



TRANSPORTATION
research and connectivity

Transportation Libraries and Information Centers: Current Practices and Future Directions

Synthesis of Practice

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Transportation Research and Connectivity Pooled Fund Study

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1 Introduction

The Transportation Research and Connectivity pooled fund study (TPF-5(442)), led by the Oklahoma Transportation Library, is seeking a better understanding of current practices in state department of transportation (DOT) libraries and information centers and how those practices are expected to change over the next several years. A working group of pooled fund members identified specific questions to inform their understanding of three topic areas associated with transportation library and information services:

- Providing services with and without a library
- Engaging agency leadership and partners
- Preparing for the future

To answer those questions, researchers conducted a literature search and distributed surveys to three key constituencies:

- State DOT research program managers and librarians
- Transportation agency library and information services users
- Transportation agency leadership

1.1 Survey Responses

The most extensive of the three surveys conducted for this synthesis of practice was distributed to members of the American Association of State Highway and Transportation Officials (AASHTO) Research Advisory Committee (RAC). RAC members act as advisors to the [AASHTO Special Committee on Research and Innovation](#). Voting members of AASHTO RAC are typically the research program managers from each of the 50 state DOTs and the District of Columbia.

Twenty-nine respondents representing 26 states and the District of Columbia responded to the RAC survey. (Two responses were received from New York State DOT and Wisconsin DOT (WisDOT). Both responses are considered in this synthesis but appear only once in the lists below.) Professional librarians and library paraprofessionals from 11 states and the District of Columbia submitted responses:

- California
- Colorado
- District of Columbia
- Missouri
- New York
- North Carolina
- Ohio
- Oregon
- Texas
- Utah
- Virginia
- Wisconsin

Respondents from the remaining 15 states, listed below, were most often research program managers but also included planners and other staff members involved in the agency's research program:

- Alaska
- Connecticut
- Delaware
- Florida
- Illinois
- Kansas
- Kentucky
- Michigan
- Mississippi
- Nevada
- New Hampshire
- Pennsylvania
- Tennessee
- Vermont
- Wyoming

The other surveys conducted for this synthesis received a mixed level of response. Twenty-nine library and information services users provided substantive responses to the brief survey distributed to this respondent

group. While these survey results are not generally applicable to all state DOT libraries and the larger library user population, they are summarized in this synthesis and provide anecdotal examples of issues identified in the literature. Seven people in leadership positions at state DOTs responded to the leadership survey. Given the small response rate, these results are not summarized but rather mentioned in anecdotal examples.

1.2 Terminology

The transportation library and information center landscape is diverse, and the people managing these programs and services bring different skill sets to bear in their work. The following general definitions, some adapted from the [Online Dictionary for Library and Information Science](#), apply in this synthesis:

Librarian: A person with a library science degree (master of library science (MLS) or master of library and information science (MLIS)) responsible for the care of a library or collection of physical or digital resources.

Library: A collection of physical or digital resources organized and maintained for intended users.

Information center: A unit or department that may have a collection of physical or digital resources from which information services are provided by a professionally trained librarian, paraprofessional or information services provider.

Information services provider or information services staff: A staff person without a library science degree (MLS or MLIS) engaged in some aspect of the care of a library or collection of physical or digital resources, or who otherwise works to organize and provide access to information. When used generally, the term may include librarians.

Paraprofessional: A member of the library staff, usually someone who holds at least a bachelor's degree, who performs high-level technical support duties.

1.3 Reviewing This Synthesis Report

This synthesis report begins with a brief discussion of the history of library pooled fund studies and their impact (Chapter 2). Chapters 3 and 4 use survey findings to classify and describe transportation libraries and library services, filling in gaps when possible by supplementing survey findings with results of independent research. Chapter 5 examines changes in library status using examples and lessons learned from the literature and real-world examples culled from survey findings.

Library and information services users are the focus of Chapter 6. Digital collections and knowledge management (KM) are examined in Chapter 7, which considers current and emerging trends. Chapter 8 considers ways to show the value of transportation libraries, and Chapter 9 presents lessons from the COVID-19 pandemic and ways to prepare for the future. The final chapter presents a brief summary of findings from this synthesis effort.

While the RAC survey of state DOT research program managers and agency librarians received responses from more than half of the possible respondents, findings from this survey and the other surveys conducted for this synthesis were not statistically analyzed to allow the reader to draw conclusions across the respondent group or beyond to nonparticipating agencies. Instead, summarizing the findings and presenting the anecdotal evidence the surveys gathered provide some perspective on how transportation libraries and information centers are currently serving customers, and how the people who manage them can more effectively navigate the future. Literature search findings are reflected throughout this synthesis and cited, where appropriate, with numeric in-text citations (for example, (1)). The survey results that are summarized in this report are identified by the constituency surveyed. Finally, the hyperlinks for websites and other resources identified in this synthesis were active as of the date of publication.

2 Brief History of Library Pooled Fund Studies

This chapter examines, in brief, the pooled fund studies upon which the current study builds, and the regional and national knowledge networks that were formed over the past two decades and that have influenced the work overseen by pooled fund members.

In 1998, the Federal Highway Administration (FHWA) recognized the value of information to help transportation agencies be more effective and efficient, recommended that those agencies all have information programs, and called for a “comprehensive inventory of all transportation information resources and programs available nationwide.” (1)

Managing and making available the vast amount of information and research produced by transportation agencies and metropolitan planning organizations have been challenging for decades. Transportation libraries have continued to evolve with the information landscape, adjusting as technological advances alter the composition of library collections and the services that users demand.

Many transportation libraries, like libraries in other sectors, have been hindered by resource constraints due to inadequate funding but also possibly the misconceptions of the leaders charged with funding them. The mistaken notion that staff can find everything they need on their own through the internet, the failure to understand the depth and breadth of the services that librarians can offer, and the lack of value placed on good information to improve and maximize the operation of DOT programs are among the challenges that place transportation libraries and librarians at a disadvantage. Yet despite downsizing and limited resources, the demand for transportation information remains the same or has increased.

Against this backdrop, transportation librarians came together in two previous [Transportation Pooled Fund](#) studies that sought to capitalize on collaboration and the economies of scale to enhance library services and address commonly held needs. The lessons learned through the previous studies have informed the pooled fund’s current iteration, Transportation Research and Connectivity. (2)

2.1 First Library Pooled Fund Study

In 2006, *TRB Special Report 284: Transportation Knowledge Networks: A Management Strategy for the 21st Century* recommended that regional transportation knowledge networks (TKNs) be established and coordinated at the national level through legislation and include sustainable funding. (3) The year before, the first Transportation Library Connectivity pooled fund study, TPF-5(105), was formed to address these issues; that pooled fund project continued until 2010. (4) This initial pooled fund effort produced a prototype national infrastructure for transportation libraries, and the first and second editions of the *Transportation Librarian’s Toolkit* in 2007 (5) and 2009 (6), respectively, in addition to providing technical assistance to individual state members. (7)

Recommendations of this initial pooled fund study included:

- **Coordination:** Coordinate pooled fund activities closely with the agendas of NTL [National Transportation Library]; regional TKNs; relevant TRB [Transportation Research Board] committees. ... Consider establishing a designated pooled fund liaison for each of the regional TKNs to act as a conduit to facilitate communication and coordination.
- **Sustainability:** Explore avenues for continuing and expanding TKNs. ... Consider alternate avenues for obtaining significant, sustainable funding for transportation libraries and information professionals within state transportation agencies. At the same time, consider appropriate organizational and leadership models. (7)

2.2 Second Pooled Fund Study

In response to the recommendations generated by the first library pooled fund, its successor—Transportation Library Connectivity and Development, TPF-5(237)—continued efforts to develop a national transportation infrastructure by establishing a “functional library consortium” using the pooled fund program and encouraging the formation of a [National Transportation Knowledge Network](#) (NTKN) and enhancement of regional TKNs. (8) Active from 2010 through 2015, the pooled fund sought to provide members with the benefits of a typical consortium, including group subscription discounts, networking opportunities and resource sharing, training and professional development, outreach and promoting value, and technical assistance to individual, mostly smaller, libraries.

Among the study’s deliverables were TKN websites in 2012 (for Eastern TKN and Western TKN, which are no longer active); *Proving Your Library’s Value: A Toolkit for Transportation Librarians* (9) in 2012; and several individual state projects. While this study produced many valuable products, its members concluded that the pooled fund program is not an effective approach to operating a library consortium given the funding mechanisms and the lead state’s contracting rules.

2.3 Transportation Knowledge Networks

In 2001, the National Transportation Library (NTL) provided funding for the establishment of Midwest TKN, the first regional TKN. Two more regional TKNs followed in 2007—Eastern and Western TKNs. While the regional TKNs were not formed through the pooled fund program, pooled fund studies produced products for them and many of the members of the regional TKNs were also pooled fund study members.

A 2017 AASHTO white paper (10) examined the status of the regional TKN program that had been in existence at that time, in some form, for more than 15 years. The 2017 analysis highlighted the need for national coordination through the NTKN and recognized knowledge networks should expand beyond libraries to include others with information and knowledge. The authors concluded that “[a]s the country and states address infrastructure challenges and the daily loss of institutional knowledge, transportation research and management of information and data have never been more critical.”

In January 2020, NTKN members recommended modification of the regional unit structure, and the regional TKNs were deactivated. (11) Regional TKN members are now considered members of the parent NTKN, and the work that had been conducted by the regional networks is now pursued under the national network using topical working groups. This change was expected to help focus and streamline efforts and eliminate duplication among the regional networks.

NTKN Services

Among the efforts begun under the regional TKNs and continued under NTKN is the production and maintenance of resource guides, also referred to as LibGuides. These online research products present topic-specific, credible resources with graphics and other visual elements in an easy-to-use format. Today, the NTL website links to 42 [resource guides](#), including topics directly or indirectly addressed in this synthesis.

NTKN also hosts communities of practice (CoPs) for [508 accessibility](#), [cooperative digitization](#) and [library advocacy](#). Several RAC survey respondents reported participating in NTKN and one or more of these CoPs. Other NTKN services include an [NTKN blog](#) that reports on matters of interest to the transportation library community, professional development opportunities that include the [Transportation Librarians Roundtable](#), and networking that brings people together for support and collaboration to address shared concerns.

3 Current State of Transportation Libraries and Information Centers

Before mapping the future course of transportation library and information services programs, it's necessary to assess the current state of practice. This chapter begins with an examination of the transportation library landscape by classifying the subset of transportation agencies responding to the survey. After considering whether agencies set aside physical space for library collections, the classification considers whether a professional librarian is on staff and identifies the collaborative relationships that allow transportation agencies to offer or participate in the maintenance of print or digital resources.

Classifying the responding agencies, which represent more than half of the national network of state DOT transportation libraries and information centers, provides a starting point for understanding trends in transportation libraries and how the information products and services offered to agency users vary based on factors such as library space, print and virtual collections, and professional staffing.

3.1 *Classifying Libraries and Library Services*

Not surprisingly, there is no standard for how state transportation agencies approach the provision of library and information services. Using survey data, the 27 responding agencies can be classified into four categories:

- In-house libraries with physical library space
- In-house collections with no physical library space
- Collaboration with other libraries or organizations
- Limited print or virtual collections

To provide a more comprehensive assessment of the current transportation library landscape, the research team sought out other data sources to also classify some of the state DOTs that did not respond to the survey. These sources include Minnesota DOT (MnDOT) Library's [Directory of State Highway and Transportation Department Libraries](#), which is periodically updated by a MnDOT librarian when changes are identified on [TRANLIB-L](#), an email discussion forum used by transportation librarians and information professionals to share information, or when transitions are identified through other means.

