Assess and fill gaps in workforce skills to implement currently available operations technologies.</p>

*Read more* 

## Strategies and Resources

What strategies can you apply now to meet today's challenges and prepare for future opportunities? What resources are available to help support these efforts?

### Information and Data Management

- IT Strategic Planning – to plan for adoption and use of new operations technologies and real time data streams.
- Enterprise Data Integration/Data Services – to support sharing and integration of real time system information with partners and travelers

### Organizational Management

- Change Management - to help the agency integrate system management and operations strategies into planning, programming and project development processes

### Workforce Management

- Recruitment and Retention – to attract employees with skills needed for operations.
- Professional Development – to build skillsets of existing staff

### Knowledge Management

- Social and Learning Communities – to provide a forum for exchange of information about operations strategies and technologies

### Partnerships

- Public/Private Partnerships – to implement coordinated operations strategies

### Where to Begin

- Identify high impact operations strategies for implementation
- Track emerging technologies that could enhance efficiency or effectiveness of transportation systems operations
- Create a committee to discuss the implications of advancing operations technologies and identify a future implementation strategy for the agency
- Work with the HR lead to fill current gaps in skills needed for effective system operations management
- Pursue partnerships with other agencies to enhance mobility and safety

### Resources

- NCHRP Project 20-102: Impacts of Connected Vehicles and Automated Vehicles on State and Local Transportation Agencies [http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-102\\_CV-AV-Summary.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-102_CV-AV-Summary.pdf)
- NCHRP Report 693: Attracting, Recruiting, and Retaining Skilled Staff for Transportation System Operations and Management <http://www.trb.org/Publications/Blurbs/166342.aspx>
- National Operations Center of Excellence <https://www.transportationops.org/>
- AASHTO TSMO Guidance <http://www.aashtotsmoguidance.org/>
- USDOT Intelligent Transportation Systems Joint Program Office –website <https://www.its.dot.gov/index.htm>
- FHWA Organizing and Planning for Operations website [https://ops.fhwa.dot.gov/plan4ops/focus\\_areas/integrating/transportation\\_sys.htm](https://ops.fhwa.dot.gov/plan4ops/focus_areas/integrating/transportation_sys.htm)
- WSDOT Cooperative Automated Transportation Policy <https://www.wsdot.wa.gov/travel/automated-connected/home>

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## Role

# Performance Management Lead



## Defined

**The Performance Management Lead** is responsible for collecting, measuring, reporting and recommending action related to performance information within the agency.

## Challenges and Opportunities

**In your role, what are the most critical challenges and opportunities?** Looking across the agency, what capabilities are required to successfully take them on? How can you help build the necessary capabilities? The first step is to understand these challenges and opportunities in terms of the major change forces that are driving them.

### Change Forces

### Challenge/Opportunity

### Your Responsibility

#### Technology Advancement

New technology impacts the tools, methods and strategies available to use data to maximize business outcomes. Connected and autonomous vehicles may generate new data for understanding system performance.

**Technology Adoption.** Help the agency leverage business intelligence to improve data-informed decision-making and use performance-based approaches to maximize investments. Anticipate future availability of new data sources for performance measurement.

#### Shift in Role and Focus

The agency's approach to performance measurement needs to consider people movement across all modes, including passenger and commercial vehicles, bus and light rail, and bicycle and pedestrian travel.

**Operations Focus.** Advance performance measures that are multimodal and operational in nature.

#### Legislation, Regulation, and Funding

Responding to new legislative requirements may require new performance measures, modified performance reporting processes, and demonstration that the agency is working to achieve its targets.

**Agility and Resilience.** Equip the agency to respond quickly to new legislative requirements.

#### Public Expectations

Increased expectations for transparency and accountability to the public, commercial travelers, elected officials, local units of government and the media create the need for effective communication of performance information.

**Transparency.** Advance efforts to communicate agency performance to agency stakeholders and the general public.

*Read more*



## Strategies and Resources

What strategies can you apply now to meet today's challenges and prepare for future opportunities? What resources are available to help support these efforts?

### Organizational Management

- Performance Management – to ensure the agency is able to measure and achieve outcomes that make progress toward its evolving goals and objectives
- Process Improvements – to close the loop between targets and results to respond to legislative requirements

### Information and Data Management

- Business Intelligence and Analytics – to capture, analyze and visualize performance information.

### Knowledge Management

- Learning Organization -to align staff activities with agency goals, create a performance system feedback loop and create a culture of transparency and accountability for results

### Where to Begin

- Monitor federal requirements and integrate them with business processes and practices
- Track new data sources and assess how they might be used to strengthen performance management
- Incorporate scenario-building and forecasting to respond to legislative requirements related to performance-based planning and programming
- Establish a mechanism for continuous performance and process improvement
- Monitor and measure results to improve linkages between performance targets and investment outcomes
- Assess current data visualization and determine better ways to communicate that will support transparency and accountability

### Resources

- FHWA Transportation Performance Management (TPM) website, <https://www.fhwa.dot.gov/tpm/>
- AASHTO TPM Portal, <https://www.tpm-portal.com>
- AMPO Performance Measurement website, <http://www.ampo.org/resources-publications/best-practices/performance-measurements/>
- AASHTO Benchmarking Tool on TPM Portal, <http://benchmarking.tpm-portal.com>
- Transportation Lean Forum on TPM Portal, <https://www.tpm-portal.com/community/tlf-home/>
- AASHTO Committee on Performance Based Management information on TPM Portal, <https://www.tpm-portal.com/community/cpbm/>
- TRB NCHRP Project 03-128, "Business Intelligence Techniques for Transportation Agency Decision Making," <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4352>
- TRB NCHRP Web-Only Document 226, "Data Visualization Methods for Transportation Agencies," <http://www.trb.org/NCHRP/Blurbs/175902.aspx>

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Role  
**Chief  
 Financial  
 Officer**



**Defined**  
**The Chief Financial Officer (CFO)** has primary responsibility for financial planning, management, and reporting for the agency.

**Challenges and Opportinites**

**In your role, what are the most critical challenges and opportunities?** Looking across the agency, what capabilities are required to successfully take them on? How can you help build the necessary capabilities? The first step is to understand these challenges and opportunities in terms of the major change forces that are driving them.

*Change Forces*

*Challenge/Opportunity*

*Your Responsibility*

**Legislation, Regulation, and Funding**

Funding instability and uncertainty impact the agency’s ability to fund maintenance and construction programs at current levels.  
 If the long-term solvency of the highway trust fund is not resolved, there could be additional pressure to find new ways to fund infrastructure.

**Agility and Resilience.** Identify ways to make better use of available funding and seek out alternative funding and financing options.  
**Transparency.** Establish reporting processes that enable the agency and its stakeholders to understand how funds are used and the implications of funding changes.

**Shift in Role and Focus**

Shift to public-private partnerships and other alternative finance mechanisms.  
 Shift toward multi-modal focus may require new approaches for partnering across agencies on funding.

**Agility and Resilience.** Facilitate use of alternative financing arrangements through changes to processes and systems.

**Technology Advancement**

Technology advances such as automation, predictive analytics and blockchain may offer new opportunities for achieving efficiencies and providing new business insights.

**Technology Adoption.** Monitor the state of the practice and identify opportunities for the agency to benefit from emerging technology.

*Read more*



## Strategies and Resources

What strategies can you apply now to meet today's challenges and prepare for future opportunities?

What resources are available to help support these efforts?

### Organizational Management

- Change Management – to help the agency adjust to changes in financial management processes and systems

### Information and Data Management

- IT Strategic Planning – to plan for upgrades to financial management systems and anticipate longer term impacts of other technologies on financial management operations

### Workforce Management

- Succession Planning – to ensure a seamless transition for key financial management roles

### Knowledge Management

- Knowledge Capture and Transfer – to ensure consistent understanding of agency financial management practices and systems

### Partnerships

- Public/Private Partnerships – to implement innovative financing strategies

### Where to Begin

- Monitor federal and state legislation related to funding and finance and assess risks and opportunities for the agency
- Track emerging technologies that could enhance efficiency or effectiveness of financial management processes and work with the information technology lead to integrate these into the agency's IT strategic plan.
- Identify financial management strategies to leverage new opportunities to improve the use of funds and maximize investments.
- Facilitate the agency's use of P3s and other alternative funding mechanisms, including tolling.
- Investigate options for transportation pricing and value capture to support investments.

### Resources

- NCHRP Report 888: A Guide to Developing Financial Plans and Performance Measures for Transportation Asset Management Plans – A guide for conducting financial analyses and developing financial plans to support transportation asset management practices <http://www.trb.org/NCHRP/Blurbs/178270.aspx>
- Committee on Funding and Finance – One of several AASHTO Cross-Functional committees. This site includes contact information and member resources <https://fundingfinance.transportation.org>
- FHWA Office of Highway Policy Information Highway Finance data collection – Comprehensive highway finance data collection site, includes information about federal, state and local finance <https://www.fhwa.dot.gov/policyinformation/hwyfinancedata.cfm>
- AASHTO Build America Transportation Information Center (BATIC) Institute– News and announcements, an event calendar, and a number of resources about capacity, funding, partnerships, and legislation <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4060s>
- FHWA Center for Innovative Finance– FHWA's site for finance support, including information, tools and resources related to P3s, alternative project delivery, project finance, tolling and pricing and value capture <http://financingtransportation.org/>

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Role

# Communications Lead



## Defined

**The Communications Lead** creates the agency’s communication strategy, directs and leads the dissemination of internal and external communications and outreach functions for the agency, and oversees agency public relations functions.

## Challenges and Opportunities

**In your role, what are the most critical challenges and opportunities?** Looking across the agency, what capabilities are required to successfully take them on? How can you help build the necessary capabilities? The first step is to understand these challenges and opportunities in terms of the major change forces that are driving them.

*Change Forces*

*Challenge/Opportunity*

*Your Responsibility*

**Technology Advancement**

New digital technology impacts the tools, methods and strategies available to reach various audiences.  
The focus on social media communications requires new skills to develop and manage content, ensure accessibility and protect user security.

**Technology Adoption.** Help the agency adopt social media, videography and other digital platforms to enhance brand identity, improve communications and provide on-demand service information.  
**Aligning Skills to Needs.** Develop strategies to build the agency’s knowledge base for resourcing social media and digital security functions.

**Shift in Role and Focus**

The agency’s communication strategy needs to adapt to engage with key stakeholders on its shifting focus toward multimodal emphasis and the effective use of existing infrastructure.

**Operations Focus.** Develop an effective messaging strategy that improves stakeholder and public support for multimodal projects and operational priorities.

**Legislation, Regulation, and Funding**

Responding to new legislative requirements may require new communication strategies and methods to clearly communicate the change and its impacts on the agency and its stakeholders.

**Agility and Resilience.** Help the agency adopt communications approaches to share information about the agency’s response to new legislative requirements.

**Public Expectations**

Increased expectations for transparency, accountability and public engagement create the need for effectively communicating the performance and accomplishments of the agency with the public, elected officials, and the media.

**Transparency.** Advance efforts to tell a consistent “story” about the agency to stakeholders and the general public.

*Read more*



## Strategies and Resources

**What strategies can you apply now to meet today's challenges and prepare for future opportunities?** What resources are available to help support these efforts?

### Organizational Management

- Strategic Planning – to ensure a clear and consistent approach for developing a communications strategy aligned with agency goals

### Information and Data Management

- Business Intelligence/Analytics - to communicate agency performance and accomplishments

### Knowledge Management

- Learning Organization – to align staff activities with agency goals and create a culture of transparency and accountability for results
- Social and Learning Communities – to share knowledge and develop new communication practices to respond to change forces
- Knowledge Capture and Transfer – to gather guidance and examples of successful communication practices at other organizations

### Where to Begin

- Investigate emerging skills gaps to understand the resources needed to incorporate and maintain effective social media practices.
- Make contact with communications leads in other DOTs to get ideas and guidance on successful communication practices in light of change forces.
- Work with agency leaders to adapt branding to reflect changing strategies.
- Interview agency leaders about the impacts of legislation and adjust communication strategies to respond to the changes.
- Assess current communication vehicles and determine better ways to communicate that will support transparency and accountability.

### Resources

- CRC Press, “Best Practices for Transportation Agency Use of Social Media,” <https://www.crcpress.com/Best-Practices-for-Transportation-Agency-Use-of-Social-Media/Bregman-Watkins/p/book/9781466568600>
- TCRP Synthesis 99, “Uses of Social Media in Public Transportation,” <http://www.trb.org/Publications/Blurbs/167067.aspx>
- AASHTO Committee on Transportation Communications, (TransComm), <https://communications.transportation.org/>
- TCRP Report 208, “Strategic Communications to Improve Support for Transit-Priority Projects: Report and Toolkit,” <http://www.trb.org/Main/Blurbs/179334.aspx>
- AASHTO Communicating Performance website, <http://communicatingperformance.com>
- USDOT, Federal Highway Administration Research and Technology, “Turner-Fairbank Highway Research Center R & D Communication Reference Guide (CRG),” <https://www.fhwa.dot.gov/publications/research/general/15058/>
- AASHTO, “Communications Guide for State Departments of Transportation,” <https://store.transportation.org/Item/PublicationDetail?ID=3730>

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Role

# Chief Executive Officer/ Chief Operating Officer



**Defined**

**The Chief Executive Officer (CEO)** is the highest-ranking executive in the state DOT. This person often has the title “Secretary” or “Commissioner.” **The Chief Operating Officer (COO)**, is typically the second-highest ranking executive in the state DOT. This person often has the title Deputy Secretary or Deputy Commissioner. These roles are responsible for overseeing the strategic and high-level operational activities of the entire agency.

## Challenges and Opportunities

**In your role, what are the most critical challenges and opportunities?** Looking across the agency, what capabilities are required to successfully take them on? How can you help build the necessary capabilities? The first step is to understand these challenges and opportunities in terms of the major change forces that are driving them.

*Change Forces*

*Challenge/Opportunity*

*Your Responsibility*

**Technology Advancement**

New technology impacts the policies and processes for designing, constructing, and managing the transportation system and the potential strategies available to maximize business outcomes. Technology also impacts the skills and tools needed to plan and program projects.

**Technology Adoption.** Lead the agency in leveraging available technologies for design, construction, system operations and management; ensure that the agency tracks risks and opportunities associated with emerging technologies.  
**Aligning Skills to Needs.** Lead the agency in creating a strategic vision to adapt staff skills to leverage new technologies and sources of data to inform decisions.

**Shift in Role and Focus**

The agency’s approach to strategic and high-level operational functions needs to incorporate a focus on multimodal systems management and operations. This shift in role and focus also impacts the skills needed to plan and program projects.

**Operations Focus.** Lead the agency in creating an organizational strategy that adapts responsibilities and strengthens collaboration with other organizations and modal partners.  
**Aligning Skills to Needs.** Lead the agency in creating a strategic vision to incorporate hard and soft skills needed to adjust from capital intensive work to an operations focus.

**Legislation, Regulation, and Funding**

New legislative requirements and changes in funding availability may require rapid shifts in how activities are resourced and in reporting requirements.

**Agility and Resilience.** Maintain active involvement in state and federal legislative and rulemaking activities to ensure that the implications of changes are considered. Identify and pursue funding strategies that offer maximum flexibility and minimize risk of disruption.

**Public Expectations**

Increased expectations for transparency and accountability.

**Transparency.** Work with agency communications and performance management specialists to enhance presentation and communication of agency accomplishments.

*Read more*

## Strategies and Resources

**What strategies can you apply now to meet today's challenges and prepare for future opportunities?** What resources are available to help support these efforts?

### Organizational Management

- **Organizational Structure** – to improve the ability of the organization to meet new challenges and leverage opportunities to improve
- **Performance Management** - to ensure the agency is able to measure and achieve outcomes that make progress toward its evolving goals and objectives
- **Organizational Culture** – to provide a foundation for positive organizational strategy adaptation and create a place where people can find meaningful work

### Workforce Management

- **Employee Engagement** – to enhance agency culture, ensure buy-in for strategic activities and improve productivity and effectiveness to adapt to change forces

### Knowledge Management

- **Learning Organization** – to align staff activities with agency goals, create a performance system feedback loop and create a culture of transparency and accountability for results

### Partnerships

- **Stakeholder Engagement** – to ensure buy-in for strategic activities and pave the way for new collaboration opportunities

### Where to Begin

- Track emerging technologies and work with the appropriate agency leaders and stakeholders to create an implementation strategy and roadmap.
- Work with the HR Lead to monitor leadership and staff bench strength and provide guidance on organizational adjustments that may be needed to align skills with strategies.
- Stay in touch with CEOs and COOs in other DOTs to learn about noteworthy practices and lessons learned.
- Work with agency leaders to develop strategies that will foster a learning organization and accountability for results.
- Monitor new federal and state requirements, confer with agency policy leaders and assign responsibility for integrating these new requirements with the agency's strategy, policies and business processes.
- Create opportunities for ongoing, face-to-face and other meaningful contacts with staff and transportation stakeholders.

### Resources

- NCHRP 20-24 Series, <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=560>
- NCHRP Foresight Series, <http://www.trb.org/NCHRP/NCHRPForesightSeries.aspx?srcaud=NCHRP>
- AASHTO Executive Committee, <http://sp.www.transportation.org/pages/executivecommittee.asp>
- NCHRP Final Report ITS Conference, "State DOT CEO Leadership Forum: A Focus on Transportation Futures," [http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-24\(100\)\\_FR.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-24(100)_FR.pdf)
- USDOT, "Strengthening Skills Training and Career Pathways Across the Transportation Agency," [https://s3.amazonaws.com/PCRN/docs/Strengthening\\_Skills\\_Training\\_and\\_Career\\_Pathways\\_Across\\_Transportation\\_Industry\\_Data\\_Report.pdf](https://s3.amazonaws.com/PCRN/docs/Strengthening_Skills_Training_and_Career_Pathways_Across_Transportation_Industry_Data_Report.pdf)
- State DOT Organizational Charts, <https://transportation.libguides.com/state-dotorgcharts>
- NCHRP Report 885, "Guide to Creating and Sustaining a Culture of Innovation for Departments of Transportation," <http://www.trb.org/main/blurbs/178368.aspx>

## Learn More

This guide is also available via the **Agency Capability Building Web Portal (ACB Portal)** developed through NCHRP Project 20-24(95)A: Ensuring Essential Capability for the Future Transportation Agency.

This online platform provides a one-stop shop for the latest information, tools, and other resources to support transportation agencies' organizational needs.

More information on the role described in this guide, including links to the resources listed above can be found on the ACB Portal at: <https://www.agencycapability.com/>



Role

# Planning Director



## Defined

**The Planning Director** ensures planning decisions are made in alignment with short- and long-term strategic priorities and within resource constraints.

## Challenges and Opportunities

**In your role, what are the most critical challenges and opportunities?** Looking across the agency, what capabilities are required to successfully take them on? How can you help build the necessary capabilities? The first step is to understand these challenges and opportunities in terms of the major change forces that are driving them.

### Change Forces

### Challenge/Opportunity

### Your Responsibility

#### Technology Advancement

Technology advancements change the types of data, tools and resources available to make planning decisions, create a need for new modeling techniques and shorten the planning time horizons.

**Aligning Skills to Needs.** Help the agency adjust planning practices to leverage new technology, incorporate modeling and forecasting practices and consider shorter planning cycles.  
**Technology Adoption.** Lead the transition to new data sources and tools through proofs of concept, pilots, etc.

#### Shift in Role and Focus

Planning practices need to evolve to better integrate multimodal travel and broader societal goals, including equity and economic vitality and the environment. This also requires new ways of working together within the various agency business areas.

**Operations Focus.** Help the agency's planning practices and outcomes evolve to reflect multi-modal travel and incorporate scenario-building, multiple objective prioritization and evaluation practices. Help the agency work more effectively across business functions, and incorporate operations, modal and divisional priorities.

#### Legislation, Regulation, and Funding

Responding to new legislative requirements requires short- and long-range planning processes, methods and documents that incorporate performance outcomes and a system viewpoint.

**Agility and Resilience.** Adapt planning processes to incorporate performance management and multi-agency planning processes to meet new legislative requirements.

#### Public Expectations

Increased expectations for transparency and accountability create the need for planning practices that incorporate public input and support system performance as well as broader societal goals.

**Transparency.** Advance planning practices that link to positive performance results while incorporating stakeholder input.

Read more 

## Strategies and Resources

What strategies can you apply now to meet today's challenges and prepare for future opportunities?

What resources are available to help support these efforts?

### Organizational Management

- Performance Management - to ensure the agency's short- and long-term plans reflect and make progress toward its evolving business objectives and incorporate scenarios and consideration of multiple performance areas into the planning process

### Knowledge Management

- Knowledge Capture and Transfer – to improve internal capability to communicate across organizational siloes, adjust to shorter planning cycles with multiple agencies and enhance transparency with stakeholders
- Learning Organization – to create a culture of transparency and accountability

### Partnerships

- Interagency Agreements – to collaborate across jurisdictions and with modal partners and to create transparency and accountability for results

### Where to Begin

- Monitor policy issues facing transportation and develop strategies to respond
- Understand the agency gaps to incorporating and leveraging effective mode-neutral performance-based planning and asset management
- Keep in touch with Planning Directors in other DOTs to learn about noteworthy practices and lessons learned
- Foster internal relationships, develop new methods and practices to plan effectively across organizational siloes and leverage new data and technology
- Monitor new federal requirements, confer with agency leaders, and identify and respond to needed adjustments
- Work with the Communications Lead to craft messaging that reflects the operational and multi-modal focus, and expresses the agency's integrated planning approach

### Resources

- NCHRP Report 896, "Updating Regional Transportation Planning and Modeling Tools to Address Impacts of Connected and Automated Vehicles, Volume 1," <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4008>
- AASHTO Committee on Planning, <https://cop.transportation.org>
- NCHRP Report 798, "The Role of Planning in a 21st Century State Transportation: Supporting Strategic Decision-Making," <http://www.trb.org/Publications/Blurbs/172210.aspx>
- Eno Center for Transportation, <https://www.enotrans.org/etl-materials/15787/>
- FHWA Policy and Governmental Affairs, <https://www.fhwa.dot.gov/policy/>
- TRB Executive Committee Report, "Critical Issues in Transportation 2019," <http://www.trb.org/Main/Blurbs/178402.aspx>
- NCHRP 20-24 Series, <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=560>

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Role

# Information Technology Director



**Defined**

**The Information Technology (IT) Director**, also sometimes referred to as the Chief Information Officer (CIO), serves as the enterprise information systems and technology lead for the State DOT.

## Challenges and Opportunities

**In your role, what are the most critical challenges and opportunities?** Looking across the agency, what capabilities are required to successfully take them on? How can you help build the necessary capabilities? The first step is to understand these challenges and opportunities in terms of the major change forces that are driving them.

*Change Forces*

*Challenge/Opportunity*

*Your Responsibility*

**Technology Advancement**

Rapid changes in available technology creates opportunities for enhancing agency efficiency and effectiveness. At the same time, technology advancement creates challenges for keeping pace with new hardware and software versions and addressing customer expectations given budgetary constraints, established IT governance processes and increasing cybersecurity concerns.

**Technology Adoption.** Establish a strategic plan for technology adoption that is aligned with the agency’s future priorities and takes advantage of emerging technologies. Work in partnership with agency leadership to establish/strengthen technology project selection and life cycle management processes.  
**Aligning Skills to Needs.** Build a strong team of IT project managers, business analysts, data scientists, database administrators, application development leads and security specialists, tapping into external resources as needed.  
**Attracting & Retaining.** Create an attractive work environment, emphasizing opportunities for learning, making a positive impact, and work/life balance. Recognize high performing staff.  
**Agility & Resilience.** Integrate change management processes within IT project development to ensure successful integration of new technology into business processes.

**Shift in Role and Focus**

Increased focus on operations and multimodal solutions will impact technology requirements and priorities.

**Operations Focus.** Work with business units responsible for system maintenance and operations to understand emerging requirements and track available solutions. Pursue data standardization to facilitate data exchange with external partners.  
**Aligning Skills to Needs.** Identify staff and consultants with in-depth knowledge of emerging transportation technologies. Engage these individuals to provide input into both strategic and tactical decisions.

**Legislation, Regulation, and Funding**

New reporting requirements may create the need to integrate information currently managed in separate systems.

**Technology Adoption.** Establish a data integration and reporting strategy that can be used to meet changing reporting requirements and business needs.

**Public Expectations**

Increased public expectations for online transactions, data access and information about agency operations and decisions.

**Transparency.** Identify and advance solutions for automating transactions. Establish clear guidelines on providing external data access to protect private and sensitive information. Make use of available open data portals to provide self-service access to agency information.

*Read more*

## Strategies and Resources

What strategies can you apply now to meet today's challenges and prepare for future opportunities? What resources are available to help support these efforts?

### Information and Data Management

- IT Strategic Planning – to identify priorities and resource needs for meeting new types of requirements and capitalizing on new technologies.
- Enterprise Data Integration/Data Services and Business Intelligence/Analytics – to curate, clean, integrate and deliver data to meet changing business needs.
- Project and Services Portfolio Management – to move to a more flexible technology architecture that is less costly to manage and update.
- IT and Data Governance – to provide clarity about roles and decision making processes for prioritizing and implementing new technology projects.

### Organizational Management

- Organizational Structure – to strengthen the ability of the IT organization to partner with business units on selecting and implementing new technologies.
- Change Management - to ensure the agency is able to adapt to changes in business processes and effectively use new technologies.

### Workforce Management

- Recruiting and Retention – to improve the ability to attract and retain IT staff
- Professional Development – to build skills needed for effective implementation and management of new systems and tools

### Knowledge Management

- Mentoring – to ensure that newer staff learn from more experienced staff about effective IT practices, especially those that aren't written down
- Knowledge Capture and Transfer – to ensure consistent understanding of agency IT policies and procedures, and efforts to investigate new technologies.

### Where to Begin

- Track emerging technologies and work closely with business functional leads to identify an implementation strategy and roadmap.
- Explore techniques to increase speed of technology deployment (such as agile development or software as a service)
- Work with the HR Lead to update position descriptions to reflect current needs, and brainstorm new strategies to recruit, retain and develop IT professionals.
- Pursue partnerships with academic institutions and contract arrangements with private firms to supplement existing agency staff expertise.
- Stay in touch with CIOs in other DOTs to learn about noteworthy practices and lessons learned.