In-House Libraries With Physical Library Space

Slightly more than half of the responding agencies (14 agencies) support in-house libraries with a physical library space. Of these agencies, which are listed below, almost three-quarters employ a professional librarian:

- | | | |
|------------------------|----------------------------|-----------------------------|
| • California | • Kansas | • North Carolina |
| • Colorado | • Michigan | • Oregon |
| • District of Columbia | • Mississippi ¹ | • Pennsylvania ¹ |
| • Florida ¹ | • Nevada | • Utah ¹ |
| • Illinois | • New York | |

1 Transportation libraries without a professional librarian.

Staffed by Professional Librarians

All but four of these libraries are staffed with highly experienced professional librarians, with all but one working more than 10 years as a professional librarian. Of the four libraries not staffed by a professional librarian, two have never employed one (Florida, Utah) and two had a librarian on staff decades ago (Mississippi, Pennsylvania). The librarian position in Pennsylvania DOT was eliminated in the 1990s; Mississippi DOT employed a librarian about 30 years ago but has not retained one since. Mississippi DOT's research manager is interested in contracting for a part-time librarian and has sought assistance from the Mississippi Library

Commission and The University of Southern Mississippi, which maintains a library school. She noted that these efforts have not been successful, likely due to the position's inadequate compensation.

Case Study Highly Experienced, Significant Institutional Knowledge

Several of the responding agencies have supported libraries—and librarians—for many decades. A professional librarian has been on staff at the Transportation Library at California Department of Transportation (Caltrans) for more than 50 years. Kansas DOT has had a library since 1962, with the agency's first librarian holding that position from the library's opening until late 2002. The present librarian came to Kansas DOT in September 2003. At Oregon DOT, the current librarian has been on staff for more than 17 years. WisDOT's librarian brings his 20 years of experience to bear in managing the agency's virtual collection.

Librarians such as these with significant tenure bring an invaluable depth of experience to their work. Their rich and varied knowledge of agency history and practices informs how they manage their collections and serve their user communities.

Library Collections

All agencies with in-house libraries but one—Utah DOT—maintain a print collection. The Utah DOT respondent noted that book shelving in the Research and Innovation Division is currently used as filing space and the librarian's office has been converted to a conference room.

The Oregon DOT librarian described a collaborative relationship with the State Library of Oregon that allows for optimum use of both library collections. While the Oregon DOT Library provides transportation and agency-related resources, their customers are referred to the State Library of Oregon for more general resources and for resources that support professional development, program management, programming language training and related topics. Resources on these topics are provided by the State Library to all state employees, and the Oregon DOT Library coordinates with the State Library to reduce overlap.

Print collections are common in these libraries, but respondents reported changes in their size, both contemplated and completed. The District (of Columbia) DOT Library still has a robust physical collection, but the agency's new library is smaller than the previous one, and the agency's librarian is working to store digitized items and include more "born-digital" materials (items created in a digital format) in the virtual collection. Florida DOT is moving away from its physical collection to focus on a virtual one.

Other State DOTs With Physical Library Space

A check of other data sources suggests that the following state DOTs also support in-house libraries with at least one professional librarian, and sometimes more, on staff:

- Maine
- Minnesota
- Montana
- Nebraska
- New Jersey
- New Mexico
- Washington

State transportation agencies in Arkansas and Georgia support in-house libraries but do not appear to be employing a professional librarian.

At least one of these libraries is providing services through a special relationship. Since 1998, New Jersey DOT has contracted with the New Jersey State Library, affiliated with Thomas Edison State University (previously Thomas Edison State College), to provide on-site professional library services to agency staff and external

customers. Services are delivered by professional librarians who manage the collections, operations and support services.

In-House Collections With No Physical Library Space

All but one of the following agencies with in-house collections but with no physical library space also do not have a professional librarian on staff:

- Delaware
- New Hampshire
- Wisconsin¹
- Wyoming

1 WisDOT Library employs a professional librarian.

In Delaware, some divisions may have a local library consisting of a few bookshelves. WisDOT maintained a physical library until the agency moved into a new office building in 2018. (The agency's transition to a virtual library is discussed in the [Case Study](#) appearing on page 32.) Wyoming DOT recently reduced its print in-house collection, retaining two bookshelves to house research reports that supplement the agency's primarily digital collection.

Collaboration With Other Libraries or Organizations

Rather than maintaining an in-house library, some transportation agencies collaborate with state libraries, universities and other organizations to maintain collections. Some of these partner agencies may also provide information services to the DOT user community. State transportation agency staff has varying levels of involvement under these arrangements.

- *Alaska.* The library collection of Alaska Department of Transportation and Public Facilities (Alaska DOT&PF) is housed at and cataloged by the Alaska State Archives. There is no library and no library-related staff members are on-site at Alaska DOT&PF. Hard copies that had been retained by the agency were sent to the Alaska State Archives about five years ago.
- *Arizona.* With the recent closure of Arizona DOT Research Center's library, the print and digital versions of reports published by Arizona DOT and other Arizona agencies were transitioned for retention by the Arizona State Library Archives in the Arizona State Government Publications collection.
- *Kentucky.* Kentucky Transportation Cabinet eliminated its librarian position in 1981 though the agency maintains a small print collection. The Transportation Library housed at the Kentucky Transportation Center at the University of Kentucky maintains Kentucky Transportation Cabinet's reports archive and "provides access to critical resources, including national database and transportation-related digital and print materials."
- *Louisiana.* The librarian providing services to Louisiana Department of Transportation and Development (LADOTD) is located at the Louisiana Transportation Research Center on the Louisiana State University (LSU) campus. The library, sponsored jointly by LADOTD and LSU, maintains print and virtual collections.
- *Maryland.* Maryland State Highway Administration partially funds a resource library through the Maryland Transportation Technology Transfer Center, which is maintained under the Local Technical Assistance Program.
- *Massachusetts.* The Massachusetts State Transportation Library provides access to the Massachusetts DOT library catalog and also links to a significant digital collection hosted by Internet Archive.

- *Missouri.* In operation since 1999, the Missouri DOT (MoDOT) Library maintains more than 11,500 print, digital and media items in its collection. Oversight of the collection, located at the Missouri State Library, is provided in part by the state library’s reference services director. MoDOT’s librarian maintains offices at the MoDOT Central Laboratory and the Secretary of State’s office.
- *Oklahoma.* The Oklahoma Transportation Library, which is staffed by a professional librarian, began with support from Oklahoma DOT “as a means to preserve the state agency’s collection of transportation-related materials.” The collection is housed at the University of Oklahoma’s South Research Campus.
- *Texas.* The Texas DOT (TxDOT) Research Division contracts for library services through the Center for Transportation Research at the University of Texas at Austin. Another DOT division retains an in-house photo librarian with a library that includes a small print collection. Other TxDOT divisions manage some digital subscriptions for the agency, including AASHTO digital publications. Dozens of districts or divisions may have informal print collections. Staff working under the contract is considered TxDOT Research Library staff.
- *Virginia.* The Virginia DOT (VDOT) Research Library is located at the facility housing the Virginia Transportation Research Council at the University of Virginia. The long-standing collaboration between the state DOT and University of Virginia began in late 1948, when the Department of Highways and University of Virginia “agreed to establish a cooperative research unit to replace the department’s Research Section.” The collaboration was part of a mission “to train future transportation professionals in collaboration with the university.” (12)

The Michigan DOT Library is an example of a full-service transportation library with deep roots in the transportation agency. Established in 1963 and part of the Research Administration Section within the Bureau of Field Services, the library houses more than 15,000 print materials in its collection and provides a range of [library services](#) that include demographic research, publication alerts and access to agency historical resources.

Limited Print or Virtual Collections

Four of the responding agencies report no significant print or virtual collections:

- Connecticut
- Ohio
- Tennessee
- Vermont

Among these agencies, only Ohio DOT employs a professional librarian. Connecticut DOT’s librarian position was eliminated in about 2019, at the same time the agency closed its in-house library. Some areas of the headquarters office store smaller print collections; others have been moved to a virtual platform. The research program also sends some materials to the Connecticut State Library and creates hyperlinks for these items that do not expire. The agency continues its attempts to move more resources online.

Ohio DOT’s in-house physical library was dismantled five years ago though a professional librarian continues to work within the agency. (The library was eliminated but not her position.) Tennessee DOT and Vermont Agency of Transportation do not maintain print or significant virtual collections, though Vermont’s research program manager indicated interest in obtaining more resources, including a temporary information services staff person.

3.2 Providing Services Without a Professional Librarian

More than half of the agencies participating in the survey employ an in-house, professionally trained librarian, and several have had librarians for more than 20 years. While the 12 remaining agencies do not retain the services of a professional librarian, many are providing information services using other agency staff, most often the people working in the agency's research program.

Some agencies, whether or not they have a librarian, use administrative staff (Florida, Mississippi) or interns (Colorado) to perform information services functions. Library and information services are frequently housed within DOT research programs, and research staff often performs or assists with providing information services, including literature reviews or research (Tennessee, Vermont). Connecticut DOT uses planners and engineers to transmit research reports to the state archives.

Case Study Two Approaches to Providing Library and Information Services

Not Requiring—But Hiring—Professional Librarians

At least one agency—TxDOT—employs professional librarians but does not require professional librarian qualifications when filling those positions. Of the three full-time positions (manager, library technical associate and webmaster), two are currently filled with professional librarians holding a master's degree even though the position descriptions do not require that credential.

Providing Library Services Without the Professional Credential

Utah DOT's library technology transfer technician, while not a trained librarian, is colloquially known as the agency's librarian. She answers reference questions, conducts literature searches, processes interlibrary loan requests in partnership with the Utah State Library, maintains the agency's digital library, prepares book lists and locates requested books and articles. The respondent noted that the work she does is completed by a professionally trained librarian in other transportation agencies. While she holds a bachelor's degree, it is not library-related. Similarly, Pennsylvania DOT's single library support staff member provides administrative assistance, cataloging, literature research, online database management, lending and purchasing.

3.3 Collaborating to Provide Information Services

Participation by Other Departments or Divisions

Departments, divisions or programs other than research are sometimes involved in overseeing library-related matters, managing collections and providing information services. Design, guidance and other documents may be housed in the pertinent unit or division of New Hampshire DOT and managed by various individuals. New York State DOT's chief of Pavement Management Systems provides high-level oversight of the research library. Delaware DOT's intranet library is managed by the Delaware Department of Technology and Information. Individuals from each department coordinate updates to documents.

The District DOT Library has a data governance team and a chief information officer interested in doing more with KM. District DOT Library's librarian reports to the agency's research manager, who is also "very invested in information infrastructure." Supplementing the information services provided by the agency's library, Oregon DOT's Government and External Relations staff support [Ask ODOT](#) services for employees and others. A team of four to five dedicated staff members field both external questions from the public and internal queries from agency employees, generally routing the questions to subject matter specialists within the agency.

Engaging With Information Technology

Among respondents, library and information services staff persons have varying levels of interaction with agency information technology (IT) staff, though most engage at least to some degree with IT professionals. One might assume that transportation libraries will work with the agency's IT department to, at minimum, ensure access to electronic resources, but not all do.

TxDOT Research Library, which is based at the Center for Transportation Research at the University of Texas at Austin, is supported by the university's IT department. MoDOT Library's information services staff engage with IT through the Missouri State Library, and New York State DOT works with a separate agency to obtain IT help. WisDOT Library has collaborated with its IT group to use resources for storing digital documents. For example, some agency documents are stored in an OnBase database. ([OnBase](#) is a modular information platform that can be used to capture and store data and documents.)

For the respondents working with agency IT staff, many noted that IT helps manage or support databases, document management systems and catalogs. Several reported IT helps manage or support library webpages. Others only work with IT when specific issues arise. Some respondents expressed the need for increased IT support and help with overcoming obstacles to electronic access.

Interconnected Roles and Responsibilities

The agencies responding to the survey have, for the most part, charged their professional librarians with a significant level of responsibility for decision-making associated with the library—from collection development to digitization to vendor selection. For some libraries, such as the District DOT Library, the librarian's role in such matters is increasing, not decreasing.

In other agencies, the librarian or library paraprofessional works in consultation with the research manager on decision-making for the library and its services. Most of the responding agencies' librarians or information services providers report to the agency's research manager. In some agencies, a section chief or division director also plays a role in setting priorities for the library. Making budgetary decisions can be a collaborative effort shared by the librarian and research manager, though advocating for more funding tends to fall to the manager.

Active and engaged oversight from a steering committee or board is less common. WisDOT's Research and Library Advisory Committee is composed of members from various DOT divisions, though the members tend to be more involved with research than library services. Colorado DOT also maintains a board focused on library services, though the board has not met in more than a year.

4 Library and Information Services

Today’s transportation libraries and information centers offer a host of services to agency users. This chapter explores the range of services provided by the agencies participating in the survey conducted for this synthesis. The services that librarians and research managers consider important are summarized, and functional differences in the services provided by agencies with and without libraries and librarians are identified. The chapter concludes with a discussion of hoped-for changes and the resources survey respondents would like to offer their users.

4.1 Services and Their Significance

To provide a sense for how services may be evolving in today’s transportation libraries and information centers, respondents identified the services their agencies offer and indicated how important those services are to the agency’s library or information services program.

The ongoing demand for transportation information largely manifests in literature searches, which are the most popular and important service according to survey respondents, followed by cataloging of library materials and electronic resource management. Reference services, digital collections and digitization are also offered by at least half to almost two-thirds of respondents, with news alerts and magazine routing rated among the least used—and least important—services. Similarly, less than one-third of respondents host or facilitate internal or external collaborative events, and most respondents do not consider this type of engagement important. Though approximately half of the responding agencies are maintaining and expanding print collections, respondents are slightly more likely to believe a print collection is not very important.

Survey responses are mixed regarding KM, which is considered the “cultivation, identification and documentation, utilization, sharing and retention” of intellectual and knowledge-based assets in an organization. (13) Respondents indicated that state DOTs are becoming more interested in facilitating this function or service. Some agencies have engaged in focused efforts to formalize KM as an important function, while others have informally experimented with various tools or mechanisms. ([Chapter 7, Current and Emerging Trends](#), takes a closer look at KM and how it can be practiced within transportation agencies.)

Survey responses addressing library and information services and their importance are summarized in Table 1.

Table 1. Library and Information Services Offered by RAC Survey Respondents

Library Service	Number of State DOTs Offering Service ¹	Number of Extremely or Very Important Ratings ²	Number of Not at All or Not Very Important Ratings ²
Literature searches	24	22	1
Cataloging of new library materials	17	18	7
Cataloging of existing library materials	17	17	7
Electronic resource management	17	17	5
In-person reference services	16	14	8
Online reference services	16	14	4
Digital collection development	15	16	5
Interlibrary loan	15	11	6
Document delivery	14	16	5

Library Service	Number of State DOTs Offering Service ¹	Number of Extremely or Very Important Ratings ²	Number of Not at All or Not Very Important Ratings ²
Print collection development	14	8	11
Digitization of print materials	13	14	7
Document archiving	13	13	5
KM ³	12	14	11
Collection development plan	12	11	7
Guidance on scholarly communication, copyright, fair use and open access	11	10	10
News alerts	10	4	16
Hosting or facilitation of internal collaborative events or trainings	8	5	15
Magazine routing (electronic or print)	8	2	17
Hosting or facilitation of external collaborative events or trainings	7	3	19

1 The 27 state DOTs responding to the survey are represented in this column.

2 The 29 individual responses to the survey (two states had two respondents each) are represented in this column.

3 This term generally refers to the “cultivation, identification and documentation, utilization, sharing and retention” of intellectual and knowledge-based assets in an organization. (13)

“The library has struck a nice balance with [its] email announcements. Not overwhelming with a newsletter. And when I get emails for training or speakers, I pay attention to the offerings as they have been valuable.”

—User survey respondent

Literature Searches

Among the responding agencies, most prepare literature searches for agency users. Some agencies prepare both literature searches and reviews; typically, a review will contain more analysis of findings than a search. The volume of requests ranges from two to three per year (Arizona, Pennsylvania, Vermont) to one per month (Michigan), with the heaviest volume of requests often occurring during periods when an agency is soliciting new research projects. Some agencies complete the literature searches internally using agency staff. Others contract with a consultant to complete the literature search or literature review; the consultant’s work is overseen by an agency librarian or other staff member.

Customized Information Packages

Some agencies prepare more customized information packages. For example, before the recent closing of its physical library, WisDOT Library prepared Institutional Memory Packages and hopes to revive them. Recently the North Carolina DOT librarian responded to an out-of-state request for historical information on North Carolina bridges. She supplemented information available in the online catalog with newsletters and timelines, and mailed the information package to the requester.

Historical requests processed by the Oregon DOT librarian require engagement with the library's unique collection and can involve scanned copies of agreements, portions of right of way maps, photos and other information from the historical files housed in the library. The agency delivers this information product, which includes a narrative and attachments, via email.

Many agencies are digitizing or otherwise archiving historical records and photos, including the Caltrans Transportation Library. North Carolina DOT also provides historical research, and Pennsylvania DOT's library is interested in sharing historical documents. The District DOT Library often uses historical photos for public communication, and the agency's [DDOT Back in Time](#) historical photo archive receives the most use of all online collections.

New Alternatives

While most research programs with or without a library will likely prepare a traditional literature search, often delivered on a library template, some offer their customers an online alternative—a LibGuide. Developed using the [Springshare LibApps](#) platform, a LibGuide presents the results of the traditional literature search in a mini-website format, with graphics and tabbed content that organizes resources and presents them in a visually compelling way. The Oregon DOT librarian uses the LibGuide tool to gather and organize resources for research requests. She noted that many of her customers prefer a LibGuide over the conventional listing of resources in a traditional literature search.

Some transportation libraries, including [MnDOT Library](#) and [VDOT Research Library](#), produce LibGuides that are stored on the agencies' websites. Other state DOT libraries have produced LibGuides that are housed on the [NTL website](#). Many of these guides were developed when regional TKNs were active and are now being hosted and maintained by NTL.

Case Study Library Lockers: A More Comprehensive Literature Search

VDOT Research Library's [Library Lockers](#), described as a "secure location VDOT employees can use to store copyrighted materials for use by peers," is another variation of the traditional literature search. The adaptability of this tool is illustrated by the [Hampton Roads Bridge-Tunnel expansion project](#), a \$3.8 billion project involving VDOT employees and contractors who needed access to standards and other resources. The library identified what was needed—about 350 citations—and located electronic versions of most of these resources through library database subscriptions. A repurposing of the library's e-reserves and document management system was used to create the Library Locker platform.

Other Services

Librarians and research managers provide public-facing websites, internal-facing intranet sites and a host of other services, including:

- Preparation of citation analyses (Virginia)
- Licensure examination resources and maintenance of a legal resource collection for the chief counsel's office (Illinois)
- Publishing and dissemination services and guidance on document accessibility (Texas)
- Historical research for the public and tracing legislative history (Oregon)

4.2 Functional Differences in Services

Not surprisingly, survey findings indicate that state DOTs with libraries and librarians provide more information services to agency users than those agencies without library spaces and staff with the professional librarian credential. Other state transportation agencies collaborate with partners to provide information services. While some library functions may appear simple, information services often involve complex issues and functions. An examination of the services provided by the responding 27 responding agencies, while not definitive, provides valuable insight.

Services Provided by Agencies With a Physical Library

The 14 agencies with physical in-house libraries offer most of the services identified in the survey. All offer literature searches, and most agencies catalog materials, are developing digital collections, manage electronic resources and offer in-person research services and interlibrary loans. The four agencies with a library but no professional librarian (Florida, Mississippi, Pennsylvania, Utah) generally offer fewer services.

The Florida DOT respondent, despite having no librarian, reported offering more than two-thirds of the services considered in the survey. Other services offered by agencies with physical libraries but no librarians include:

- Cataloging new and existing material (Mississippi, Pennsylvania)
- Digital collections development (Florida, Pennsylvania)
- Document delivery (Florida, Utah)
- Interlibrary loan (Pennsylvania, Utah)
- Electronic resources management (Florida, Pennsylvania)
- In-person research services (Florida, Pennsylvania)

“Currently the librarian is the only full-time staff member in the unit, and we are pursuing two additional full-time staff members. Once those are filled, we will have the ability to share publications with targeted audiences [and] develop guidance for preparing references.”

—Leadership survey respondent

Services Provided by Agencies Without a Physical Library

Agencies without a physical library fall into three categories:

- Collaboration with other entities
- Limited or no print or digital collections
- Predominantly digital collections

Three of the agencies collaborating with other entities to host a library collection or contract to provide library services (Missouri, Texas and Virginia) are offering a similar level of service as compared to agencies with in-house libraries. (All three employ professional librarians.) These libraries offer a full range of services and support to the DOTs they serve. The only difference for these agencies is that the services are provided from a location outside the state DOT. Practically speaking, these libraries operate as in-house libraries in all ways except their physical location.

The two other survey respondents collaborating with an outside entity to host or manage a library collection (Alaska, Kentucky) offer fewer services than in-house libraries of any type.

Of the four agencies with limited or no print or virtual collections (Connecticut, Ohio, Tennessee, Vermont), both Connecticut and Ohio DOTs provide selected information services—about one-quarter of the services considered in the survey. Ohio DOT continues to employ a professional librarian though has closed its library. The librarian offers online and in-person references services and prepares literature searches, in addition to managing document delivery and distributing news alerts. Connecticut DOT’s librarian position and in-house library were eliminated in about 2019, but the agency continues to provide literature searches, document archiving, KM and news alerts, and hosts or facilitates internal meetings.

In the final group of libraries—those with a predominantly digital collection (Delaware, New Hampshire, Wisconsin, Wyoming)—the impact of a professional librarian can be seen in the scope of services that can be provided when an agency elects not to support a library space but retains a librarian on staff. The information centers for three of the four agencies in this category (Delaware, New Hampshire, Wyoming) are not staffed by a professional librarian and offer few services. WisDOT retains an experienced librarian who oversees WisDOT Library’s now fully virtual collection. The WisDOT librarian offers more than two-thirds of the services considered by the survey, a more comprehensive suite of services than some responding agencies with both a physical library space and a professional librarian on staff.

The WisDOT librarian’s level of activity and user support demonstrates what commentators in the special libraries arena have noted—a physical library space does not have to be a prerequisite for delivering the library-related services that users demand. (See [Chapter 5, Changes in Library Status](#), for further discussion of what makes a library.)

4.3 Unmet Needs

When asked to offer a “wish list” of services not currently supported or needs not being met, not surprisingly several respondents expressed the desire for more budget and staff. These and other needs noted by respondents fall into broad categories:

- *Staffing* that extend beyond a professional librarian to include a records manager and more ancillary support such as IT. One respondent simply wants a dedicated librarian, or someone with library skills, to help develop an information services program.
- *Professional development* for information services staff, including training for nonlibrarians and increased networking opportunities.
- *Enhanced marketing of information services*. Several respondents cited this need, noting that these efforts require both time and a particular skill set. Examples of marketing designed with decision-makers in mind included improved webpages and an embedded presence at the agency for better visibility.
- *Space for physical collections versus virtual information services*. A few respondents want space for physical collections, but many more were focused on virtual information services, including a desire for a web-based or a fully virtual library for statewide access.
- *Digitizing and cataloging older materials, and related tasks*. The ability and resources to digitize and catalog older materials was a general need, along with more specific needs such as a curated database of project deliverables, including copyrighted items like codes, data sets and guidebooks. One respondent wanted time and support to claim publications scanned by Google Books, which would enable more control over how Google displays the items.

- *Customer service.* Various customer-service-oriented needs included improved cataloging, central point of contact for archiving, chat widget, digital suggestion box and the ability to share historical documents. Several respondents noted the need for materials to prepare for professional engineer exams.
- *KM.* Some respondents recognized the need for KM, including improved practices through library services and a central document repository.

“I wish we could offer our employees digital access to a curated collection of current engineering publications. But without some type of regional partnership, those collections will always exceed our funding.”

—RAC survey respondent

An interest in offering more access—or easier access—to electronic resources was a common thread among respondents, including:

- Integrated or easier access to AASHTO and ASTM International (formerly known as American Society for Testing and Materials) materials
- Easier access to online documents in general
- Access to more databases
- Digital access to magazines, periodicals and professional development publications

5 Changes in Library Status

Transportation libraries have not been immune to the downsizing and closures that have impacted libraries generally. While this synthesis did not attempt to make a full accounting of the presence of libraries in all state DOTs—and how that number has changed over the years—survey findings and the research that supplemented them has identified a certain degree of volatility in the transportation library community. In this chapter, a brief discussion of recent changes to the libraries of survey participants is supplemented by lessons learned from agencies participating in the survey and libraries outside the transportation community.