### Resources

- TRB Transformational Technologies Reports – Includes reports, articles, research reports, record papers and other resources for connected and autonomous vehicles, connectivity, modeling and multi-modal next generation technologies <http://www.trb.org/Main/SPOTTTRBReports.aspx>
- NCHRP Synthesis 508: Data Management and Governance Practices – Synthesis of data management and governance practices within State DOTs <http://www.trb.org/NCHRP/Blurbs/176005.aspx>
- AASHTO Committee on Data Management and Analytics – AASHTO committee responsible for activities related to provisioning, analyzing reporting and sharing transportation data <https://data.transportation.org>
- TRB Committee on Information Systems and Technology - <http://www.trb.org/ABJ50/ircStandingCommittee.aspx>
- AASHTO Innovation Initiative (AII) – Site with information about active technologies developed within agencies, with a mechanism to nominate a technology <http://aii.transportation.org/Pages/default.aspx>
- National Association of State Chief Information Officers (NASCIO) – resources of interest to CIOs in state government agencies <https://www.nascio.org/resource-center/>

## Learn More

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# 5. Situation-Based Guidance

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This chapter provides quick guides for potential situations faced by the DOT in coming years that help to conceptualize and plan around change forces that will affect the agency's operation and needed capabilities.

# Situation-Based Guidance

## Introduction

The situation-based perspective provides a structured approach to thinking through specific situations with the aim of understanding and enhancing capabilities needed to address change forces.

### Why does understanding situations provide a critical perspective to understanding capability-building?

Situations represent a set of potential scenarios affecting state DOT leadership and practitioners. These situations are meant to be specific enough to provide practical, implementable guidance, but flexible enough to accommodate a broad set of circumstances.

### How are capabilities incorporated?

One benefit of examining the impact of capabilities through the lens of situations is in providing a structured approach to thinking through multiple facets of a scenario. Each of the two-page situation-based guidance sections includes a common set of elements:

- **Context** for the how the situation may arise,
- **Description of the change forces** precipitating the situation,
- **Essential capabilities** required to respond to the situation,
- **Strategies** for adapting to the change force described in the situation,

- **Resources** that can be used to implement the strategies

The guidebook reflects a sample of current situations of interest to state transportation agencies. It will be expanded over time in the online guidance platform as new challenges, needs, strategies and resources emerge.

### What situations are included in the guidance?

The following situation-based guidance scenarios represent a curated set of critical topics facing State DOTs at the time of publication:

- Initiative fatigue/managing multiple initiatives
- Undertaking a major system upgrade
- Budget cuts
- Improving data for decision making
- Response to increased flooding
- Managing workforce transition
- New multi-modal focus that requires partnerships
- Planning for CAVs and other transformational technologies

## Situation

# Planning for CAVs and Other Transformational Technologies



## Context

The agency has taken a “wait and see” attitude with respect to connected and autonomous vehicles (CAVs), but has been actively monitoring activities at peer agencies to pilot connected vehicle technologies and formulate proactive strategies for accommodating autonomous vehicles. We need to create a plan for what our agency should be doing to implement and support these transformational technologies. We need to better understand the implications for planning, design, maintenance and operations. We also need to understand risks to be mitigated – related to cybersecurity, revenue streams, and data privacy.

## Change Forces

- **Technology Advancement.** CAVs and other transformational technologies show great promise to improve safety outcomes, reduce congestion and provide positive societal impacts. There are also risks associated with deploying transformational technologies that need additional research and vetting.
- **Legislation, Regulation and Funding.** Public and private agencies and research organizations are starting to understand the critical issues surrounding deployment of CAV and other transformational technologies. However, additional research is needed to inform policymaking and legislation. At the same time, current public sector funding levels are not adequate to deploy large scale CAV infrastructure and do not address improvements to existing assets.
- **Shift in DOT Role and Focus.** The growing emphasis on system operations contributes to interest in use of CAV technologies to achieve more efficient use of existing capacity with improved safety.

## What Capabilities Are Essential?

**Agility and Resilience.** Agencies must recognize uncertainties with respect to the timing of technology maturation and adoption and the specific communications technologies and standards that will be used. They must design procurement and operations strategies that provide flexibility to adjust to different situations.

**Technology Adoption.** Agencies must build the capability to evaluate, pilot and integrate new information and communications technologies.

**Operations Focus.** Agencies need to strengthen their capability to plan for and actively manage system operations.

**Aligning Skills to Needs.** Agencies need to identify the knowledge, skills and abilities required to plan for CAVs and other transformational technologies and determine what skills to develop in-house and what can be best met through use of external consultants or partnering with universities.

*Read more*



# Planning for CAVs

## What can you do about it?

### Organizational Management

- **Organizational Structure** – to ensure that system operations and technology deployment functions have the appropriate level of focus and resourcing.
- **Change Management** – to help the agency understand the implications of CAVs and adjust to use of new technologies.

### Workforce Management

- **Strategic Workforce Planning** – to proactively plan for needed skills for technology deployment.
- **Recruitment and Retention** – to ensure that the agency has the right mix of skills and experience needed to plan for and integrate CAV technology.
- **Professional Development** – to strengthen employee skills and support career advancement.

### Knowledge Management

- **Social and Learning Communities** – to provide an opportunity for internal agency knowledge sharing and collaborative problem solving.
- **Knowledge Capture and Transfer** – to capture and share knowledge from inside the agency as well as from peer organizations and industry.
- **Learning Organization** – to create a work environment that encourages experimentation and enables teams to “fail fast” and learn from their experiences.

### Information and Data Management

- **IT Strategic Planning** – to integrate consideration of IT infrastructure, cybersecurity and data privacy concerns into future investment strategies.
- **IT and Data Governance** – to establish clear roles, responsibilities, standards and processes for decision making related to technology acquisition and integration.
- **Cloud Solutions** – to equip the agency to manage and access large volumes of data associated with CAVs.

### Partnerships

- **Innovative Contracting Methods** – to provide the flexibility to use different models such as design-build-operate-transfer.
- **Public/Private Partnerships** – to take advantage of new opportunities for collaborating with industry.

## What resources will help you?

- **National Academies/TRB Forum on Preparing for Automated Vehicles and Shared Mobility.** <http://www.trb.org/TRBAVSMForum/AVSMForum.aspx>
- **Our New Mobility Future: A U.S. DOT Volpe Center Thought Leadership Series.** <https://rosap.ntl.bts.gov/view/dot/43616>
- **NCHRP Report 845, Advancing Automated and Connected Vehicles: Policy and Planning Actions for State and Local Transportation Agencies.** <http://www.trb.org/Main/Blurbs/176418.aspx>
- **Connected Vehicle Procurement State of the Practice Assessment: Summary Findings Report (Final).** <https://rosap.ntl.bts.gov/view/dot/37173>
- **NC Readiness for Connected and Autonomous Vehicles (CAV).** <http://www.ncav.org/wp-content/uploads/2016/03/NC-Roadmap-for-CAV-Final-ALL.pdf>
- **National Operations Center of Excellence Clearinghouse of CAT Policy Frameworks and Policy Statements.** <https://transportationops.org/CAT-Coalition/clearinghouse-cat-policy-frameworks>
- **SMART Belt Coalition.** A regional CAV collaborative comprising multiple jurisdiction, including state DOTs, research organizations and federal partners, charged with creating economies of scale, shared practices and responsibilities around shared CAV and other transformational technologies. <https://www.ibtta.org/sites/default/files/documents/2017/Atlanta/Cole-Shuey.pdf>
- **NCHRP Project 23-03: Guidelines for State Transportation Agency Chief Executive Officers on Cybersecurity Issues and Protection Strategies.** <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4784>

## Learn More

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<https://www.agencycapability.com/>



## Situation

# Improving Data for Decision Making



## Context

**The agency has a longstanding practice of collecting and using data to report on our results.** We have been using some of the data we collect to analyze our performance, especially for pavements and bridges. We need additional data to meet legislative requirements and ensure we are making wise investment decisions. Current systems do not always provide adequate data validity or reliability, which makes meaningful analysis and reporting difficult. We want to see if new data sources might meet our needs efficiently and cost-effectively. We also want to make sure that we minimize risk of using any external data sources. We want to leverage additional data science techniques enhance our ability to make investment decisions. Our long-term goal is to use leading performance measures and predictive analytics to become more adaptive in our programming and funding strategies to maximize our return on investment. We want to put data in the hands of our staff, so they can have access across our IT systems to data they need to perform analyses and make operational decisions.

## Change Forces

- **Technology Advancement.** Today, our volume of data is much greater than our ability to use it. Our current systems need to be upgraded. Eventually, we want to move beyond having dedicated staff synthesizing data from separate, disconnected systems to creating an agency with integrated data that trained practitioners can use as a single source of truth to perform the analysis they need to do their jobs. In addition, we want to take advantage of machine learning and other technologies that are making it easier to collect data that can be used for predictive decision-making.
- **Legislation, Regulation and Funding.** Federal transportation performance management, performance-based planning and programming, and other requirements are drivers moving the agency toward linking data to investment decision-making, but our knowledge of how to align them is inadequate, and our current measurement system and local priorities are separate and not connected to the requirements. Legislation also creates opportunities to leverage data and analytics available from third parties and federal partners, especially in areas of national performance measurement.
- **Workforce Evolution.** Advances in systems and reporting platforms should eventually make data more accessible to practitioners than they were in the past, but we still don't have the specialized analysis and reporting skills we need to use data effectively for decision-making in all performance measurement areas. We want to create a set of standardized data elements that can easily be used across the agency for reporting. We want to train existing staff in data science skills and recruit new staff with business intelligence (BI), business analysis (BA), including forecasting and investment decision-making across performance areas.

## What Capabilities Are Essential?

**Aligning Skills to Needs.** Agencies need to identify specific skills needed to support data management, governance, analysis, and communication and put recruiting, training and mentoring processes in place to build these skillsets.

**Attracting & Retaining Workforce.** Agencies must strengthen their capability

to attract and retain employees who can support data management and analysis.

**Transparency.** Agencies need to build an internal culture that values information sharing and data-informed decision making.

**Agility and Resilience.** Agencies need to improve their ability to change decision

making processes to consider available data and incorporate situation analysis.

**Technology Adoption.** Agencies need to enhance their ability to identify and use evolving toolsets supporting data integration, reporting, visualization and analysis.

*Read more*



## What can you do about it?

### Organizational Management

- **Organizational Culture** – to create a culture in which data sharing and data-informed decision making is expected and rewarded.
- **Change Management** – to help the agency move towards more data-informed decision making processes.

### Workforce Management

- **Strategic Workforce Planning** – to proactively plan for needed skills for data management and analysis.
- **Recruitment and Retention** – to develop targeted strategies for attracting talent and providing a rewarding work environment.
- **Employee engagement** – to ensure two-way communication between employees and managers and ensure that employee concerns are addressed (as feasible).
- **Professional development** – to build skills in needed areas and provide a growth path for employees.

### Knowledge Management

- **Social and Learning Communities** – to establish opportunities for learning and collaborative problem solving.
- **Knowledge Capture and Transfer** – to facilitate onboarding of new staff and avoid loss of important knowledge about agency data sources when current staff change jobs or leave the agency.
- **Learning Organization** – to promote a culture in which employees are challenged to improve use of data for decision making.
- **Mentoring** – to provide opportunities for newer employees to learn from more experienced employees.

### Information and Data Management

- **IT Strategic Planning** – to ensure that planning for future investments considers needs to support data integration, analysis, reporting and commercially available data products.
- **Project and Services Portfolio Management** – to provide a process for prioritizing new investments and services that is aligned with changing business priorities and with available agency resources.
- **IT and Data Governance** – to establish clear decision making processes for new data-related products and services.
- **Enterprise Data Integration** – to establish an agency-wide approach to curating, cleaning, integrating and delivering data from various information systems.
- **Business Intelligence and Analytics** – to establish tools, processes and services for transforming data into information that can be used for decision making.

## What resources will help you?

- **NCHRP Report 920** – Management and Use of Data for Transportation Performance Management: A Guide for Practitioners. <http://www.trb.org/NCHRP/Blurbs/179095.aspx>
- **Leadership Guide for Strategic Information Management for State Departments of Transportation**. <http://www.trb.org/Main/Blurbs/174182.aspx>
- **NCHRP Web-Only Document 226** – Data Visualization Methods for Transportation Agencies. <http://www.trb.org/NCHRP/Blurbs/175902.aspx>
- **FHWA TPM Toolbox**. <https://www.tpmtools.org/guidebook/chapter-09/chapter-09-home/>
- **Agency Capability Portal Shared Practices, Position Description Library** – Repository of job descriptions for emerging fields, including data science. <https://www.agencycapability.com/#>
- **FHWA TPM training**: Provides training resources for implementing TPM and PBPP. Includes a course on the Role of Data in Transportation Performance Management. <https://www.fhwa.dot.gov/tpm/resources/training.cfm>

## Learn More

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<https://www.agencycapability.com/>



## Situation

# Undertaking a Major Systems Upgrade



## Context

**The state DOT is faced with an impending overhaul of its primary computer systems.**

There are several critical reasons for this change, including: requirements from customers for better security and improved customer service; the need to retire legacy systems that are an increasing level of risk to the state DOT every year; and the need for an integrated system for reporting, planning and programming.

## Change Forces

- **Technology Advancement.** New systems are available that provide desired functionality; older technology may no longer be supported
- **Legislation, Regulation and Funding.** New legislation may major modifications to information systems to support analysis and reporting
- **Workforce Evolution.** Skills to maintain older mainframe systems are in increasingly short supply; it is difficult to recruit a new generation of employees to work with outdated technology
- **Shift in DOT Role and Focus.** New technology is required for managing system operations
- **Public Expectations.** It is time consuming to meet evolving public expectations for transparency using older systems with inflexible reporting capabilities.

## What Capabilities Are Essential?

**Aligning Skills to Needs.** Agencies expecting to undertake a series of major system upgrades will need to build a core group of technology project managers, business analysts, technical architects, database administrators and security specialists. Some agencies may choose to build software development teams in-house; others may choose to outsource all or most of this function.

**Attracting & Retaining Workforce.** Agencies must be able to attract and retain employees with the management and technical skills needed to upgrade or replace major systems. While DOTs may not be able to offer

a competitive compensation package relative to the private sector, they can emphasize work-life balance, opportunities for advancement and skill building, and satisfaction associated with improving transportation for the public. DOTs can implement practices such as agile development and pair programming that foster collaboration and frequent constructive feedback.

**Agility & Resilience.** Implementing new systems often requires changes to existing business processes, particularly when an old, custom-built application is being replaced by a commercial-off-the-shelf (COTS) product. An organizational capability

for agility is needed to enable employees to shift to new processes and workflows using the new system.

**Technology Adoption.** Agencies need the ability to implement new technology solutions so that they provide anticipated functionality and benefits, meet agency security needs, and fit with existing solutions. This a capability requires adopting and supporting a technology acquisition process with well-defined steps, roles and responsibilities. This process needs to balance predictability and discipline against cost and adaptability to emergent business needs.

*Read more*



# Undertaking a Major Systems Upgrade

## What can you do about it?

### Organizational Management

- **Change Management** – to ensure that new systems are successfully integrated within agency business processes and deliver anticipated benefits.
- **Process Improvements** – to ensure that business processes are optimized prior to automation.

### Workforce Management

- **Recruitment and Retention** – to ensure that the agency has the right mix of skills and experience to successfully implement new information systems.
- **Professional Development** – to strengthen skills needed for information system development or acquisition, and support career advancement for employees..

### Knowledge Management

- **Knowledge Audits** – to assess current strengths and weaknesses for critical areas of knowledge.
- **Social and Learning Communities** – to provide opportunities for employees to share lessons learned from working on diverse projects, and collaborate on strategies for improvement.

### Information and Data Management

- **IT Strategic Planning** – to ensure that IT investments are aligned with changing agency priorities.
- **IT and Data Governance** – to establish clear roles, responsibilities, standards and processes for new system development.
- **Agile Development** – to increase delivery timeframes, engage end-users, and reduce risks associated with large software project development.

### Partnerships

- **Innovative Contracting Methods** – to provide flexibility in use of contractors for development, integration, operation and support of new systems.

## What resources will help you?

- **NCHRP Report 829** – Leadership Guide for Strategic Information Management for State Departments of Transportation. <http://www.trb.org/Publications/Blurbs/174182.aspx>
- **NCHRP Report 865** – Guidance for Development and Management of Sustainable Enterprise Information Portals. <http://www.trb.org/Main/Blurbs/177144.aspx>
- **NCHRP Synthesis 508** – Data Management and Governance Practices. <http://www.trb.org/Publications/Blurbs/176005.aspx>
- **Florida DOT Change Management Board**– Noteworthy example of a State DOT change management group and process. <https://www.fdot.gov/traffic/its/projects-deploy/cmb.shtm>
- **TCRP Legal Research Digest 51** – Technology Contracting for Transit Projects. <http://www.trb.org/Main/Blurbs/176498.aspx>
- **Mobile Applications for GIS Case Studies of Select Transportation Agencies**. [https://www.gis.fhwa.dot.gov/casestudies/Mobile Applications for GIS Case Studies.pdf](https://www.gis.fhwa.dot.gov/casestudies/Mobile%20Applications%20for%20GIS%20Case%20Studies.pdf)
- **NCHRP Project 08-115** – Guidebook for Data and Information Systems for Transportation Asset Management. <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4362>
- **NCHRP Report 800** – Successful Practices in GIS-Based Transportation Asset Management. <http://www.trb.org/Publications/Blurbs/172204.aspx>

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## Situation

# Managing a Workforce Transition



## Context

The agency is faced with several emerging opportunities and challenges related to our evolving workforce. Baby boomers are retiring. Current staff have a gap between their current skills and those that will be needed for the future. We are competing with the private sector for workers with specialized and emerging skillsets. Workers that are filling positions vacated by tenured employees may have the technical skills required, but lack the institutional knowledge and documentation to seamlessly transition into the agency and perform their job responsibilities.

## Change Forces

- **Technology Advancement.** Connected and autonomous vehicles (CAVs), internet of things (IoT), artificial intelligence (AI), machine learning and other emerging technologies are creating a gap between our current skills and future needs. Our current staff don't have the skills required to engineer, manage, analyze and operate an autonomous system or perform the data analysis required to make data-formed planning and programming decisions.
- **Workforce Evolution.** With the increase in workforce transitions and retirements, we are challenged to provide an attractive work environment for a new generation of workers with increased expectations for alternative work arrangements and other benefits that the public sector can provide, at the same time that public sector benefits are declining. We are also challenged by the loss of institutional knowledge when tenured employees transition to new jobs or retire. Documentation of processes and succession planning is inadequate.
- **Shift in DOT Role and Focus.** As the organization shifts away from highway construction to focus on system maintenance and operations goals, we need to develop a management system and workforce that can be resilient through change and quickly adjust to new strategies, goals and objectives. This includes finding new ways to work together regardless of organizational boundaries and changes.

## What Capabilities Are Essential?

**Aligning Skills to Needs.** Agencies must put processes in place to identify and address current and likely future gaps in workforce skills. Enhanced tracking of skillsets and use of creative strategies for providing access to specialized skills (e.g. centers of excellence) may be part of establishing this capability.

**Attracting & Retaining Workforce.** Agencies must strengthen their capability to attract and retain the next generation of employees. This may require an overhaul to recruiting strategies as well as staff management, recognition and reward systems.

**Technology Adoption.** To meet expectations of newer, "born digital" employees, agencies will need to improve their capability to adopt and integrate new technologies supporting process automation, information sharing and collaboration.

*Read more*



# Managing a Workforce Transition

## What can you do about it?

### Organizational Management

- **Organizational Culture** – to create a more collaborative work environment

### Workforce Management

- **Strategic Workforce Planning** – to ensure that the agency is building the right skillsets as workforce transitions occur
- **Recruitment and Retention** – to create effective strategies for attracting new talent, and for keeping new employees motivated
- **Succession planning** – to smooth transitions as employees leave the agency or change jobs, and use these transitions as an opportunity to build both hard and soft skills in new areas
- **Employee engagement** – to ensure there is two-way communication between employees and agency managers and that employees' concerns are heard and addressed (where feasible)
- **Professional development** – to build skills in needed areas and provide a growth path for employees

### Knowledge Management

- **Knowledge Audits** – to sources of specialized expertise within the agency as well as gaps in critical areas
- **Social and Learning Communities** – to establish opportunities for learning and collaborative problem solving
- **Knowledge Capture and Transfer** – to facilitate onboarding of new staff and avoid loss of important knowledge when current staff change jobs or leave the agency
- **Learning Organization** – to promote a culture in which employees are challenged to improve the agency's internal processes and services
- **Mentoring** – to provide opportunities for newer employees to learn from more experienced employees

### Information and Data Management

- **IT Strategic Planning** – to ensure that expectations of newer employees are considered within decisions about IT investments to facilitate internal communication and collaboration

## What resources will help you?

- **NCHRP Report 693** – “Attracting, Recruiting and Retaining Skilled Staff for Transportation System Operations and Management.” <http://www.trb.org/Publications/Blurbs/166342.aspx>
- **NCHRP 08-125** – “A Comprehensive Study of Future Competencies for Transportation Planners,” (Active Project). <https://www.agencycapability.com/library/nchrp-08-125-a-comprehensive-study-of-future-competencies-for-transportation-planners/>
- **AASHTO Committee on Human Resources**. <https://humanresources.transportation.org>
- **AASHTO Committee on Human Resources: Workforce Toolkit**. <http://toolkit.ashr.transportation.org/NCHRP.aspx>
- **NCHRP Synthesis 323** – “Recruiting and Retaining Individuals in State Transportation Agencies.” <http://toolkit.ashr.transportation.org/StatePracticesRecruit.aspx>
- **NCHRP Synthesis 362** – Training Programs, Policies and Practices. <http://toolkit.ashr.transportation.org/StatePracticesTraining.aspx>
- **AASHTO Committee on Knowledge Management**. <https://km.transportation.org/resources/>
- **NCHRP Report 813 A Guide to Agency - Wide Knowledge Management for State Departments of Transportation** – Provides guidance for states in developing a knowledge management strategy. Includes a PowerPoint presentation. <http://www.trb.org/Publications/Blurbs/173082.aspx>
- **Knowledge Management Guide** – Online version. <http://sites.spypondpartners.com/kmdemo/index.html>
- **TRB Task Force on Knowledge Management**. <https://trbkcm.org>

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## Situation

# New Multi-Modal Focus and Partnerships



## Context

**Stakeholder needs for seamless transportation solutions,** and expanding DOT objectives that incorporate societal goals for regional goals and transportation- and non-transportation goals require new partnerships. The organization needs to adapt to develop a common understanding of priorities, to strengthen collaboration, improve data and information and enhance communication and reporting mechanisms. We have additional needs to collaborate with our local partners in ways we have not done in the past.

## Change Forces

- **Shift in DOT Role and Focus.** The shift in emphasis from highway construction to maximizing the capacity of the existing multi-modal transportation system increases the importance of public/private and multi-jurisdictional partnerships.
- **Legislation, Regulation and Funding.** Legislation creates the need for the agency to strengthen integration of community priorities and collaborative processes into its project planning and programming, and to develop performance measures that consider the entire transportation system.
- **Technology Advancement.** New technologies are impacting the tools, methods and strategies available to share data with stakeholders that can be used for customer-facing, traveler information systems incorporating information about multiple modes.
- **Public Expectations.** Travelers are seeking improved intermodal connections.

## What Capabilities Are Essential?

**Agility & Resilience.** An organizational capability for agility is needed for adjusting planning, programming and project development processes to incorporate working with other organizations that have different missions, objectives and decision making timeframes.

**Operations Focus.** Agencies must strengthen their capability to focus on the operation of the multi-modal system. Coordination with other agencies, modes, jurisdictions and organizations is an integral part of this.

**Transparency.** The agency needs to keep modal and other jurisdictional

agency partners engaged, to ensure buy-in for policy initiatives and so external funding agencies are informed about status and schedules.

**Technology Adoption.** The agency needs to strengthen its ability to share data with partners and collaborate in provision of traveler information.

*Read more*



# New Multi-Modal Focus and Partnerships

## What can you do about it?

### Organizational Management

- **Strategic Planning** – to ensure that development of strong partnerships is clearly spelled out as integral to the agency's mission, goals and objectives.
- **Performance Management** – to incorporate a multi-modal perspective into planning and decision-making processes

### Knowledge Management

- **Knowledge Capture and Transfer** – to share information about partner agencies and key contacts within those agencies; and to share information about approaches to integrating multiple modes and intermodal connectivity into plans and projects

### Information and Data Management

- **IT and Data Governance** – to identify and adopt open data standards that enable sharing data with partners

### Partnerships

- **Public/private Partnerships** – to leverage available commercial products and services that provide a platform for information sharing and collaboration
- **Interagency Agreements** – to develop common understanding, coordination and collaboration among multiple agencies

## What resources will help you?

- **AASHTO** – “AASHTO Partnering Handbook.” <https://store.transportation.org> (search by item code APH-2-UL)
- **NCHRP Project 03-131** – “Guidance for Planning and Implementing Multimodal, Integrated Corridor Management.” <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4355>
- **Virginia Transportation Research Council** – “Multimodal Public-Private Partnerships: A Review of the Practices of Other States and Their Application to Virginia.” [http://www.virginiadot.org/vtrc/main/online\\_reports/pdf/17-r11.pdf](http://www.virginiadot.org/vtrc/main/online_reports/pdf/17-r11.pdf)
- **TRB Transportation Research Circular** – “Managing Transportation Systems in a Fast-Changing World.” <http://www.trb.org/Publications/Blurbs/179993.aspx>
- **TransitCenter** – “A People’s History of Recent Urban Transportation Innovation.” <https://transitcenter.org/publication/a-peoples-history-of-recent-urban-transportation-innovation/> - foreword
- **NCHRP Report 827** – “Navigating Multi-Agency NEPA Processes to Advance Multimodal Transportation Projects.” <http://www.trb.org/Publications/Blurbs/174665.aspx>
- **NCHRP Report 885** – “Guide to Sustaining a Culture of Innovation within Departments of Transportation.” <http://www.trb.org/main/blurbs/178368.aspx>

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## Situation

# Response to Increased Flooding



## Context

The state DOT is faced with **more frequent flooding events**. Environmental emergencies like flooding pose a threat to the public, DOT staff and transportation infrastructure and may result in detours, congestion and closures. They have economic impacts and are difficult to address programmatically because they occur without much warning, although some locations are starting to experience recurring flooding events. In addition, they require coordination among multiple organizations and agencies.

## Change Forces

- **Shift in DOT Role and Focus.** The changing DOT role creates a shared responsibility for emergency response with multiple other entities playing a first responder role, and the DOT involved as a part of the emergency response team before, during and after emergencies occur. This requires integrated flood warning and response systems among response partners.
- **Public Expectations.** The public generally has little understanding of steps needed to prepare for an emergency, but an expectation for a seamless public infrastructure. They need to get event warnings for transportation and non-transportation issues via a coordinated and multi-faceted approach that includes sensors, media alerts, websites, and closure of at-risk or compromised facilities.
- **Technology Advancement.** Technology for flood monitoring has been implemented to provide advanced warning capabilities, extending the amount of time for mounting a response effort.

## What Capabilities Are Essential?

**Transparency.** The agency needs to communicate with the public and other stakeholders to provide warnings, directives and to coordinate on response efforts.