5.1 *Assessing Library Changes*

When agency facilities change, libraries and information resources may also change, and several state DOT libraries have undergone changes in the past several years. Colorado DOT's library is now housed in the agency's new headquarters near downtown Denver. North Carolina DOT's library moved from a smaller space to a different, more centralized building with better access to the agency's design units. When Nevada DOT's offices were moved, the library gained about 25% more space.

More state transportation agencies, however, appear to be losing physical space. Whether the result of agency headquarters facilities moving or agency priorities changing, losing shelf space doesn't mean that needs or capacity for library and information services are lessened. And a transportation library doesn't have to be defined by physical spaces with physical collections, as noted in a 2020 blog post:

What does it take to establish a transportation library? Well, let's start by talking about what it doesn't take. It doesn't take a large room or rooms that occupy what might be considered "prime real estate" in a building that might already have limited square footage available for offices and labs. It doesn't take rows and rows of expensive shelving. And it doesn't take a huge capital outlay for books, journals, reports and other physical information resources that might rarely be used. (14)

Acknowledging that the NTL has always been a virtual library, the author describes the changing nature of intellectual capital. Once it was an asset owned by the authors of the physical publications lining a library's shelves. Now the intellectual capital asset is the actual access to information, made possible and managed by information professionals. The author concludes that establishing a transportation library requires recognizing the value of intellectual capital to the organization and demonstrating a willingness to hire information professionals who can locate and curate a collection of information resources and make those materials available to the researchers who need them. (14)

Another author notes that information services should be "branded" to the professionals, not the facilities. (15) While a physical library closing or downsizing seems far from ideal, there are considerations and steps that can preserve and grow the knowledge assets of a transportation agency when library spaces disappear. Change, and keeping up with user and agency needs, can be positive.

5.2 *When Libraries Downsize*

Downsizing can take different forms. At Delaware DOT, some library holdings were cleared out when the agency's facility was renovated. The New Jersey DOT Library recently lost physical space. With new space restrictions, the library was advised to pay particular attention to collection management practices and develop a continuous weeding schedule to identify and remove outdated or irrelevant materials. (16)

Losing space or losing physical information resources, however, does not mean information capacities are lost. While Utah DOT eliminated most of its physical library, the workload of the lead information services staff

person has increased. Regardless of the extent of the physical space or resources lost, it has become even more important to focus on the librarian or information services provider who provides services—and value—to the agency.

Case Study Make the Most Effective Use of Space (Whether You're Downsizing or Not)

Losing physical space will necessitate careful space planning that considers the resources to be housed and the other functions the library or information center will provide. The Connecticut State Library's [Library Space Planning](#) guide and related materials (17) address design considerations, planning steps and space planning resources. A worksheet used to enter information about physical collections, other resources and desired functions will calculate space needs.

5.3 Transitioning to Virtual

For libraries losing some or all of their physical space, planning for and maintaining a virtual information services program is paramount, as noted in a 2020 journal article: “[T]hose of us who handily let go of the battles over space are better prepared to think more daringly about how to push services forward. ... This is a huge opportunity, but it is not always perceived as one. Online life is noisier than ever, but our message is simple: We have the answers, and we can help you find them.” (15)

Transitioning to or planning and maintaining a virtual information services program can be daunting and is significantly more complex than simply scanning materials or replacing print materials with an online equivalent. As agencies prepare to go digital, it's important to take a step back and avoid common misconceptions such as equating digitization with raw imaging (scanning documents). Metadata; appropriate file naming; optical character recognition; accessibility; and permanent digital storage, preservation and access are often overlooked when the digitization process is discussed.

Discarding print materials in favor of electronic copies is also less straightforward than many assume. For example, some of the most common resources requested by transportation library users—standards and codes—had been easily obtainable via print on a library shelf. Now they may only be available behind a paywall. Transportation libraries may find that electronic access to some of the most in-demand resources may not be included in a post-print library budget.

Oklahoma DOT provides an example of a well-developed statewide digital transportation information resource. The Oklahoma Transportation Library is maintained through a collaboration with the University of Oklahoma, which owns and maintains the library catalog, stores the digitized items and maintains the website. WisDOT Library is taking a similar approach with its transition from a print to digital collection. A robust, continually expanding virtual statewide transportation information resource may be just what's needed for transportation libraries and information centers to meet users where they tend to be—online.

While most responding agencies reported no plans to transition to a completely virtual collection, Ohio and Delaware DOTs have already made that transition. Ohio DOT's digital Research Library is housed under the research program and includes final reports, newsletters, project dashboards, archived materials and other information. Utah DOT Library no longer purchases printed materials in an effort to go paperless.

5.4 When Libraries Close

When WisDOT moved from its long-term headquarters to a new facility, the WisDOT Library lost its physical library space. When Ohio DOT's library closed, most of the physical materials were discarded. The library science literature offers little guidance on how to close a library but recognizes that the information need doesn't disappear, and library professionals, including special librarians wonder where researchers will turn after a library closes. (18) Some believe that researchers can find necessary sources online or elsewhere, and any remaining resources can be easily digitized. However, digitization can be costly and difficult without sufficient budget, staff and the necessary expertise.

Library closures can happen in several ways. For example, a library can close, collections discarded or put in off-site storage, and services discontinued. Or a physical library can close and leave one or more agency staff to coordinate and provide information online. Librarians and other library staff may be retained but in different roles. Or a library can close and its collections integrated (but not necessarily maintained) into another library, and a part-time "liaison librarian" may be brought on.

Librarians charged with the closure of an academic health sciences library chronicled, analyzed and shared lessons learned. (19) They offered several recommendations, including the need for detailed planning, communication to users, and collaboration with librarians and any other involved staff. If the collections are moving to another institution or facility, collaboration with the receiving librarian and staff is essential. The librarians concluded:

Trying to determine in advance the best processes will help lead to a successful result. Librarians know the value of having a disaster response plan for their institution. Now may be the time to develop an understanding of the issues librarians would face if given a mandate to close—to avoid a potential disaster of a different kind.

Understanding how high-profile library closures unfolded—and what it took to reverse those closures—can target efforts to show the value of your library or information center **before** the threat of downsizing or closure.

Learning From the U.S. Environmental Protection Agency Experience

In 2006, the U.S. Environmental Protection Agency (EPA) announced library closures to save money. Facing a backlash from agency employees, concerned scientists, environmental groups, congressional committees and the general public, some libraries and resources were restored.

The EPA libraries had struggled to quantify the value of the variety of resources and functions they provided. Regional libraries were operated by contractors with little consistency across regions, so even the costs were hard to accurately calculate. Substantial user input regarding value was not regularly collected and only came forth after closures were announced. Little effort had been given to how the libraries contributed to the overall agency mission. Recalling the EPA libraries' saga, library professionals offered several recommendations to other libraries:

- If closure is threatened based on cost savings, verify those savings and counter with savings generated by maintaining services. Generate a list of business-oriented questions for management to use in evaluating consequences of closure.
- Generate and facilitate ongoing advocacy among users.

- Seek user input about library value before the threat of actual closure.
- Have a clear vision and articulation of the role of information services in the agency's success.
- Understand who your champions are and how to use formal and informal channels to make benefits of the information services program known. (20)

Ultimately, EPA streamlined the operation of its libraries, digitized a significant portion of its collection and focused on services provided to agency staff. (21)

6 Meeting User Needs

Understanding the needs of its users is critical to the success of a transportation library or information services program. This chapter considers some of the ways survey respondents are identifying user needs. These practices are considered in tandem with how the sampling of users surveyed viewed their transportation libraries—if they had access to one—and the resources they deemed most critical.

6.1 Identifying User Needs

Some agencies have invested significant effort to identify what users want and need from the library or information center. User surveys or more comprehensive research studies are the primary formal mechanisms for gathering this information and can be an effective first step in tailoring information services to a specific user community.

User Surveys

User surveys are relatively little used tools among survey respondents, with only one-third reporting surveying library and information services users, and only a few more planning to do so. Most responding agencies do not survey users regularly. While a few agencies survey all agency staff, WisDOT Library targets current library users and key managers or staff who might benefit from library services. Delaware DOT has targeted all staff in a particular division. Respondents note that providing anonymity may encourage responses. The VDOT Research Library respondent noted that surveying known users is labor-intensive and happens only occasionally. The library does send a survey to all patrons requesting a literature search.

More informal surveying of agency users can also generate useful data and become part of daily library operations. Tools to track database usage will generate useful data about the types of materials getting the most use in the user community. Tools to manage user engagement, such as [LibChat](#), a Springshare online chat platform that can be used on any website, can also be used to gauge user satisfaction. At the end of each chat session, the user can be asked to provide a rating for the experience.

Case Study Automate User Surveys

In 2020, VDOT Research Library implemented a more targeted, random “quality of service” survey that was sent to 25% of all “tickets” closed in the agency’s [LibAnswers](#) ticketing system, which is used for service requests sent to all library departments.

TxDOT Research Library keeps a survey form active and linked on the signature line of the library’s shared email account. Other practices include suggestion boxes (California), personal correspondence (California, Oregon) and simply asking users what additional services they would like to see (Nevada).

General Findings

Surveys conducted by several state DOTs identified a general satisfaction with the libraries and services. Results of a 2020 TxDOT Research Library survey, which received only 15 responses, indicated that:

- Library patrons will interact with both print and digital media, although some have a strong preference for a particular format. Some prefer electronic and others prefer hard copy.

- Patrons are generally satisfied with the library and its services (in providing value). But users also revealed that the library needs to do a better job creating awareness with the newer employees. Simple steps like new employee orientations to showcase the library’s value can be very effective.

TxDOT Research Library is not alone in generating few responses to its user surveys. The Nevada DOT respondent suspects that some staff may be hesitant to describe how they’re using the library. Other agencies have found that library visibility needs to improve (Wisconsin) and that many staff members are unaware of the services offered (North Carolina, Texas, Wisconsin). Caltrans Transportation Library users want more electronic resources, spacing and services.

Several respondents noted that distributing the survey and reviewing its results is just the first step. Libraries should evaluate feedback and consider responding with changes to collections or services that the library can reasonably sustain.

Power Users

Some libraries and information centers try to keep track of frequent, or power, users of information services. Sometimes it’s a matter of recognizing the divisions most frequently using or requesting library resources and services, or simply taking note of who routinely engages with the library. Other libraries take a more proactive approach, maintaining lists of those requesting literature searches and other research products, and the most frequently requested items. Usage reports generated by catalog software or online databases can also be helpful in identifying the most frequent—and potentially the most supportive—users of library and information services.

Instead of focusing on power users, one survey respondent suggested taking a step back and trying to discover the library’s **nonusers** and why they don’t engage in information services.

User Studies

Lessons from a more comprehensive user study can inform not only that agency’s practices but offer a window into user expectations for other agencies. Arizona DOT undertook such a study in 2016 (22) to understand the information needs of agency staff and preferences regarding access to library services and resources. While the agency has since closed its library, the best practices identified by researchers can inform the practices of other transportation libraries:

- Alignment and integration of the library with organizational goals
- Ongoing monitoring of and response to customer needs
- Customer-focused delivery of library services
- Continuing development of partnerships to enhance library assets and services
- Ongoing monitoring and evaluation of library performance in meeting customer needs

6.2 User Perspectives

State DOT library and information services users identified the library resources they use, the resources they would like but can’t currently access, and their preferences for services. Because the 29 users responding to the

survey represented 10 states, it's difficult to generalize these findings across all state DOTs. Their responses, however, may identify issues for further exploration.

General Awareness of Library and Services

Identifying an agency's library champions can leverage their support across an organization. About half of responding users reported being extremely aware of their agency's library and library services. A handful of users were moderately aware. Most were made aware of these resources through word-of-mouth. Four reported learning about the agency library and its services through a librarian presentation and a few learned through the agency website.

Other factors and practices that influenced users' awareness of the library were:

- *Proximity.* A user learned about the library when it was relocated into the user's building. Another user noted that the agency's librarian is located in the user's unit, which conducts research and often has the librarian perform literature scans.
- *Employee orientation.* For one user, learning about a new job included learning about the library.
- *Personal experience.* Some users reported awareness of the library simply because they used the library in the course of doing their work.
- *Librarian engagement.* One user reported getting emails from the librarian.

One user, from a state DOT that recently closed a library, was unaware of the current resources and library setup. Another noted receiving a lot of agency news alerts but none that concerned information services and collections.

Top Resources and Services

User responses to the top five information resources used were consistent with the trend recognized throughout this synthesis: Information services programs must operate in the context of today's digital age. Electronic resources such as databases and journals, literature searches and online reference services are the most popular among users. Only four users cited the importance of a print collection and guidance on copyright and open access, and even fewer expressed interest in news alerts, magazine routing and collaborative events. Table 2 summarizes the most frequently used resources.

Table 2. Users' Top Resources

Information Source	Number Identifying Resource as Top 5 Most Used
Databases, electronic journals and other electronic resources	19
Literature searches in support of research	19
Online reference services	14
Document delivery	9
Interlibrary loan	6
Digitization of critical print materials	6
In-person reference services	5

Usefulness of Other Resources

In a rating of possible (not necessarily available) information sources, users in this small sampling clearly prefer digital resources and were consistent in their lack of interest in a print collection. As one user noted, “Hard copies have little value.” Google and other internet search engines were rated very or extremely useful by 85% of respondents; more than three-quarters of users find transportation-related conferences very or extremely useful. Seventy percent rated the librarian or other information services provider and virtual collections as very or extremely useful sources of information. Most other sources were rated highly by more than half of the respondents, except for the FHWA website, other libraries’ collections and the agency’s own print collection. Table 3 summarizes users’ survey responses.

Table 3. Potential Information Sources for the Users Surveyed

Information Source	Number of Extremely or Very Useful Ratings	Number of Not at All or Not Very Useful Ratings
Google and other internet search engines	23	0
Transportation-related conferences	21	2
Agency’s librarian or information services provider	19	3
Agency’s virtual (online) collection	19	3
TRID (TRB’s transportation database)	18	4
Agency’s intranet site	16	2
AASHTO website	16	3
Agency’s external website	15	5
Personal professional journal subscriptions	14	3
FHWA website	12	4
Another library’s print or virtual (online) collection	12	8
Agency’s print collection	11	5

Other resources or services that users found useful in doing their jobs ranged from access to standards and guidelines to technology. Highlighted below are survey responses:

Access to Standards and Guidelines

- American Concrete Institute
- American National Standards Institute
- American Society of Civil Engineers
- Association of Asphalt Paving Technologists
- ASTM International

Library Materials

- Access to database aggregators of peer-reviewed journals
- Historic records

Personal Engagement

- Information-gathering consultation
- TRB personal connections to topic specialists

Services

- Access to and use of references for increasing knowledge on a technical subject
- Document delivery
- Interlibrary loan
- Literature search in support of research
- News alerts

Technology

- Forum-style websites like [Stack Overflow](#) for finding examples, vignettes and other useful items for statistical computing

Other Resources

- Informal peer exchange (interagency collaboration)
- Newsletters
- State library
- University consortium websites

Case Study Google Syndrome

One library user survey respondent said, “I’ll use Google before I use the library.” Most librarians and information services providers have heard this before.

The Special Libraries Association (SLA) co-commissioned a study of the evolving value of information management. (23) Study researchers used the term “**Google syndrome**” to refer to a ubiquitous perception that any information can be found on Google and accessed for free. But this user perception is not unwavering. Users in the SLA study identified challenges such as information overload and finding relevant and up-to-date information. Librarians can show users—and their leadership—that they can access more robust information and add value by customizing the combining, analysis and delivery of information to specific users.

Library and information services providers do need to find ways to coexist with Google, and distinguishing their services from other approaches to research may be a good start. Survey respondents offered these suggestions:

- Illustrate that relevant information is behind paywalls (not free) or in databases that Google can’t access. WisDOT Library offers an online learning course that provides just this perspective—*Transportation Research and Databases: Information Beyond Google*.
- Explain the differences between general and technical searches.
- Discuss the importance of the right, not just quick, information.
- Make presentations or lead discussions on why peer-reviewed material generally can’t be found on the open web and show users the catalogs, database subscriptions and other transportation resources available.
- Document instances of “link rot” and educate users on copyright and digital licensing issues.
- Provide instructions for accessing documents through [TRID](#), [ROSA P](#), [National Technical Reports Library](#) and [WorldCat](#).

Users’ Unmet Needs

Library services users’ wish lists were consistent with the services most librarians and research managers offer or rate as very or extremely useful. The top five resources or services users wished their agencies offered include:

- Databases, electronic journals and other electronic resources

- Digitization of critical print materials
- Interlibrary loan
- Literature searches in support of research
- Online reference services

The users surveyed also expressed the desire for easier access to resources housed in other libraries and assistance from librarians or information services providers with research and technical editing. Some want their libraries to better market their services. One respondent suggested that “[i]t would be great to have a set of ‘links’ to be able to send to new employees so that they know what is available as well as a one-pager describing services from the library. The library is an invaluable resource.”

Finally, users called out the need for materials to study for the professional engineer and other licensure exams. Many DOT libraries have responded to this need, including Illinois DOT Library, by providing licensure exam resources.

Overall, most responding users are generally satisfied with their libraries and services. Users appear most satisfied with librarians and information services staff in answering questions or helping with specific requests. Print collections, while meeting the research needs of some respondents, do not garner as much satisfaction as assistance from staff.

“The library includes a large historical collection of publications, photos, reports and miscellaneous information on the state highways, bridges and other topics related to the history of the agency. I make use of this collection, combined with digitized agreements, resolutions, contract information and plans, right of way information and maps to provide a comprehensive picture of projects and practices from the past. This is helpful as new projects are being considered and when questions of former alignments come up.”

—Oregon DOT Library user

7 Current and Emerging Trends

Explored in this chapter are two topics commanding attention in libraries of all kinds: digitization and KM.

The trends are clear that collections and services are becoming more virtual. But establishing, maintaining and expanding digital collections is not without challenges, including the complexities of coordinating the digitization of historical documents, maps, images and ephemera.

State DOTs are also increasingly realizing the need to preserve staff and institutional knowledge as retirements rise and challenges faced by agencies become more complex. Focused efforts on KM can lessen the risk of losing valuable information. What it means as a practical matter to manage knowledge is less straightforward.

7.1 Digital Collections

Digital collections are widely accessible, are easily searchable and offer endless opportunities to expand a library’s holdings. While many digital collections exist across federal, state and local transportation agencies, managing and expanding these is a challenge for many state DOT libraries. Twice as many state DOT survey respondents, however, rated digital collections as very or extremely important as they did for print collections. This makes sense in light of the apparent trend in downsizing or removing physical library spaces.

While there are agencies with an almost entirely digital collection, a similar number of responding agencies report a more print-dominant collection. As the associate library director of the Virginia Transportation Research Council noted, simple availability of digital content doesn’t tell the whole story:

[O]ur licensed digital holdings are far greater on quantity than print, but many of our print holdings are in higher demand, and many are ONLY available in print. So the lesson learned here is a modern library has both print and digital collections and leverages them in appropriate ways.

There are varying interpretations of what a digital collection includes. For purposes of this discussion, a digital collection includes:

- Any materials converted from print to digital
- Any sources—internal to the agency or external—produced in electronic format (“born digital”)
- Any databases, networks or other web-based sources

The extent of the digital collections maintained varied significantly among state transportation library and information centers responding to the survey, as summarized in Table 4.

Table 4. Respondents’ Digital Collections

Digital Content of Collection	Agency and Description
10% or Less	<p><i>California.</i> Under 10%.</p> <p><i>Colorado.</i> 5%.</p> <p><i>Connecticut.</i> Approximately 10%.</p> <p><i>New York.</i> 10%.</p> <p><i>Oregon.</i> Approximately 10%. (Electronic copies of or links to freely available TRB and FHWA publications and agency research reports are associated with hard copy records.)</p>

Digital Content of Collection	Agency and Description
10% to 30%	<p><i>District of Columbia.</i> 30%.</p> <p><i>Illinois.</i> Approximately 20%.</p> <p><i>Kansas:</i></p> <ul style="list-style-type: none"> • Digital (stored as PDFs): Approximately 20%. • CD/DVD: Less than 1%. <p><i>Michigan.</i> 10% to 15%.</p>
Approximately Half	<p><i>Florida.</i> Approximately 50%.</p> <p><i>Pennsylvania.</i> 50% to 55%.</p>
More Than Half	<p><i>Wisconsin.</i> Approximately 60%. Print items are off-site to be eventually digitized.</p>
Most of the Collection	<p><i>Mississippi.</i> Approximately 90%.</p> <p><i>Missouri.</i> 80% to 90%.</p> <p><i>New Hampshire.</i> 95% to 100%.</p> <p><i>Texas.</i> 83%.</p> <p><i>Utah.</i> 99%.</p>
Entire Collection	<p><i>Alaska, Delaware and Tennessee.</i> Note: Tennessee DOT’s entire collection is digital but not curated. The collection is housed in specific division folders; final reports are also posted on the agency’s website.</p>

Managing Diverse Digital Collections

Most responding agencies offer access to at least one digital collection, typically AASHTO’s (almost two-thirds of responding agencies). One-third of respondents offer online access to ASTM standards. Other respondents highlighted their collections of research reports produced through agency-funded research, and some have collections unique to their agencies. Below are examples of common types of digital collections:

- **Research reports and other deliverables.** The TxDOT Research Library has digitized legacy research deliverables and is the primary repository for agency research from the 1950s to present. This is the agency’s highest-use digital collection. All of MoDOT’s research reports are born digital on Innovation Library, which the transportation librarian controls. This collection includes published research reports, studies and newsletters dating back to 1997.
- **Special collections.** District DOT Library’s [DDOT Back in Time](#) historical photo archive gets the most use of any online collection.
- **Open access.** TxDOT Research Library librarians focus on indexing digital, open access gray literature from various agency divisions and districts, metropolitan planning organizations, pooled fund projects and other sources.
- **Shared drive.** Utah DOT’s IT group set up a shared drive for AASHTO publications. The drive is also used to house other categories of digital offerings. The agency’s employee development group also has a [Saba Cloud](#) platform that is used as an alternate tool for accessing the same digital content.
- **Statewide collections.** Several respondents highlighted statewide collections that their agencies offer access and may also contribute to:
 - [State Library of Ohio Digital Collection](#) includes permanently accessible documents that are categorized by agency and listed alphabetically.
 - [Wisconsin Digital Archives](#) is “a growing collection of documents about the activities, functions and policies of Wisconsin State Government.” The collection includes documents from 2001 to the present. [Recollection Wisconsin](#) is a collection of digital cultural heritage resources made

- available by Wisconsin libraries, archives, museums and historical societies through a partnership with the [Digital Public Library of America](#).
- [Missouri State Publications](#), hosted on the Internet Archive platform, highlights digital publications from all Missouri state agencies, including MoDOT. This collection, managed by the Missouri State Library's Government Documents Librarian, is one of MoDOT's largest collections.
 - **State-sponsored resources.** [OhioLink](#) is an example of how states can leverage cooperative funding and collective buying power to provide a wealth of resources. The Ohio DOT respondent noted that OhioLink users can access 88 college and university library collections in the state through a single portal. Resources on the OhioLink shared catalog are also available through a peer-to-peer interlibrary loan system to all Ohio residents through their local library. Similarly, MnDOT Library's [Reference Resources](#) offers users access to Minnesota's eLibrary Minnesota ([ELM](#)), which "gives Minnesota residents access to magazine, journal, newspaper and encyclopedia articles, media, including images, videos and audio files, and other information resources."
 - **Full-text online subscriptions.** The survey uncovered few details of respondents' subscriptions to full-text online journals or journal collections. VDOT Research Library now has 17 full-text online subscriptions. Some are for one or two journals (Taylor and Francis Online) while others are bundled collections such as ASCE Library. Most popular are ASTM Compass, Knovel and Skillsoft Books.

A few respondents noted that digital document management depends on the resource. At TxDOT Research Library, digital subscriptions are internally managed through various agency divisions. WisDOT Library's librarian is the gatekeeper for AASHTO digital publications and some other resources. The library also adds DOT-produced digital documents to the [Wisconsin Digital Archives](#), which contains material from other state agencies.