**Agility & Resilience.** An organizational capability for agility and resilience is needed to adjust for emerging issues before, during and after the event and for adjusting construction approaches to improve future resilience.

**Technology Adoption.** The agency can use Unmanned Aerial Vehicles for flood assessment, and implement informa-

tion systems and tools for predictive modeling, risk assessment, integration with inventories of critical assets, facilitation of active flood response, and support for post-disaster recovery and reimbursement activities.

**Partnerships.** In times of emergency, the public relies on multi-agency teams to restore their access to infrastructure networks for communications and transportation. Emergency response depends on coordination among federal agencies (for flooding, this includes the National Weather

Service, US Geological Survey, the Army Corps of Engineers, NOAA and FEMA), climate and research organizations and other public sector stakeholders (such as the State Emergency Management Offices, local units of government, law enforcement agencies and the State DOT).

*Read more*



# Response to Increased Flooding

## What can you do about it?

### Organizational Management

- **Strategic Planning** – to establish clear and comprehensive direction among multiple response agencies for oversight, operational support and funding mechanisms
- **Change Management** – to coordinate, resource and sequence the implementation of the emergency response
- **Process Improvement** – to improve processes and methods and create improved infrastructure resilience in anticipation of future events

### Knowledge Management

- **Knowledge Capture and Transfer** – to improve communication among response agencies and with the public

### Information and Data Management

- **IT and Data Governance** – to establish roles and responsibilities, structures and processes for IT integration and support for emergency response among multiple agencies
- **IT Systems** – to support incident operations and management activities

### Partnerships

- **Interagency agreements** – to coordinate and collaborate across jurisdictions and organizations and to document responsibilities and acceptable levels of effort

## What resources will help you?

- **FHWA Emergency Transportation Operations.** [https://ops.fhwa.dot.gov/eto/tim\\_pse/index.htm](https://ops.fhwa.dot.gov/eto/tim_pse/index.htm)
- **RISE – 2018 Transportation Resilience Innovations Summit and Exchange.** [http://onlinepubs.trb.org/onlinepubs/conferences/2018/RISE/2018\\_RISE\\_Presentations\\_Addendum\\_v02.pdf](http://onlinepubs.trb.org/onlinepubs/conferences/2018/RISE/2018_RISE_Presentations_Addendum_v02.pdf)
- **AASHTO Special Committee on Transportation Security and Emergency Management (SCOTSEM).** <https://security.transportation.org/about/scotsem-fundamentals/>
- **NCHRP Report 525 – “A Guide to Emergency Management at State Transportation Agencies, Second Edition.”** <http://www.trb.org/Main/Blurbs/164691.aspx>
- **NCHRP Project 20-59(53) – Floodcast Resource Page.** <http://floodcast.info/wordpress/>
- **TRB Webinar – “Road Weather and Flood Monitoring with the National Water Model.”** <http://www.trb.org/Main/Blurbs/178840.aspx>
- **NCHRP Synthesis 20-05 – Topic 51-10 (Active Synthesis).** <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4723>
- **DOT Emergency Preparedness – Response and Recovery Information.** <https://www.transportation.gov/emergency>
- **Government Accountability Office Disaster Assistance.** [https://www.gao.gov/key\\_issues/disaster\\_assistance](https://www.gao.gov/key_issues/disaster_assistance)

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## Situation

# Budget Cuts



### Context

**Revenues are declining**, and the State DOT is challenged to keep up with program delivery in the face of stagnant and reduced budgets. Federal transportation fund sources are no longer sufficient to sustain the Highway Trust Fund and state funds are competing with other Legislative priorities. The organization needs to adapt in the face of uncertain future funds.

### Change Forces

- **Legislation, Regulation and Funding.** Federal and state legislation and regulations impact funding levels, eligibility, flexibility and available financing options. They affect planning and delivery practices and may impact staffing levels.
- **Shift in DOT Role and Focus.** The shift in roles among multiple agencies and modes creates a need for additional funding coordination to meet evolving regional needs.
- **Public Expectations.** The public has high expectations for delivery of transportation services. It is critical for the agency to communicate what it is accomplishing and how it is adjusting to constrained budgets; failure to do so can result in declining public confidence which can lead to additional funding cuts.

### What Capabilities Are Essential?

**Agility & Resilience.** The agency must build the capability to adjust to changing revenue sources. This requires use of flexible funding strategies, strong prioritization processes, clear and frequent communication, and strategic use of contract resources.

**Transparency.** The agency needs to communicate with funding agencies and the travelling public to make sure they understand the implications of

budget cuts and have confidence that the agency is making the best use of available funds.

**Technology Adoption.** The agency needs to strengthen its technology adoption capabilities to take advantage of opportunities to achieve operational efficiencies through process automation, e-construction, and system modernization.

**Operations Focus.** The agency needs to focus on efficiently maintaining current infrastructure and incorporating cost saving strategies to direct limited funding resources toward established business and stakeholder priorities.

*Read more*



## What can you do about it?

### Organizational Management

- **Strategic Planning** – to ensure clear direction for fiscally responsible delivery of multi-modal and operations-focused transportation services
- **Performance Management** – to ensure the agency is able to measure and achieve outcomes that improve the life-cycle performance of existing infrastructure at the lowest possible cost to the agency and transportation stakeholders
- **Process Improvements** – to create process efficiency, reduce duplication, and do more work with the same (or fewer) resources

### Partnerships

- **Innovative Contracting Methods** – to deliver projects more efficiently within funding constraints
- **Public/Private Partnerships** – to build consensus for actions and to enhance collaboration and coordination on establishing and expanding funding participation

### Workforce Management

- **Outsourcing** – to maintain flexibility and do the work when staffing is limited or restricted

### Information and Data Management

- **IT Technologies** – to achieve operational efficiencies

## What resources will help you?

- **NCHRP 19-16** – “Federal Funding Uncertainty in State, Local and Regional Departments of Transportation: Impacts, Responses and Adaptation,” (Active Project). <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4578>
- **NCHRP Report 798** – “The Role of Planning in a 21st Century State Transportation”
- **Supporting Strategic Decision-Making.** <http://www.trb.org/Publications/Blurbs/172210.aspx>
- **FHWA Policy and Governmental Affairs.** <https://www.fhwa.dot.gov/policy/>
- **TRB** – “Critical Issues in Transportation.” <http://www.trb.org/Main/Blurbs/178402.aspx>
- **NCHRP** – “Innovative Contracting for Major Transportation Projects.” [http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/20-24\(43\)\\_FR.pdf](http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/20-24(43)_FR.pdf)
- **NCHRP Synthesis 391** – “Public-Sector Decision Making for Public-Private Partnerships.” <http://www.trb.org/Publications/Blurbs/156870.aspx>

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# 6. Developing an Agency Capability-Building Action Plan

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This chapter provides a step-by-step guide to developing an action plan to build capabilities in response to change forces, needs, and strategies.

# Action Planning Introduction

Action planning is a six step process involving:

1. Establishing a clear scope for the capability-building effort,
2. Building a vision for achieving the end goal,
3. Reviewing and finalizing the strategies that will guide the agency’s actions,
4. Determining a prioritized set and sequence of actions that will achieve the vision and use the strategies,
5. Building a team that will carry out the plan, and finally,
6. Monitoring and adjusting the approach as needed to achieve the goal and create a baseline for future action plans.

This action planning process can be simplified, expanded or adapted to meet an agency’s needs and fit within existing processes– the guidance provided in this chapter is intended as a starting point.



## Step 1

# Determine Scope

**Initiate action planning for capability building by determining the scope of the effort, establishing a focus, determining why additional capabilities are needed and how much to take on at once.**

### Use the ACB Framework to Determine Scope

Action planning should start with a determination by senior leadership of desired area(s) for capability-building. It is important to know at this step what is prompting the need for change. It may be that a specific disruptive change force is resulting in a capability gap that is driving the effort:

- Technology Advancement
- Legislation, Regulation & Funding
- Workforce Evolution
- Shift in DOT Role & Focus
- Public Expectations

For example, federal performance-based planning requirements are driving an agency to consider incorporating a new approach to project prioritization. The agency knows that it doesn't have the processes in place or capabilities to perform some of the activities that will be needed to carry out this new function in an efficient and effective way. Agency leadership knows they will need to run forecasting scenarios, make programming adjustments based on their performance and

work across divisions to get the data needed to make decisions.

On the other hand, perhaps an agency already has a big picture idea on how to move forward. It is possible that the agency has started down the road of focusing on a specific strategy:

- Organizational Management
- Workforce Management
- Knowledge Management
- Information and & Data Management
- Partnerships

Perhaps leadership within an agency establishes a strategic goal to improve sharing of data and information across the agency. Leadership has a long-term goal to implement organizational changes that will facilitate information sharing and to eventually democratize agency data so it is widely available across systems, divisions and regions. Over the short term, the agency wants to implement data governance to establish principles around collecting, storing and sharing data.

Having knowledge of what is driving the need for capability building is helpful in determining where the agency is at in terms of mobilizing to develop the initial scope of the effort and understanding the current state of capabilities.<sup>1</sup> There will likely be additional work needed to agree upon scope if a change force is prompting the need for change as opposed to the agency already having a strategy in mind.

Regardless of what is driving the need for capability building, at the end of this step, the agency should have a common understanding that there is capability gap that must be closed and an action plan is needed to formalize the process.

### Determine Incremental or Transformational Approach

Action planning can be carried out for small changes or to have larger impacts on existing organizational structures, culture or strategy.

Two approaches that can be taken in action planning for capability building are:

- Incremental – small changes over time to the existing systems and processes
- Transformational – systemic changes to an organization

Some of the considerations in deciding whether to use an incremental or transformational approach are shown in the table below.

There are times when it is most appropriate to use an incremental approach, such as when there is a high risk associated with making wholesale structural or strategic changes across the organization. For example, a DOT operating in a severely constrained financial environment may not be in the best position to undertake a transformational action plan to restructure operations divisions and hire staff to focus on major infrastructure investments in disruptive technology. On the

**Table 6.1 Action Planning Considerations**

Considerations	Incremental	Transformational
<b>Scope</b>	Local scope – Isolated to one or just a few business areas	Agency-wide
<b>Scale</b>	Will not require major changes to structure or systems	Will significantly change the agency culture, strategy and systems
<b>Resources needed</b>	Few – small implementation team made up of process owners	Many – medium to large team needed across multiple business areas
<b>Outreach required</b>	Low- to moderate engagement needed	Moderate- to high engagement needed, including strong leadership support
<b>Time Frame</b>	Short-term but iterative	Mid- to long-term
<b>Other benefits</b>	Provides a quick win as a foundation to future changes	Drives culture change based on agency-wide changes to strategy

other hand, they may benefit from establishing a task force or small unit focused on developing capabilities to innovate and drive efficiency within the agency.

An incremental approach can often be achieved with a small pool of staff and financial resources, and can build the foundation for additional iterative implementation that could lead incrementally to major transformation over time.

When the capability building effort is critical across the agency, and there is low risk of making a systemic change, a transformational approach may be in order. For example, a state DOT faced with a serious security breach

involving employees' personal data may undertake an agency-wide data management initiative to assess and mitigate system damage and data loss, and build up capability to secure data in the future. This approach requires mobilization of a significant number of staff and coordination across multiple business areas. Furthermore, it cannot be achieved without active project management and leadership support. These topics are discussed in more detail in Step 5 of this chapter.

See the attached Scoping Template for a guide on completing this step.

### Step 1 Checklist



#### Use the ACB Framework to determine scope

- Do we understand which change forces matter most?
- On which needs should we focus?
- Which strategies are likely to support our selected needs and the capability(ies) that need to be built?



#### Determine incremental or transformational approach

- Is our scope local or agency-wide?
- Is the scale within current functions or does it require systemic changes?
- Do we know at a high-level the number of resources needed?
- Generally, how much outreach will be needed, based on the scope and scale?
- Do we have a general sense of the timeframe that will be needed?
- Have we thought about other benefits of our selected approach?



#### Complete Step 1 – Determine Scope

## Project Scope Statement

What is within the scope of the project? What business objectives does this project accomplish? What change forces and/or organizational needs does it address? What strategies will be used? What capabilities will be enhanced? This will be refined in later action planning steps. If this project includes a charter, scope statement should align with scope/problem statement in charter.

<b>Initiative Name</b>	Note: “Working name” for the initiative.
<b>Background</b>	Note: Describes the background, context and need for the initiative.
<b>Description</b>	Note: Describes the high-level project suppliers, inputs, process, deliverables, outputs, customers. For example, “develop a process for governance and management of knowledge within the agency. This will establish the sources and types of knowledge addressed, ownership, the knowledge lifecycle, dissemination of knowledge and list of knowledge recipients.”
<b>Benefits</b>	Note: How will we know the project is a success? This could include performance measures, if known. This section will be refined in later steps of the action planning effort.
<b>Initiative Timeframe</b>	Note: Provide a rough timeframe for the initiative.
<b>Assumptions</b>	Note: For example, could address whether scope is local or agency wide, assumptions about resource availability, other internal or external factors that could impact success. Assumptions should be tested and actions taken if any assumptions are false.  A1  A2
<b>Out of scope</b>	Note: What is “not” part of initiative? For example, if scope is local, out of scope does not include other divisions or agency wide activities.  Item 1  Item 2
<b>Risks</b>	Note: Include summary of all risks, their likelihood (high/medium/low), severity (high/medium/low) and any mitigating actions.  R1  R2
<b>Additional documentation</b>	Note: Attach additional documentation, such as current process steps, business requirements, etc.