Paying for Digital Access

Many databases and other resources useful to transportation agency employees require fees to access. State DOTs with access have different ways to pay, some of which depend on the resource. Fourteen responding agencies indicated they pay a single fee for all state agency users.

Licensing rather than outright purchase of electronic content is often recommended given changing needs and budgetary constraints. Some agencies opt for a license that offers concurrent, multiuser or unlimited access across the agency that is based on IP address authentication. Others may choose to pay for access for a limited number of concurrent users that, while a less costly option, could preclude some users from access. Also, some e-book subscriptions limit both users and the number of pages that can be printed or saved.

Five agencies (Mississippi, North Carolina, Ohio, Utah, Wyoming) pay on a title-by-title basis. Other payment strategies follow:

- The District DOT Library pays *annual fees* for its catalog and archival software.
- Florida DOT pays a *flat-rate annual maintenance fee* and additional fees for specific titles.
- Delaware DOT maintains *software licenses*, including five licenses for each AASHTO publication.
- Some states benefit from statewide access to resources made available through a *consortium*, such as through Minnesota's ELM, which gives access to all Minnesota residents, and Ohio's OhioLink, a statewide academic consortium.
- The least likely way to pay for digital access is as part of a *regional access agreement*, though the TxDOT Research Library and WisDOT Library respondents reported using this mechanism.

Case Study Digital Transportation Library Collections

Several survey respondents discussed the importance of their agencies' historical collections. The examples below show the range of digital collections of historical and other digital materials that transportation libraries maintain:

Caltrans Transportation Library [digital collections](#)

Iowa DOT [historic archives digital collections](#)

Metro Transportation Library and Archive (Los Angeles County) [Flickr archive](#)

[Minnesota Digital Library](#)

Northwestern Transportation Library [digital collections](#)

Washington State DOT Library [digital collections](#)

Expanding Digital Offerings

Most transportation libraries and information centers responding to the survey plan to expand their digital offerings. Highlighted below are the most common types of additions:

- **More AASHTO digital publications.** While respondents will continue to provide access to AASHTO digital publications as they are released, several offered recommendations that would improve access or make it more cost-effective:
 - Create a Technical Services Program subscription to allow agencies to pay one fee for access.
 - Simplify Digital Rights Management (DRM) restrictions so print publications (with library services around them) will no longer have to be the more logical choice for some libraries.
 - Address the challenges brought about by the AASHTO requirement for a gatekeeper to manage digital document access.
- **Subscription databases.** VDOT Research Library developed a “workaround” to large, expensive journal packages with the purchase of discounted bundles of tokens that can be used by library staff through a mediated process to quickly acquire and deliver copyright-compliant versions of articles for agency patrons. Other respondents expressed interest in access to articles on demand.
- **E-books.** Caltrans Transportation Library and Colorado DOT Library are considering adding e-book collections. The Caltrans respondent noted the importance of identifying a platform that is compatible with the agency's firewall.
- **Multiple digital repositories.** WisDOT Library uses more than one digital repository because no single depository has enough breadth within its collection guidelines to host all of the agency's digitized items.
- **New online platforms.** MoDOT Library recently implemented [Techstreet](#), a subscription-based platform for hosting online industry standards.

Managing Born-Digital Collections

Born-digital items are materials that are created in a digital format, including reports, websites, email, spreadsheets, presentations, digital photographs and electronic records. Born-digital items are distinct from analog items that are subsequently digitized, such as paper manuscripts or photographs. Managing born-digital publications is a relatively new challenge, but a crucial one to meet. As one survey respondent noted, the lack of systematic capture of important born-digital agency publications creates the risk of losing those resources. Most are stored in temporary digital environments, and they can easily disappear without permanent preservation.

The challenge involves where to house these resources and how to format and catalog them so they can be easily identified and found. Metadata provides a standard format for records for these purposes but is a challenge to standardize and apply consistently across an agency. Compliance with Section 508 accessibility requirements must also be considered.

Agencies responding to the survey are taking different approaches to addressing born-digital publications:

- *Additions to websites, catalogs or library databases.* Some agencies simply provide links on an agency website (Connecticut, Kentucky, Missouri) or add them to the library database along with printed publications (Mississippi, Pennsylvania, Tennessee). MoDOT Library archives these publications as needed.
- *Decentralized management.* At Caltrans, the various divisions archive their born-digital reports and provide access through an intranet site. Most of Oregon DOT's documents are now produced as born-digital publications that are posted on unit webpages. Currently there is no method for collecting them, and links are rarely sent to the library as hard copies had been. Divisions and regions within Utah DOT manage their own materials; many are posted on Utah DOT's website.
- *Departmentwide notification program.* WisDOT Library is proposing a departmentwide digital capture notification program to capture and digitally harvest and catalog these documents for access and preservation.
- *Distribution to digital repositories.* TxDOT Research Library distributes research reports funded by the agency to ROSA P and other digital repositories. The library also frequently distributes born-digital links to Internet Archive's [Wayback Machine](#) for web archiving and is encouraging Texas university researchers to use the [Texas Data Repository](#).

VDOT is required to submit all publications (including born-digital documents) to the Library of Virginia as part of a state depository program, but is less focused on access and more concerned with the most recent edition of works. The respondent noted that the agency's ability to preserve born-digital materials "is sometimes stronger than our ability to make those copies accessible."

- *Access management.* Delaware DOT's library is starting to use a wiki to provide access to digital materials. Illinois DOT Library hosts electronic documents on a webpage that requires a secure login by staff using generic credentials. Michigan DOT Library manages digital access in OneDrive and is working with the Library of Michigan to manage the born-digital collection.

Digitization

"Digitization" refers to creating digital records from physical ones. This process begins with scanning printed documents or photos but also includes managing file naming protocols, metadata, optical character recognition and cataloging, and ensuring Section 508 accessibility requirements are met. Digitizing print collections involves prioritization, processes and resources that not all transportation libraries have access to. The Consortium of Academic and Research Libraries in Illinois (CARLI) has compiled general factors to consider (24) before embarking on a digitization effort:

- **Purpose and audience.** While expanding access to a wider audience and ensuring long-term preservation are common goals of digitization, ensure that the digital resources fulfill a specific purpose aligned with the agency or library mission and have an intrinsic or unique value.
- **Discovery and access.** Consider how the digitized items will be discovered, accessed and whether the digital objects have added value (such as keyword searchability for textual materials).
- **Copyright.** Ensure that the library has permission to digitize the items or that they are in the public domain.

- **Cost.** Consider personnel time, equipment costs and long-term storage, preservation and maintenance costs of the digital files.
- **Physical condition.** Ensure digitization will not damage, destroy or prevent further handling of the original items.

Case Study Working Toward a Statewide Digital Transportation Library

WisDOT’s physical library closed in 2018, shifting the library’s emphasis to digitizing unique elements of its print collection, now housed off-site, and ramping up management of the agency’s electronic resources and information services. The library uses repositories both within and outside of the agency to effectively catalog, preserve and provide access to a growing collection of digital items.

Efforts continue toward expanding access to the growing digital content WisDOT Library curates. WisDOT Library’s librarian envisions the WisDOT catalog providing search capability for all repositories to create a “one-stop shop” for transportation information. Users would be able to search for Wisconsin transportation documents created by other organizations in addition to WisDOT documents existing in other repositories. The catalog home page would also include links to national portals to search for other transportation information.

Process Considerations

Developing standards and processes can contribute to the success of a digitization effort. The NTKN offers a series of [resource guides](#) devoted to digitization issues, including:

- Digitization process
- Example digitization projects
- Transportation digitization plans
- Metadata standards
- File naming
- Technology options

Additionally, NTKN has a [cooperative digitization](#) CoP to “discuss collection development, cataloging, digital rights, promotion, contracting and best practices for digitizing transportation collections.” This forum for discussing digitization is also intended to eliminate duplication of efforts within the transportation community.

“Digitization is of increasing value to our patrons. Access, speed and ease of use are all increased by digitization. Of course, cataloging and findability are still essential.”

—RAC survey respondent

Case Studies

A 2013 *Public Roads* article (25) presents case studies of early digitization efforts of South Carolina and Iowa DOTs, Indiana’s Joint Transportation Research Program and Northwestern University Transportation Library. Highlights from this study, which appear below, can inform other agencies’ digitization efforts.

- *South Carolina DOT* embarked on an effort to digitize road construction plans and had to address access decisions. The agency developed [Plans Online](#), a subscription service that allows anyone to buy and access all plans.
- *Iowa DOT* focused on a large collection of photos. The agency’s process highlighted the importance of metadata, which allows for the images to be accessed and identified, and helps users to understand the information conveyed.
- The *Indiana* effort explored standardized title pages and digital object identifiers, or character strings, developed by the International Organization for Standardization.
- The [Northwestern University Transportation Library](#) owns its own machine for digitizing fragile materials and it outsources other digitization jobs. Its digital collections include unique resources such as studies, plans and reports covering Chicago O’Hare International Airport; the Panama Canal construction photograph collection; and a collection of public transit and commuter rail photos.

7.2 Knowledge Management

KM can be a challenge to operationalize. But capturing, preserving and building upon professional and institutional knowledge is fundamental to an organization’s continued success.

A May 2019 publication of the [AASHTO Committee on Knowledge Management](#) defines KM as:

[A] collection of policies and practices relating to the identification, sharing and retention of intellectual/knowledge-based assets in an organization.

It is a management practice fostering collaboration across organizational and disciplinary boundaries[,] linking people who have the requisite knowledge with those who need it to do their jobs. (13)

A second national transportation association committee—[TRB Standing Committee on Information and Knowledge Management](#)—advocates for KM in the transportation community and supports state DOT KM efforts by:

[A]dvancing and disseminating practices that improve knowledge and information creation, access, sharing, preservation and retention within and among transportation organizations. The committee identifies critical research needs in these areas, promotes understanding of these topics throughout the transportation community, and fosters the use of library and information science and knowledge management practices through education, training, collaboration, outreach and research.

As a practical matter, transportation agencies need to ensure that the knowledge employees gain over their careers is not lost when they retire or leave. With the current retirement trends and workforce changes, preserving and managing this valuable intellectual capital should be of vital interest to agencies, and agency information professionals can be natural leaders of this effort.

National Guidance

NCHRP Report 813: A Guide to Agency-Wide Knowledge Management for State Departments of Transportation (26) describes ways to implement and benefit from KM. While some strategies fall in the human resources realm, others address information management, which is within the purview of the transportation library or librarian:

- Capture of specialized knowledge from employees before they leave the agency
- CoPs, where less experienced employees can learn from peers
- Employee expertise directories

A 2014 U.S. Domestic Scan Program project (27) similarly identified effective KM implementation strategies for state DOTs. Work that could be done by or in collaboration with a transportation librarian includes:

- *Fostering networks and CoPs*, including expertise directories and networks in which employees participate based on their primary discipline
- *Knowledge capture and application*, such as peer review processes, presentations or podcasts with technical experts, focused discussions on the agency’s history, and processes to capture and share knowledge from employees and contractors
- *Information management and dissemination* practices, including processes and policies to ensure accessible information.

An agencywide KM plan or strategy can promote actions—many relatively simple and low cost—to save and leverage institutional knowledge. State DOTs will benefit from managing this intangible asset, and libraries—and librarians—can play an important role.

Role of Library or Information Services in Knowledge Management

Many transportation agencies may not have a coordinated approach to KM. While some efforts to preserve knowledge occur in isolated programs, divisions or other units within agencies, KM can be most effective if agencies approach it in an organized, methodical fashion.

Librarians and information professionals are in the business of searching for, organizing and disseminating information. They’re comfortable working across disciplines and staffing levels within their agencies, regularly engaging with research managers, agency leadership, engineers, planners and other subject matter experts. Given this expertise and level of engagement, libraries and information centers and the people managing them are well suited to facilitating KM in their agencies.