## Step 2

# Build a Vision

## Finalize the more specific strategies that will achieve your capability-building goal.

### Determine the expected outcome based on scope

The first step to building a shared vision is to clearly understand the end goal as it relates to the scope developed in *Step 1 - Determine Scope*. A shared vision provides the focus and motivation for stakeholders to understand and embrace:

- Where we're going
- Why this matters
- What's in it for me
- What success looks like

### SMART goals

Goals for your action plan should be:

- S** **Specific:** clearly and unambiguously links behaviors to the goals
- M** **Measurable:** provides a quantifiable measure of success
- A** **Achievable:** realistic within agency responsibilities and resources
- R** **Relevant:** makes sense in the context of the project
- T** **Timely:** provides a deadline for completion

Understanding the expected outcome informs “What” is the expected destination, but does not describe the “How,” that is, what the journey will look like get there. An example of a supporting strategic plan vision statement is Arkansas DOT’s data management vision statement to “ensure all stakeholders have ready access to coordinated data for the optimization of business processes and decision making.”

### Understand how effort will support other strategic initiatives

This is also the step to ensure the action plan will be aligned and not working at cross-purposes with other strategic plans, initiatives, goals and objectives. The time frame for the expected outcome should be consistent with other strategic goals and help to bring them to life. This step is the time to give thought and consideration to elements within the action plan for putting in place the skills, resources, processes and tools to meet the target state.

An example of this step is a state DOT that has a performance level goal in their five-year organizational strategic plan to achieve a 10 percent improvement in pavement condition by 2024. The agency has already determined in Step 1 that a gap in their capability to

perform predictive analytics exists, and that it is the result of a limitation in the way staff are able to share data across systems. Even if the data were available, the agency has always based its assessment of performance on post-project results. In this example, the agency establishes a vision to establish a data management effort to coordinate data, and put in place a formalized process to link target setting to outcomes for all projects going forward.

### **Establish performance measures to communicate your vision**

Another important component of this step is establishing performance measures that can be used to communicate a vision. This helps to bring focus to the effort by determining the ways success will be measured and how the tasks within the action plan will be coordinated across business areas within and beyond the agency.

In the previous example, the DOT could set a goal of putting in place a data governance structure by July 1, 2020, and running predictive analysis on 75 percent of their projects in the first year. The agency aims to achieve anticipated project outcomes 60 percent of the time in the first year.

See the attached Vision Template for a guide on completing this step.

#### **Action Plan Performance Measures DOs and DON'Ts**

##### **DO**

- Use quantitative measures if at all possible
- Use a mix of leading and lagging measures to communicate your vision, verify the validity of your approach, show results and adjust your approach along the way.
- Have a clear understanding of your data sources and their limitations.
- Make sure your measures are valid and reliable before you use them to communicate your vision or results.
- Document your measures so they can be traced, easily understood and provide continuity when staff turnover.

##### **DON'T**

- Let perfect data get in the way of measuring progress.
- Rely on one measure to tell the whole story.
- Measure in a vacuum – involve your stakeholders so they have skin in the game and can interpret the results from their perspectives.
- Forget that performance measures reflect facts but can't replace the common sense of humans who use them to create value.
- Think of performance measurement as one and done. It is an ongoing process.

## Step 2 checklist

### Determine expected outcome based on scope

- Do we know where we're going?
- Is our vision clear?
- Are we able to articulate it?
- Do we have SMART goals?

### Understand how effort will support other strategic initiatives

- Do we know why this matters?
- Are we aligned with other strategic initiatives?
- Are our time frames consistent with other agency goals and objectives?

### Establish performance measures to communicate your vision

- Do we know what success looks like?
- Do we know what measures we will use to communicate it?
- Do we have a mix of leading and lagging indicators?
- Do we have the data we need?
- Are our measures valid and reliable?
- Have we documented our measures?
- Have we engaged with our stakeholders?
- Have we established a measurement system for ongoing measurement?

### Complete Step 2 — Build a Vision

## Vision Statement

What is our expected outcome, based on our scope? How does this relate to other strategic initiatives, including timelines? This is a living document – update as new information is available

<b>Project Name</b>	Note: “Working name” for the project.
<b>Project Sponsor</b>	Note: Leader responsible for supporting implementation team and removing barriers to ensure successful project completion. Typically, the leader of the area responsible for the activity, or one of the key owners in the case of activities with shared responsibility.
<b>Project Manager</b>	Note: Staff person responsible for managing project through implementation and post action assessment.
<b>SMART Goal(s)</b>	Note: Goals for your action plan should be specific, measurable, achievable, relevant and timely
<b>Performance Measures</b>	Note: Include a mix of leading and lagging indicators, if possible. Include period and timing of measurement.  PM1 =  PM2 =
<b>Data needed</b>	Note: Include as much detail as possible, including frequency, timing, hyperlinks, as well as any notes about data reliability/validity  PM1 – Data field(s), Data source/location, documentation location/link  PM2 – Data field(s), Data source/location, documentation location/link
<b>Stakeholder engagement</b>	Note: Provide a summary of high-level actions to ensure the appropriate stakeholders are engaged throughout the process. This will be refined in later steps.
<b>Additional documentation</b>	Note: Attach any supporting business or data documentation.

## Step 3

# Select/Develop Strategies

## Finalize the strategies that will guide action.

### Review the scope and vision

This step is the time to review the strategies selected as part of Step 1 and consider the decisions made during the Step 2 to ensure an appropriate level of detail is built into the plan before moving forward.

In the example in Step 2, the agency knows it needs to develop predictive analytics capability. Leadership developed a vision to establish data management and establish a process to link target setting and outcomes. Step 3 would be the opportunity to take a step back and think about all of the ramifications to tools, people and processes of embarking on this effort. Based on this step, the agency might refine their vision to comprise:

- using data management to coordinate financial systems data with planning and project data, and
- putting in place a formalized process to establish predictive analysis for all projects going forward.

It is possible that upon review, the scope and vision are too much to take on in one iteration. This is a good time to consider paring back the effort based on scope, scale and bandwidth.

### Finalize the strategies that will guide action

Action planning for capability-building is meant to be flexible. This step might include adding strategies or preliminary steps that are outside of the current ACB framework. For example, perhaps an agency realizes that before it can embark on a data management effort, it needs to know additional detail related to the agency's current state. This needs to happen before it can move forward. The agency may also determine that the action planning has a certain level of risk that requires leadership support. The agency decides it will need to free up a group of leaders to assist with the plan governance. This will involve temporarily re-assigning some responsibilities and bringing a project manager onboard to shepherd the initiative.

This is also the step to learn from those who have undertaken similar efforts in the past. This can significantly speed up implementation, reduce risk of failure and leverage resources, like templates and "how to" guides, that have been developed or used by peers. Those looking to take on a capability-building initiative would be prudent at this step to:

- review examples in the literature of how agencies used specific strategies to build capabilities, and

- examine strategies that have been undertaken by peers to build capabilities in this area, and reported on their successes and lessons learned.

One possible approach that could be used at this step to finalize and fully develop the strategy is to host a cross-functional strategy development workshop. This format could help the agency move from conceptual scoping and visioning to practical planning and include all of the requisite knowledge, skills and perspectives to confidently move forward with an actionable set of next steps for documenting the action plan. The basic steps of a strategy workshop include:



Included is a sample agenda for a three-quarter day strategy workshop that can be adapted for state DOT use. By taking a step back for reflection on the scope and vision to develop additional planning details at this step, the agency can avoid the pitfalls of moving forward without a clear and achievable objective that is backed up by an actionable plan of next steps for moving forward.

By taking a step back for reflection on the scope and vision to develop additional planning details at this step, the agency can avoid the pitfalls of moving forward without a clear and achievable objective that is backed up by an actionable plan of next steps for moving forward.

## Agency Capability Building Strategy Workshop Agenda

**Date:** July 14, 2020

**Times:** 8:00 AM – 2:00 PM

**Location:** State of Jefferson DOT, 1776 Constitution Dr., Room 100  
Anytown, Jefferson

In this workshop participants will:

- Review the change forces and needs driving the need for capability-building
- Review the scope and vision of the effort
- Finalize the strategies that will guide the action plan

### A G E N D A

---

8:00 – 8:30 am	Welcome, Introduction and Overview <i>Susan Smith, Secretary, Jefferson DOT</i>
8:30 – 9:00 am	Overview of Change Forces, Needs and Capabilities <i>Thomas Jones, Facilitator</i>
9:00 – 9:30 am	Scope and Vision <i>Jane Doe, Project Sponsor</i>
9:30 – 9:45 am	Break
9:45 – 10:30 am	Discuss Capability Gaps and Potential Strategies <i>Participants</i>
10:30 – 11:00 pm	Practice Example: State X did a similar capability-building effort and has a noteworthy practice or lessons learned <i>Guest speaker, State X</i>
11:00 – 12:00 pm	Table Exercise: Finalize Performance Measures <i>Participants</i>
12:00 – 12:30 pm	Lunch
12:30 – 1:00 pm	Table Exercise Report Out <i>Participants</i>
1:00 – 1:30 pm	Discuss Process and Priorities <i>Participants</i>
1:30 – 2:00 pm	Wrap Up, Next Steps <i>Thomas Jones, Facilitator</i> <i>Jane Doe, Project Sponsor</i>

### Step 3 checklist

#### Review your scope and vision

- Do the decisions we made during the vision step align with the strategies we selected in the scoping step?
- Are they comprehensive?
- Do the scope and scale seem appropriate?

#### Finalize the strategies that will guide your actions

- Do we need to incorporate additional strategies?
- What additional detail is needed?
- Is there anything else we need to have in place before we start?
- Have we involved all the right people to ensure we have the detail we need to move forward?
- Are we fully aligned?
- Have we reviewed noteworthy examples and lessons learned?
- Have we got a solid set of next steps for moving forward?

#### Complete Step 3 – Select/Develop Strategies

## Step 4

# Create Actions

## Document the set, sequence and priorities of the actions that will achieve the vision and strategies

### Produce the appropriate set and sequence of actions

This step is focused on the project management steps related to the capability-building initiative. It includes documenting the set and sequence of the actions that will achieve the vision and implement the strategies selected earlier for enhancing inadequate capabilities and developing any missing capabilities.

The plan's set of actions should map to the vision and strategies established earlier. The sequence of actions should reflect the logical and efficient set of implementation steps, and maximize value based on the time frame determined earlier. It should include the priority of the steps, along with the current status of the actions throughout implementation.

What distinguishes an agency capability-building action plan is that it should detail the design of each of the desired capabilities and how each of the steps contributes to the desired outcomes related to building capabilities.

There are several dimensions that contribute to developing capabilities, shown in Figure 6.1.:

Not all dimensions are present in every capability, nor necessary to enhance it. For

example, the capability to establish data management capability is likely to require some dimensions of governance, systems and processes to enhance it. The capability to quickly adjust strategy may primarily require the organization dimensions.

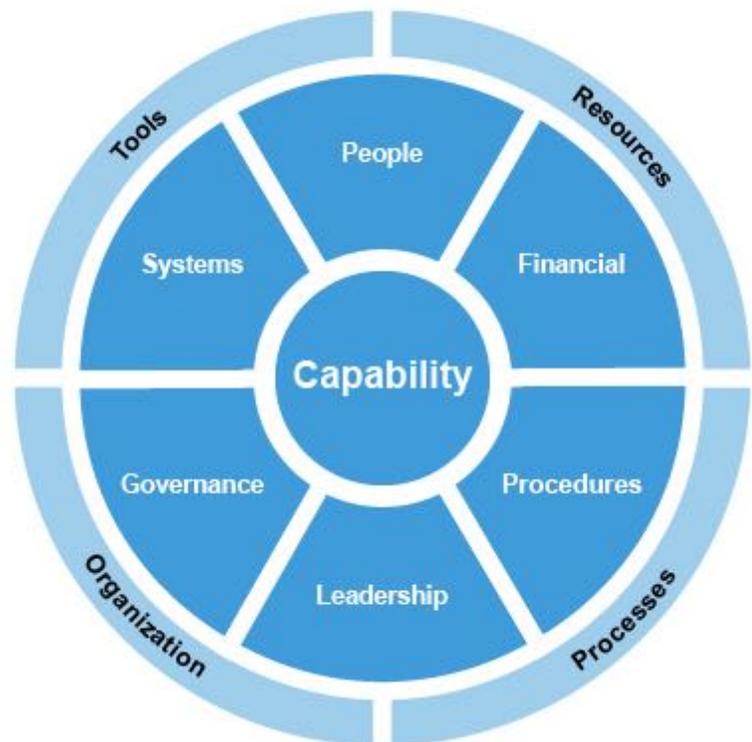


Figure 6.1. Capability Dimensions

## Determine responsibilities, resources and schedule

In addition to the set and sequence of actions, the action plan should establish the implementation roadmap in enough detail that all responsible and supporting staff understand the role they play and the actions for which they are responsible.

- who should lead each action
- which business areas are involved or support each step
- when each step should commence, how long it will take and when it should be completed
- staff will do what and by when, including the list and schedule of activities and what will be achieved through each.

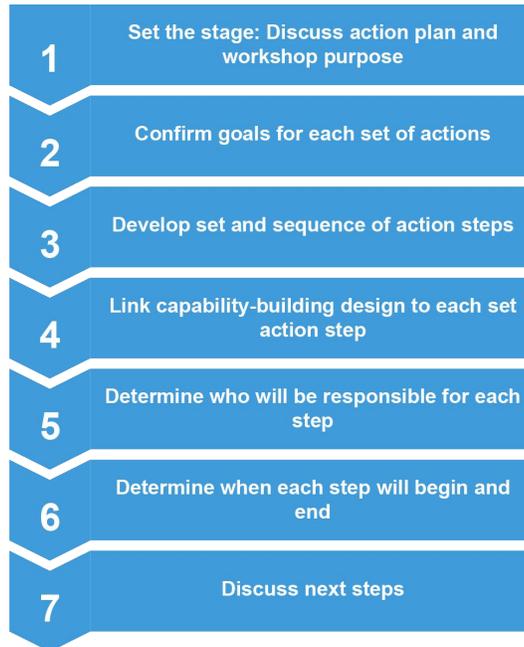
An action plan is meant to be a living document, and the action steps, start and end dates and progress should be updated in real-time. Step 6 goes into additional detail on monitoring and adjusting the action plan over time.

**PREWORK to be completed before the workshop – based on the previous steps, participants should review:**

- change forces/context
- scope
- vision
- capability gaps
- proposed strategies
- priorities
- performance measures

The agency could use a cross-functional action development workshop to determine the set of actions needed to develop capabilities. This approach helps an agency collaborate on developing the “who” “what” “when” “where” and “how” of the action plan. This ensures that there is agreement that the actions taken will be focused on enhancing the missing or inadequate essential capabilities and establishes joint responsibility for accountability.

The basic steps of an action development workshop include:



Included is a sample agenda for a half-day action development workshop with detailed instructions that can be adapted for state DOT use. Also included is an action plan template, filled in with an example of capability building for creating a learning organization. Note that it incorporates each of the project goals, along with the capability element developed, the business areas responsible for and supporting the action steps, the step priority, along with start and end dates.

## Action Planning Workshop Agenda

**Date:** August 14, 2020

**Times:** 8:00 AM – 12:00 PM

**Location:** State of Jefferson DOT, 1776 Constitution Dr., Room 100  
Anytown, Jefferson

In this workshop participants will:

- Review the purpose of the action plan – “who” “what” “when” and “how”
- Confirm goals and develop action steps
- Incorporate capability-building into action steps
- Establish timelines, roles and responsibilities

### A G E N D A

8:00 – 8:30 am	Welcome, Introduction and Overview <i>Jane Doe, Project Sponsor</i>
8:30 – 9:00 am	Overview of Action Plan in the Context of Change Forces, Needs and Building Capabilities <i>Thomas Jones, Facilitator</i>
9:00 – 9:30 am	Discuss Action Plan Goals <i>Participants</i>
9:30 – 10:15 am	Table Exercise 1: Develop Action Steps for Building Capabilities <i>Participants</i>
10:15 – 10:30 am	Break
10:30 – 11:15 pm	Table Exercise 2: Determine Timeline, Roles and Responsibilities <i>Participants</i>
11:15 – 11:30 am	Table Exercise Report Out on Action Steps, Timeline, Roles and Responsibilities <i>Participants</i>
11:30 – 12:00 pm	Wrap Up, Next Steps <i>Thomas Jones, Facilitator</i>

## Example Action Plan Template

Action Plan Title: Capability-Building Related to Learning								
Project Lead: Jane Smith								
Develop Capability to create a learning organization. Current capability is very low; department has no experience with continuous improvement methodology								
Organizational Management approach: Continuous Improvement/Lean								
Goal 1: Establish Lean governance and management structure by October 1, 2020								
	Capability element	Business area/person responsible	Support Roles	Priority	Start date	End date	Status	Notes
<b>Assign lead</b>	Human resources necessary to develop and monitor capability	Jane Smith	Deputy Secretary Jones	High	10/1/2019	12/1/2020	Behind schedule	
<b>Plan workshop</b>	Process for aligning leaders, determining gaps, prioritizing likely efficiency drivers, monitoring and reporting	Jane Smith	HR/ Talent Development Contact	Medium	1/1/2020	3/1/2020	Not started	TD contact will be assigned by 12/15/2019
<b>Kickoff governance committee</b>	Leadership support and guidance for initiative	Jane Smith, Secretary's Office	Board of Directors	Medium	4/1/2020	5/1/2020	Not started	
Goal 2: Achieve \$2M in organizational efficiencies bottom line savings) by July 1, 2021								
<b>Document how to measure/ track savings</b>	Process documentation and baseline for future improvements	Jane Smith, Division Reps	Governance Committee	High	10/15/2019	12/1/2019	On track	
<b>Set up tracking mechanism</b>	System structure	IT Lead (TBD)	Jane Smith	Medium	10/20/2019	1/2/1020	On track	IT Division Administrator will assign by 10/1/2019
<b>Monitor savings</b>	Measurement process for capturing results	Jane Smith	Division Reps	Low	5/1/2020	Ongoing	Not started	

### Step 4 checklist

**Produce the appropriate set and sequence of actions**

- What are the set and sequence of steps?
- How does the plan map to capability-building?
- What are the priorities of the steps?

**Determine Responsibilities, resources and schedule**

- Who is responsible for what and by when?
- Which business areas are supporting the effort?
- When will each step begin?
- When will each step end?
- What is the current status of each step?

**Complete Step 4 – Create Actions**

## Step 5

# Build a Team

## Determine the team and provide them with what they need to be successful.

### Determine team composition

The agency will likely have mobilized a group of individuals during the earlier steps to develop scope, build a vision, select and develop strategies, and draft the action plan. This step is about building the tactical team that will perform the individual tasks to implement the vision for capability-building.

Why form a team to implement the action plan? There are several critical benefits of establishing an implementation team:

- Improved collaboration across organizational boundaries compared with simply assigning tasks
- Improved communication to increase efficiency of handoffs throughout implementation
- Shared vision of success and accountability for results

This step engages and coordinates all staff (and partners, if applicable) who will be conducting the actions, as well as assigning a lead to shepherd the initiative through the final two steps.

Note that the timing and details of this step are somewhat flexible. It is up to the agency when to form the actual team. It is possible and advisable in cases where a cross-functional team is required to begin this step earlier.

### Assign team roles

Clarity around roles is a critical success factor for teams. Teams need people to lead the effort, provide logistical support, contribute expert advice and carry out the implementation steps. These roles are distinct from the roles each individual plays within their assigned job duties.

Without clear roles, initiatives are at greater risk of failure because team members may be working simultaneously on the same activities, steps may be forgotten, and the focus of the initiative may be lost. Ambiguities also cause frustration for team members and compromise the development of effective team collaboration.

Following is a summary of common team and individual member roles:

- The team sponsor provides leadership support and removes barriers to the team's success.
- The team lead is the single point of contact for the overall effort, including clarity around goals and actions.
- The project manager provides management of the project plan and timelines and tracks day-to-day progress.

- The team member is typically included on the team based on their area expertise or the balanced perspective they bring to the project.

This list is not exhaustive. Some initiatives are fairly simple and may involve one person serving several roles, such as team lead and project manager. Other teams require specialized skills, such as IT testing expertise or specialized communication or change management skills.

Team roles evolve over the lifecycle of the project. For example, the team sponsor may be called upon early in the project to help the team lead clarify and communicate the scope and vision. Later, they may be called upon to remove barriers to scaling an initiative or communicating the results to other executives within the agency. A team lead's role will also change as the team members work to complete their individual assignments and also grow together as a team.

### Provide resources

A common failure mode of project teams is lack of leadership support. This step provides the team with the resources and empowerment they need to be successful, particularly those things that require leadership to remove barriers, including:

- Time and permission to work on the initiative
- Vocal support, coaching and direction, if needed, by leadership
- Financial resources, if needed
- Tools, such as software
- Data and analysis support needed for performance measurement

It is up to the agency and the specific situation who needs to be on board to support and energize the team as they embark on the effort and throughout the implementation. In low risk situations, they should be given as much independence as possible within clear boundaries; when the initiative is higher risk, leadership may need to play a more active oversight role.

### Develop an elevator speech

It is important for everyone participating in effort to feel like they know why they are participating and that the effort is worthy of pulling them away from their "day jobs." Creating an "elevator speech" for team members and leadership alike ensures everyone knows and can communicate the vision for the plan in brief, including:

- why it's important,
- what it will entail,
- how it will enhance capabilities, and
- how it adds value to the agency and its customers.

An effective elevator speech should be concise, clear and inspire listeners. It is linked to but distinct from the change management strategy described below in that its purpose is as much about motivating the project team and supporting leadership as it is about garnering support from those outside of the process.

## Develop change management strategy

There is ample literature available on the topic of change management, and the variety of formats for state DOTs to use is endless. We provide several resources in the bibliography for those wishing to explore this topic in further detail.

The key components that should be included in any change management plan for capability-building include:

- Articulating the change forces or other context around the need to implement capability-building strategies
- Understanding where the agency is culturally in their ability to change
- Creating a change management team to collaborate with the implementation team and leadership on the change

- Developing communication and outreach around the change
- Removing barriers and mitigating risks associated with the change
- Executing the change management strategy
- Evaluating the change and capturing lessons learned

A simple change management roadmap is included to assist agencies in the preparing for, manage and support their capability-building change effort. The guidebook also includes a list of items that should be included in a team charter. This list includes team names and roles, project objectives, success factors and additional project resources that should be made available to team members.

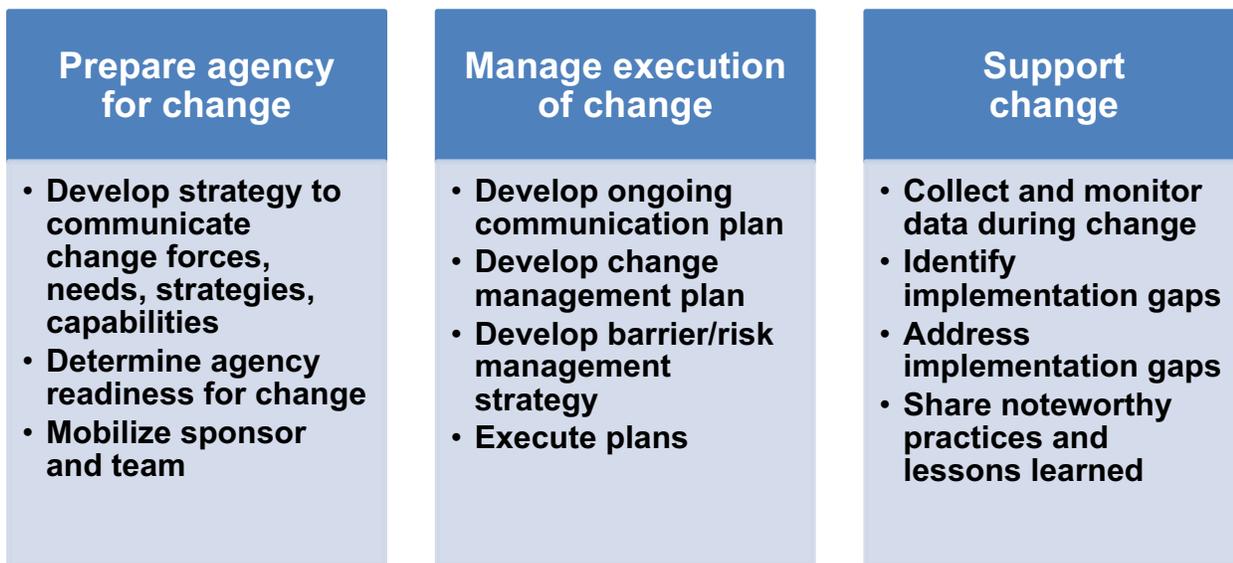


Figure 6.2. Change Management Roadmap

## Team Charter



### Team names and roles

- John Smith - Sponsor
- Jane Doe - Project Manager
- Mary Jones - Team Member
- Bill Johnson – Team Member
- Sue Anderson – IT contact

### Objectives of project (team completes each item)

- why it's important,
- what it will entail,
- how it will enhance capabilities
- how it adds value to the agency and its customers



### How we will ensure success (team completes in each item)

- Time and resources
- Leadership support
- Financial resources
- Tools and software
- Data and analysis support
- Success measures

### Additional resources

- Project scope statement
- Vision statement
- Strategy outputs
- Action plan template
- Change management plan



Figure 6.3. Team Charter

## Step 5 checklist

### Determine team composition

- Who should lead?
- Who should be involved?
- Who should be informed?

### Determine Team Roles

- Have we defined and documented which role(s) will each team member play?
- Have we provided clarity to members on their team and individual roles?
- Do team members know the team and individual responsibilities associated with their roles?

### Provide resources

- What resources does the team need - financial, tools, data, etc., and how can we help them get them?
- How can we free up their time to work on this?
- How can leadership help support the team?

### Develop elevator speech

- What is our elevator speech for the project team and leadership?

### Determine change management strategy

- Have we articulated change forces, needs, strategies and capabilities to be built?
- Do we know the agency's readiness for change?
- Do we have a team in place to facilitate change?
- Do we have a communication plan?
- Do we have a barrier/risk management plan?
- Do we know how to execute the change management?
- How will we capture lessons learned?

### Complete Step 5 – Build a Team

## Step 6

# Monitor and Adjust

## Check and adjust the implementation of the action plan

### Design review and reporting mechanisms

The last step entails periodically checking and adjusting the implementation to verify that the process is working as intended and resulting in the intended outcomes. This step includes scheduling regular check-ins with the implementation team, the project lead and leadership, if necessary, during implementation, especially at the start of the initiative.

This step includes developing performance reporting mechanisms, and documenting and executing a process to show progress toward the vision for the capability-building effort. Thought should be given to the reporting mechanism(s) most appropriate for the audience. Possible performance reporting mechanisms include:

- Dashboards
- Performance reports
- Presentations to leadership

Reviewing how the process is operating and making small adjustments prevents major rework loopbacks that slow the overall implementation.