Yet relatively few librarians and research managers—slightly more than one-third of those responding to the RAC survey—reported providing KM services, and only seven rated KM as an extremely important service. Many respondents said they were interested in starting or expanding a KM program or KM activities at their agencies. For some, the work has already begun. The District DOT Library participates in the management of an agencywide KM-related wiki. After starting its own KM program, Florida DOT Library is educating the agency about it and looking for ways to expand. Mississippi DOT is beginning work on a KM program and plans to involve the library. Oregon DOT Library’s librarian is looking for ways to incorporate KM into library services. Other agencies face limitations in KM program efforts. Budgetary concerns are restricting WisDOT Library’s plans to implement a KM program. Similarly, Illinois DOT Library is interested in improving KM services but staffing limitations are a hindrance.

More targeted efforts were reported by TxDOT Research Library, which indexes nontraditional resources like podcasts of interviews with agency staff that can be used by knowledge managers to capture informal knowledge; the library is also collaborating with the NTKN on KM activities.

The User Perspective

Perhaps not surprisingly, more than half of responding library users weren’t aware of whether their agencies engage in any KM activities, but a few reported on notable agency efforts. A Utah DOT Library user described an employee development group that is “actively engaged in managing and providing knowledge through a

learning management system that provides learning, conference presentations, a digital library and access to TC3 and other learning materials.” (TC3 refers to [AASHTO’s Transportation Curriculum Coordination Council](#), which offers almost 200 web-based training courses with additional courses that are planned as needs are identified.) A TxDOT Research Library user noted there was an agency position dedicated to KM.

Case Study Getting Started With KM

The AASHTO Committee on Knowledge Management developed a [June 2020 guide](#) on key terms and principles that describes the four pillars of KM:

- *People*. Strategic communication enabling a culture of collaboration to accelerate organizational learning.
- *Process*. Organizational efficiency and effectiveness.
- *Technology*. Enabling efficient business actions.
- *Data and information*. Authoritative information for analysis and decision-making.

Common purposes for KM in an organization include mitigating knowledge loss; making knowledge and information findable; supporting innovation; and improving performance.

Organizations developing a KM strategy are advised to consider three perspectives: *strategic* (have a vision and end goal), *tactical* (create the infrastructure of partnerships and systems) and *operational* (identify the specific projects and activities that will be performed). (28)

State Transportation Agency Efforts

One of the state transportation agency efforts described below was led by the Washington State DOT Office of Research and Library Services, illustrating the point that research programs—and the libraries that serve them—can be at the forefront of an agency’s KM program.

The Method for Analyzing and Structuring Knowledge (MASK), developed by French researchers, uses models to organize and present information from interviewing one or more experts on a given topic. A “knowledge book” presents this information with links to relevant reference materials that successors can easily navigate and use. Two state DOTs recently applied the MASK technique:

- Washington State DOT tested this technique in an October 2019 project, reporting outcomes and lessons learned to assist others interested in exploring this method. (29)
- MnDOT completed three knowledge books in connection with its 2020 knowledge retention pilot project. (30)

Other KM practices are illustrated in a recent Vermont Agency of Transportation study. Concerned about employee turnover, the agency commissioned a study in 2015 to examine ways to improve employee retention and KM at the agency. As part of this study (31), researchers developed a workshop method and a Knowledge Exchange Tool that provides a format for a group to discuss, understand and record tacit knowledge.

The study concluded that KM involves people, processes and information technology—all of which are equally important for success. Researchers recommended KM efforts be coordinated, ideally designating an individual with authority and responsibility to move KM forward.

8 Showing the Value of Transportation Libraries

Like other types of libraries, transportation libraries are under pressure to prove their worth. Shrinking budgets, information technology advances and changing workforces require librarians and information services providers to be flexible and responsive to meet evolving agency needs with innovative solutions. This chapter briefly examines how librarians and other library advocates are engaging with leadership and undertaking efforts to ensure the value of a library or information center is recognized across the agency.

8.1 Agency Support

Showing the value of transportation libraries is critical to their survival. Librarians and other library advocates must tip the scale in favor of benefits as compared to resources invested. While one state DOT reported using a return-on-investment exercise, a library's value cannot be solely measured in dollars. Institutional leadership (agency or other state leadership) makes decisions on a library's existence. As such, the library's value must be shown in the context of that institution. Providing a broad scope of services, not just collections, is imperative to showing value. Communicating that value across the agency, through library champions and other methods, is also crucial.

A librarian describing the value of special libraries recognized the following:

Even long-established special libraries will not be kept open simply because their users like the service, or even because they save their users time and money. Today's special libraries must integrate themselves into projects aligned with organizational goals and be able to demonstrate their contributions to all levels of management. Traditional metrics like number of volumes, gate counts or reference transactions are useless to administrators without any context, because library usage in and of itself is not likely to be one of the larger organization's goals. Outcomes must be defined in terms of these goals. (32)

The majority of responding research managers and librarians believe they have the support of agency leadership for library or information services, which is demonstrated through financial support or leaders' services requests. Support may fluctuate with administrations and require reeducation. Three respondents reported that they do not feel like they have leadership support. (All three agencies do not employ a professional librarian.) Other respondents cited the lack of budget or budget shortfalls and are unsure of the level of support.

Less than one-half of the RAC survey respondents are attempting to align the library and information services with the agency's mission, strategy or other formal planning. Fewer yet have undertaken formal qualitative or quantitative evaluations of library and information services, though some agencies identified efforts to raise awareness of the library and heighten leadership support:

- Ensuring that the online catalog reflects all library materials elevates the DOT's presence statewide. Previously, the DOT had no online presence and now can share its collection with other state agencies (North Carolina).
- Aligning services with the agency's research program heightens the library's profile. Some questions from senior leadership and the Legislature are fielded by the librarian and presented with the library's branding (Oregon).
- When changes occur in agency administration, educating the new set of decision-makers about library services should yield benefits to the library (Wisconsin).

8.2 Toolkit for Proving Value

Proving Your Library's Value: A Toolkit for Transportation Librarians (9) has proved to be valuable to libraries of all types given the common issues all libraries face, and it remains a seminal tool for transportation librarians. Reviewing contemporary literature, surveying and interviewing practicing librarians, and evaluating the library experience of the authors resulted in a robust review of how transportation libraries can and do illustrate value and a set of recommendations for moving forward. The overarching recommendation: There is no single solution for all libraries. Institutional contexts can vary, and each library needs to be described and valued in the specific context of the institution that it serves.

According to the toolkit, value must be appropriately defined for each library before it can be demonstrated. Most importantly, a library must align with the institution's mission, values, goals and strategies. Almost half of the transportation agencies responding to the survey reported aligning with these elements. Showing value starts with understanding the multiple facets of the context in which the library operates. The toolkit suggests time be spent planning strategy and considering multiple facts, issues and problems. Building a case may include metrics and statistics, but also success stories, user surveys and social impacts. Communicating the case that's built depends upon the specific audience. Lastly, understanding the library valuation is an ongoing process.

8.3 Current Practices

Librarians and research managers reported implementing various efforts to better understand what users need and value, and to facilitate and maintain support across the agency. Some common practices include:

- Regularly surveying users
- Attending agency meetings to stay informed about priorities
- Focusing on customer service and responsiveness
- Offering research support
- Relying on anecdotal evidence

While some agencies take a more reactive approach, others use targeted education and outreach aimed at staff and leadership to help sustain and grow the library or information management program. Table 5 summarizes the efforts described by RAC survey respondents to promote the information products and services their agencies offer.

Table 5. Practices to Promote Library and Information Products and Services

Practice	Description
In-Person and Virtual Events	<ul style="list-style-type: none">• Annual symposiums• Open houses• Presentations to staff and the public• Webinars
Library Resource	LibGuides sent out in daily emails
Marketing	<ul style="list-style-type: none">• Customized bookmarks and mouse pads• Information products branded with logos• Word-of-mouth marketing by agency leaders

Practice	Description
Publications	<ul style="list-style-type: none"> • Posters • Employee bulletins • Flyers and brochures (included when mailing items) • Listservs and newsletters (library- or research-specific)
Reporting	Regular management reporting
Targeted Outreach or Engagement	<ul style="list-style-type: none"> • Annual open house for local staff • Discussing specific resources with units or divisions • Focus groups • Email notifications about new resources • Marketing new titles • Meeting with decision-makers • Presentations to the public about unique historical content • Participation in new employee orientation and onboarding, and meeting individually with new hires
Training	<ul style="list-style-type: none"> • Administration of the agency’s learning management system (LMS), encouraging relevant training offerings • Training webinars on electronic resources
Web Presence	<ul style="list-style-type: none"> • Intranet • Library website • Social media

Agency research managers and librarians noted some of their needs in this area, including a greater capacity (time and expertise) to engage in marketing and promoting information services. Several respondents also expressed the need for greater understanding—in both directions—between library services and other divisions of their respective functions. There was also interest in improving research and library webpages to be more dynamic and interactive.

Case Study Examples of Transportation Library Outreach

Transportation libraries are serving their customers and demonstrating the value of their libraries with products and services like these:

MnDOT Library’s [Library Alerts](#)

Oregon DOT Library’s [LibGuide](#) on finding transportation resources

VDOT Research Library’s [e-newsletter](#)

Leadership Perspective

Transportation agency leaders responding to the survey had similar ideas to enhance interest in or encourage support for agency information services:

Adjusting Attitudes

- Overcome the stereotypes of a librarian and library services, and underscore the value that can be brought to data and information management.

Information Products and Services

- Develop an interactive website that effectively identifies available services.
- Develop guidance for preparing reference searches.
- Digitize, develop and maintain web-based data.
- Produce subject-specific webpages and annotated bibliographies.

Outreach

- Assist with KM.
- Include the library in new-hire orientation.
- Offer presentations from librarians for staff.
- Share publications with targeted audiences.

9 Preparing for the Future

As illustrated throughout this synthesis, transportation libraries are evolving, often in response to new user or agency needs. Taking on new roles, enhancing current practices or shifting gears to respond to agency changes bring challenges and also opportunities. In this chapter, recent lessons learned from the COVID-19 pandemic are considered along with tools that can ease welcome and not-so-welcome transitions, such as developing an overarching strategy to articulate the value of the library and information services program, and engaging with partners and networking with transportation information professionals to share best practices.

9.1 Lessons From the COVID-19 Pandemic

The COVID-19 pandemic has had global impacts on the way governments are run, business is conducted and life is lived. The operations of transportation libraries have not been immune to these changes. Transportation information professionals can be informed by observing how libraries of all types move through the pandemic. One impact to public and academic libraries, for example, was staff furloughs or termination. This may be less of a concern for state DOT libraries given the typically small number of people employed to provide information services. Information professionals and librarians should, however, give careful thought to how duties and user needs may have changed since 2020.

Many state transportation agencies have started or increased the provision of remote services, recognizing that DOT staff still needs access to reference materials. Oregon DOT’s librarian believes the significant increase in remote customers will continue. There, the public can no longer come to the library to do research; services are provided by email and phone, and sometimes materials are mailed to users’ homes. Many respondents recognize that more flexible telecommuting options are likely to persist.

*“The librarians even before the pandemic were really good about electronic delivery.
This is especially important now that we are telecommuting.”*

—User survey respondent

Some state DOT libraries, such as VDOT Research Library, already had a significant virtual operation, which may have mitigated the pandemic’s disruptive impact. The library’s overarching goal explains this more seamless transition to providing services at a physical distance:

[T]o be a 24/7/365 resource for all VDOT employees regardless of where they are, where we are, what day of the week it is, what time of day it is or what kind of device they are using. We now have “systems” in place that help us receive questions, fulfill requests and track assignments handed off from one library staffer to the next until the patron gets what they need.

Likewise, there has been little change in Pennsylvania DOT’s library operations as requests for print materials were handled curbside. Most state DOT libraries, however, experienced changes in services and capacity as a result of the pandemic. These changes are summarized below.

Print Collections

For TxDOT Research Library, the cataloging of print donations has slowed. The Kansas DOT respondent reported that interlibrary loans—both lending and borrowing—have been more challenging. Circulation is down but renewals may be up as patrons are not easily returning items. VDOT Research Library is shipping resources to

users. The Caltrans Transportation Library could not circulate any print materials until 2021, and the library's archive processing halted completely. Several respondents expect that a larger portion of library collections will take a digital form as a result of the pandemic.