### Make adjustments based on triggers

Triggers should be built into the review and reporting structure to provide a signal that an

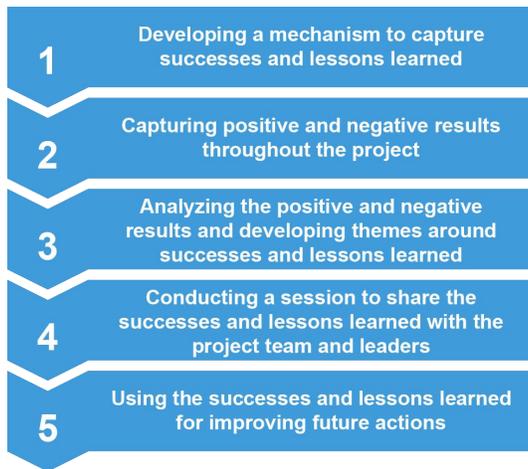
adjustment is needed to the overall implementation process or one of the tasks within the plan. This trigger should be based on performance measurement results, and an associated mitigation strategy should be aimed at bringing the project back within acceptable tolerance. For example, an agency is undertaking an implementation to build process agility/innovation using organizational management strategies, specifically, using the lean methodology. One of the action plan metrics is operational efficiencies, measured through process improvement dollars saved. The agency is targeting \$3M in bottom line savings by the end of 2021, but has only achieved \$250K in savings to date. A look at the pipeline of continuous improvement project savings on a quarterly basis could be used to establish a trigger based on dollars saved, active and planned projects and the deadline for achieving the savings.

The trigger in this example could signal a need for escalating results to division or regional leadership advice on ramping up the pipeline of projects. Adjustments are integrated into the implementation process steps.

## Establish feedback loop for future actions

The project team should track successes and lessons learned during the implementation to build a feedback loop and make the next set of actions more efficient and effective to implement. This activity should be built into the implementation tasks rather than completed after the plan has been completed.

Typical steps for capturing lessons learned include:



The resources at the end of this chapter provide a sample template for capturing successes and lessons learned.

### Step 6 checklist

**Design review and reporting mechanisms**

- When and how often should we check-in with the team?
- What mechanism(s) should the team use to report on performance?

**Make adjustments based on triggers**

- What are our triggers?
- What are our mitigating actions?
- How will we integrate adjustments into the plan?

**Establish feedback loop for future actions**

- What are our successes?
- What are our lessons learned?
- How will we integrate these into the next set of actions?

**Complete Step 6 – Monitor and Adjust**

### Check and Adjust.

Modify Status boxes to reflect performance and process statuses. Adjustments could be triggered by performance or process gaps. This is a living document – update as new information is available.

Goal(s)	Target Condition(s)	Actual Result(s)	Status (RYG)	Process Issue(s)	Status (RYG)	Adjustment Action(s)?
G1				•		•
G2				•		•
G3				•		•
G4				•		•
G5				•		•
G6				•		•
G7				•		•
G8				•		•

### Lessons Learned Template.

Positive (+) and Negative (Δ) lessons learned should be captured throughout the project. The Project Management Institute (PMI) at [www.pmi.org](http://www.pmi.org) suggests starting with the following categories (they can be adjusted for more granularity, or feel free to add to the list): project management, technology, communication, business processes, requirements, design and build, testing and implementation. This is a living document – update as new information is available.

Lessons Learned (+)	Impacts	Recommendations/Actions
L1(+): Note: Brief summary of lesson learned	<ul style="list-style-type: none"> <li>Note: List impact(s)</li> </ul>	<ul style="list-style-type: none"> <li>Note: List recommendations for further discussion/ action(s) taken</li> </ul>
L2(+)	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
L3(+)	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
Lessons Learned (Δ)	Impacts	Actions
L4(Δ)	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
L5(Δ)	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
L6(Δ)	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>

# Chapter 6 Resources

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## Use this Guidebook's Companion Digital Platform

The digital Agency Capability-Building Portal (ACB Portal) developed in coordination with this guidance incorporates additional resources and updated information. Read Chapter 6 on the ACB Portal: <https://www.agencycapability.com/chapter/6-actionplan/>

## Chapter 6 References

1. Harvard Business Review, "Capitalizing on Capabilities," June 2004 [Online]. Available: <https://hbr.org/2004/06/capitalizing-on-capabilities>

# **NCHRP 20-24(95)A Ensuring Essential Capability for the Future Transportation Agency**

## **Community of Interest Meeting 5 – Summary Final Products & Dissemination and Outreach**

**February 19, 2020  
Spy Pond Partners, LLC**

The information contained in this report was prepared as part of NCHRP Project 20-24(95)A, National Cooperative Highway Research Program.

**SPECIAL NOTE:** This report **IS NOT** an official publication of the National Cooperative Highway Research Program, the Transportation Research Board, or the National Academies of Sciences, Engineering, and Medicine.

**Acknowledgments**

This study was requested by the American Association of State Highway and Transportation Officials (AASHTO), and conducted as part of National Cooperative Highway Research Program (NCHRP) Project 20-24. NCHRP is supported by annual voluntary contributions from the state departments of transportation (DOTs). NCHRP Project 20-24 provides funds for research studies intended to address specific needs of chief executive officers (CEOs) and other top managers of DOTs. The work was guided by an NCHRP project panel. The project was managed by Dr. Andrew Lemer, NCHRP Senior Program Officer.

**Disclaimer**

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## Introduction

The world around us is changing. Due to technology advancements, changing political landscapes, funding instability, workforce behavior, and many other external forces, organizations need to adapt and prepare for a new reality. This research project, NCHRP 20-24(95) Ensuring Essential Capability for the Future Transportation Agency, is helping to define the changes transportation agencies face, determine the implications of these changes, and provide guidance on what they can do to prepare for the future.

The project is focused on Agency Capability Building (ACB). An agency's capabilities are the ways it brings together its people and other resources to deliver value to its customers and stakeholders and respond to changes in its business environment. Two main goals of the project are to develop a sustainable framework for OCM and provide useful resources to the transportation community in a timely and easily accessible way.

This Community of Interest (COI) is an online focus group that provides feedback to the research team throughout the project on draft products. The COI participants will also provide insight on current practices in ACB at transportation agencies across the country.

## Agenda

The fifth COI meeting was held on February 19, 2020. The following agenda items were covered in the COI meeting:

1. Introduce ACB Guidebook (print and digital versions)
2. Training on how to use the Guidance
3. Digital Guide and Portal Management and Stewardship
4. Dissemination and Outreach Discussion

## Participants

This COI meeting had 11 participants from 9 different agencies or organizations.

<b>Name</b>	<b>Agency/Organization</b>
Peggi Knight	Iowa DOT
Tracy Larkin	Nevada DOT
Allison Hardt	Maryland DOT
Hua Xiang	Maryland DOT
Russ Buchholz	North Dakota DOT
Daniela Bremmer	Washington DOT
Leni Oman	Washington DOT
Tammy Haas	New Mexico DOT
Lauren Little	Alaska DOT
Chris Young	Texas DOT
Keith Williams	FHWA

## Summary of Discussion

The following is a summary of the responses received during the discussion portion of the COI.

### Question 1 – How do you think you'll use the Guide and Portal?

Response 1: Interested in the data position descriptions and best practices for helping to stay on the cutting edge. Would love to get a presentation of this project at the AASHTO administration conference.

Response 2: This is a great overarching tool. We tend to retreat into what we know, so this is a great way to step back and look at the big picture.

Response 3: Everyone gets “hey-you’d” into new tasks. Having a framework and starting point before going into new projects will be a great way to get everyone speaking the same language and getting on the same page. This is a good framing tool for problem solving. There are lots of competing frameworks out there. For example, IT folks and planners might have their own methodologies and frameworks. But the framework in this project will be a nice starting point and a neutral ground.

### Question 2 – Who is the audience of this guidance? What are the best mechanisms to get the word out?

Response 1: At WashDOT, we are always looking for leadership training material to add to the curriculum. This could be incorporated into training material that is used for senior and mid-level training. TRB committees and AASHTO committees would be a great place to showcase the tool.

Response 2: The existing formats for TRB with webinars for all interested parties would be a good way to get the word out. Participation or training during Asset Management Conference this summer could also be good.

Response 3: Suggest doing a 5 minute video for AASHTO TV. The Management and Productivity committee at TRB will be interested. A distribution email that they could forward to community would be great.

# **NCHRP 20-24(95)A**

## Ensuring Essential Capability for the Future Transportation Agency

### **Task 12**

#### Outreach and Stewardship Plan for the Agency Capability-Building Guidebook

February 28, 2020

Spy Pond Partners, LLC

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**Disclaimer**

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## Introduction

This document provides the plan for the outreach and stewardship of the research products developed under NCHRP 20-24(95)A Ensuring Essential Capability for the Future Transportation Agency. The two research products are (1) the Agency Capability-Building (ACB) Guidebook in PDF format and (2) the ACB Portal, a website which provides access to the Guidebook in a digital format and provides additional, related resources. The web addresses for the ACB Portal and digital guidebook are:

<https://www.agencycapability.com/>  
<https://www.agencycapability.com/guidebook/>

The ACB Guidebook will not be published in paper format, but instead will be available in PDF format on the ACB Portal. Those interested in having a printed version of the guide will be able to print the guidebook on their own. The PDF and digital guidebook will be transferred to the American Association of State Highway Transportation Officials (AASHTO) and the activities that AASHTO performs will continue to keep the guidance relevant. The PDF version will not be changed under this stewardship plan, but the digital version will be updated periodically with new content.

The following sections describe in more detail the outreach plan for disseminating the research and the stewardship plan for keeping the guidance current and relevant.

## Outreach Plan

Many activities have occurred during the project to market and communicate the research products including presentations at conferences, facilitated discussions at committee meetings, and individual meetings with transportation agency leadership. Once the project is done, two AASHTO committee areas will help to market the research products as well as a Transportation Research Board (TRB) standing committee. The AASHTO committees are the Committee on Performance-Based Management Subcommittee on Organizational Management and the AASHTO Agency Administration Committees, including the Human Resources Committee and Knowledge Management Committee. The TRB Workforce Management Committee (currently the Management Productivity Committee) will also help market the research products. These committees will send emails to their membership and friends alerting them on the availability of these research products and providing a link to the site.

There are already plans underway to have a presentation of these research products at the AASHTO Agency Administration Conference in June 2020 in New Orleans, LA.

## ACB Portal and Guidebook Stewardship

The future of the ACB portal and guidebook depends on it remaining a current resource that meets the changing needs of a dynamic audience. Resources will need regular updating, and content of the site may need to be updated as agency needs and practices evolve. Fundamental to the success of the portal and digital guidebook is ownership by an entity that hosts the site and engages with the transportation community that provides an ongoing user and contributor function.

The AASHTO Committee on Performance-Based Management (CPBM) Subcommittee on Organizational Management has agreed to take ownership of the ACB portal and digital guidebook including disseminating the products of this research and stewarding the use of the products. At the conclusion of NCHRP Project 20-24(95)A, the hosting of the ACB portal and digital guidebook will be transferred to AASHTO and become a component of the AASHTO TPM Portal that is actively managed by AASHTO. This transfer can be effective immediately upon the formal conclusion of the project. The digital guidebook has been designed in anticipation of this transfer. All files necessary for the ongoing

maintenance of the portal are currently online and can be seamlessly integrated into the AASHTO TPM Portal.

The digital portal and guidebook and its components have been designed to be easily maintained and updated by AASHTO. These key components include:

- Position descriptions
- ACB framework
- Events calendar
- Practitioners directory
- ACB Guidebook chapter content in digital format
- Checklists
- How To's
- Resources
- Navigation

A user guide is imbedded in the digital guidebook for users to access when needed. A technical guide document is part of the final deliverables that will be sent to TRB and transferred to AASHTO. A draft of this document has been sent to the TRB program manager.

There is discussion at AASHTO on having the ACB Portal be the foundation for the Agency Administration Committees website. Until a decision is made, the ACB portal and guidebook will be a part of AASHTO's TPM Portal.

### **Updating of Content**

The digital guidebook will be updated when new content is available and at periodic intervals of review. The ACB Portal will continuously seek new content on the site. Users of the site are asked to submit new resources that they are aware of or have produced in their agencies. Each new resource will be reviewed for relevance in the ACB guidebook and a link to the resource will be added to the digital guidebook.

At periodic intervals, at a minimum annually, the digital guidebook will be reviewed for currency and an effort will be made to add new content and links to new resources. AASHTO's Subcommittee on Organizational Management will lead this effort through its membership and reach out to partner organizations to support this effort.

### **Digital Guidebook Enhancements**

If projects are initiated to enhance the digital guidebook, AASHTO will work with the enhancement effort to make sure that the enhancements can be integrated into the current application seamlessly. Some of the enhancement that are possible are:

- Online training modules integrated into the digital guidebook
- Greater use of videos to deliver the content
- Templates that can be downloaded for users to add their own content

### **Next Steps**

When the digital guidebook is transferred to AASHTO next month, the following activities will commence to make the transportation community aware of its existence and promote its use.

- Notices on the front page of the ACB Portal with a link to the digital guidebook
- Emails to the AASHTO and TRB communities with an announcement of the portal and digital guidebook and how to use it

## NCHRP 20-24(95)A Task 12 Outreach and Stewardship Plan

- The recent community of interest (COI) presentation on the research products will be prominently linked to the digital guidebook
- A session at the AASHTO Agency Administration Conference in New Orleans in June 2020 on the ACB portal and guidebook will be developed
- Ongoing management and maintenance of the digital guidebook that is described in this document