Self-Service

Some respondents noted the pandemic has moved their library or information center toward self-service. Caltrans Transportation Library is offering more scanning on demand and considering systematic scanning efforts to build repositories for employee use. Nevada DOT's research chief speculated that "patrons will be more catalog/search savvy and can locate the items themselves." Utah DOT's librarian reported making some services more "hands-off" than they were before the pandemic and adding more information and resources to the website.

TxDOT Research Library expects to increase the use of virtual conferencing for reference interviews.

Physical Library Spaces

Along with the opportunities, the pandemic may increase challenges for some transportation libraries. As more library patrons (the public or agency staff) are spending more time in settings that minimize social proximity, already endangered physical library spaces may become more threatened as in-person use declines.

Some state DOTs have limited the hours of in-person staff, limited the hours or days a physical library is open, or still have not reopened a library. One user reported that in-person research is restricted, and most physical resources cannot be removed from the premises. These restrictions, however, have led to an increased dependence on library staff.

Along with general recommendations to safeguard the health, safety and well-being of patrons and staff, SLA's guidelines for reopening (33) emphasize the need to offer more digital services and the importance of clear and timely communication to users regarding changes in services or accessibility of collections.

Pandemic Opportunities

Responding to the pandemic has created some opportunities for improvement. For example, the paths of interaction between librarians and users may have evolved. One user noted that while unable to go into the library, sending an email with requests, especially literature searches, worked well.

For many types of libraries, hosting or facilitating programs and events has become an increasingly important element of library services. Public librarians, for example, found that virtual programs attracted attendees from a wider geographic area. (34) Librarian professional development has also increased with the move to online conferences and seminars, eliminating travel time and costs. These trends—practices to reach a wider audience and increased opportunities for professional development—can benefit state DOT libraries.

One university dean of libraries (35) believes that academic libraries are facing a paradigm shift and thinks "mass digitization efforts" may result, leveraging "collaborative storage agreements currently dedicated to the preservation of print content" to make print collections more accessible. He predicts resource-sharing

agreements will become necessary and standard. Such efforts in other types of libraries can inform state transportation libraries' move toward digitization.

Across the board, the pandemic has hastened and expanded the trend toward digitization. Several state DOT respondents noted more digitization has taken place or is planned, and the acquisition of access to digital items may be increasing, although others face barriers to digitization (see [Chapter 7](#)). Many users noted an increased preference for digitized resources, including existing print materials. Some may still depend on printed sources, as one user noted, bemoaning the lack of “access to my 29 years of extensive collected references, which are at work.”

The pandemic also highlighted the need to develop and maintain service recovery plans and training in crisis preparedness and contingency planning. SLA concluded that “[w]e must see this as an opportunity to continue to innovate, evolve and adapt to these changes, and also build in future programming for our libraries, and for ourselves as professionals. ‘Never waste a crisis’ as one academic stated in our research.” (33)

Case Study Digital Impacts of the Pandemic

Many respondents reported the pandemic resulted in increased use of virtual tools, which is expected to continue as these tools can allow greater access to services. The momentum in use of collaborative technologies—including meeting and document sharing platforms—can be harnessed for collaboration, information services, KM and more. The Caltrans Transportation Library reported that most services, including interlibrary loan and document delivery, training webinars and literature searches, are now conducted and provided remotely.

Due to the reliance on the digital world, however, the pandemic may have required many libraries to upgrade or amend technology systems and to prepare for digital disruption and/or cybersecurity issues. (36) VDOT Research Library, for example, had IT issues given the significant increase in the need to access the agency network. Another state’s library user reported that accessing certain references was more difficult away from the agency network, where certain subscriptions may be IP address-dependent. Some transportation agencies also recognized the need to make webpages more user-friendly and interactive.

9.2 Overarching Strategy

While some state DOT libraries and information centers are thriving, others are challenged by resource constraints and other factors. To stay relevant, retain or increase resources and provide value to the agency, an overarching strategy is vitally important regardless of the library’s current status or the extent of its services.

A clearly articulated vision of why the library or information services program exists and the information services, products and other value that will be provided is the first step to achieving that reality. Services and functions should be clearly described—and prioritized if feasible—with goals and possibly actions and tasks. Capacities, including staff expertise and other resources needed to develop or maintain the library or program must be identified.

Particularly important is the necessity to understand and align an information services strategy with the strategic direction of the agency as a whole. Most agencies have explicit strategic plans or annual reports containing agency performance toward defined goals. Incorporating the library or information services strategy within agency strategies or goals, and illustrating the critical role played by transportation information, will ground the library or information services program within the agency. Additionally, an effective strategy needs

involvement from the right people who can create agency buy-in and set the stage for successful implementation.

Vision and Mission Statements

An articulation of the ideal library or information services program to accommodate the changing information landscape and meet evolving user needs can set the direction for programmatic efforts and resource requests. A succinct vision statement, ideally one or two sentences, describes what an organization is or desires to be. A mission statement describes what an organization does to be what it is or wants to be. Both will set the stage for more detailed planning and prioritization. And to be relevant and sustainable, both will reflect the agency's high-level strategy statements and agency culture.

“Library services of the future should provide timely and relevant information, nothing more or less.”

—Leadership survey respondent

Most responding librarians and research managers do not have vision or mission statements for their libraries or information services in general, but a few provided their guiding statements:

- **Caltrans Transportation Library's** mission statement:

The California Department of Transportation Library supports the Department's employees statewide in working to improve and preserve the state's transportation infrastructure and shape its future.

As part of its mission the Library maintains and sustains a physical and digital library, an archive collection and services designed to meet the Department's current information needs and preserve its history. To effectively deliver these collections and services, the Library subscribes to electronic information systems and databases that are easily accessed by all Department employees.

The Library is committed to developing partnerships within the Department and the wider transportation community, to ensure that its systems and services are relevant, innovative and accessible.

- **MoDOT Library's** mission statement: *The MoDOT Library delivers quality, actionable information to support the informed decision making by the agency's managers, professional and technical staff; provides access to the best transportation knowledge resources and tools; and disseminates MoDOT research innovations and solutions.*
- **TxDOT Research Library's** informal mission statement is used internally to direct priorities: *To fulfill and respond to the research needs of the greater transportation community by providing access to print and digital works supporting transportation research, providing leadership in partnerships and collaborations, and offering premier research and library information services that support TxDOT's goal of being a “best in class” transportation agency.*

Capacities

Any organization needs the means—tangible and intangible resources—to provide services and functions, meet its mission and realize its vision. Capacities that relate directly to services and functions to consider and characterize in a strategy document include:

- **Staffing/expertise:** Analyze how much effort and the types of expertise will be needed for the services and functions to be provided. Needed expertise may include a more pronounced communications competency (see *Information Professional Competencies* below).
- **Infrastructure:** Identify the physical space, equipment or organizational support needed to support the program.
- **Technology:** Determine the software and other IT and support needs into the future.
- **Funding:** Consider that tying the budget needed to carry out the program as described to a formal strategy may make the funding request more compelling.

Other needs relate to the program as a whole:

- **Governance:** Articulate how a program is run. While this step may seem unnecessary, it can provide clarity (and ultimately support) for program staff and agency leadership. What other programs should be involved in suggesting or directing operations? Would a steering committee be helpful?
- **Image:** Describe the program’s intended goals. Many state DOT libraries and information professionals struggle to make their presence and value known. An intentional description of the brand or image a program wants to project provides the basis for effective outreach and marketing.

Information Professional Competencies

Some state DOTs have lost professional librarians and others never had one. The nature of what is needed from an information services provider—whether a professional librarian or not—is evolving. Many tasks are significantly more complex than they may initially appear. Trends in IT, workforce preferences and changing transportation agency priorities are requiring flexibility from the people who manage transportation information. They may have to shift their focus, adjust their methods and consider how to modify even their interpersonal practices.

Case Study Reimagining the Special Librarian

In a study co-commissioned by SLA (23), researchers recognized the opportunities for librarians to rebrand themselves from technical, inward-looking, reactive and siloed to multiskilled, outward-looking, proactive and integrated within the organization. Another librarian (37) opined that librarians have to become data managers, but, despite the “machine-driven trends,” face-to-face interaction has become more important than ever.

Observers of special library operations (23, 38) have highlighted the value of librarians or other information services providers being more “embedded” within the programs they serve. In essence, this means providing library or information services outside of the library context. In these roles, information providers enhance their relevance and can be more responsive to user needs.

An experienced library science professor who has researched embedded librarians noted that “[t]he successful embedded librarian has a broad view of the librarian’s role. It is not to provide just expert research service, or information literacy instruction, or the management of internal content. The embedded librarian’s role is to help

the team use information most effectively in its operations, and the manager’s role is to help the organization optimize its use of information—by the most appropriate means available. That means that embedded librarians are constantly trying to work themselves out of a job. It also means that they are change leaders, not change followers. And it means that they are in a position to experience sustained success.” (39)

9.3 *Engaging Partners and Networking*

Transportation librarians and information services providers are connecting with a whole host of partners and resources—national transportation associations, state libraries and others—to solicit advice, expand collections and share best practices among a dynamic and engaged community of transportation information professionals. Highlighted below are some of the connections survey respondents are making.

AASHTO. Agencies are engaging with AASHTO to provide agency users with access to AASHTO digital publications. Complimentary copies of AASHTO digital downloadable publications are available to state DOT and associate members of AASHTO. For each publication, AASHTO members will receive access to a downloadable, printable PDF with five single-user licenses and five complimentary print copies of the publication that are sent to the agency a few weeks after receipt of the transmittal email.

AASHTO and TRB KM committees. In addition to participating in AASHTO RAC, research managers and their librarian colleagues participate, as a member or a friend, on the KM committees convened by AASHTO and TRB.

Advocacy groups. A few of the librarians surveyed mentioned participating in NTKN’s CoPs ([508 accessibility](#), [cooperative digitization](#) and [library advocacy](#)). (NTKN is an initiative of the NTL.) Several are also participating in the SLA Transportation Division.

Informal cooperative networks and other peer engagement. Informal cooperative networks such as [TRANLIB-L](#), the email discussion list now hosted at the University of Michigan, connect transportation librarians and information services providers with other transportation community members to ask questions and share difficult-to-source materials. Participation in the peer exchanges (40) periodically conducted by state DOT research programs is another way transportation librarians and research managers engage with and learn from others in the transportation community.

Library-related publications and professional development. One respondent keeps track of current developments through the online publication [Computers in Libraries](#), portions of which are freely available. Free webinars and forums sponsored by schools of library and information science can also be good sources of information about current trends.

Local and regional partners. State libraries are frequent partners with the transportation libraries in their home state, offering the benefit of both resources and staff support to bolster the transportation library. Historical societies and librarians at state universities also offer opportunities to network and share new ideas. State library associations and regional library councils offer opportunities for networking and resource sharing, as well as local and statewide training.

Caltrans Transportation Library participates in a California State Library program to scan historical materials. The agency also benefits from providing employee access to the state library’s electronic resources.

National Transportation Library. Several respondents reported submitting their agencies' research reports to [ROSA P](#), NTL's all-digital library. Others mentioned participating in the [Transportation Librarians Roundtable](#) (TLR), an NTL initiative co-sponsored by AASHTO, TRB and SLA. The TLR hosts a monthly web conference series on a variety of topics of interest. Still others commented on the [Springshare LibApps](#) platform, a central hub providing access to the LibGuides application. NTL supports access to LibApps for transportation libraries wishing to create their own LibGuides.

OCLC. One respondent mentioned engaging in resource sharing through [OCLC](#) locally, across North America and overseas. Other transportation libraries offering interlibrary loan and document delivery services may have resource-sharing arrangements with OCLC or other partners.

Other state DOT libraries. Some respondents have developed their own network of contacts with fellow state DOT librarians. For others, the relationships forged when regional TKNs were active will likely continue in a more informal manner and through the NTKN.

10 Summary of Findings

Maintaining and improving the nation's transportation systems is daunting. Daily lives depend on the safe, effective movement of people and goods. That movement depends on complex physical, mechanical and technical systems and their intersection with human behavior and preferences. Understanding these issues and finding effective and efficient solutions require knowledge of how problems have been solved before and how technology and current practices are advancing. As such, transportation research and knowledge sharing are ongoing priorities.

Making relevant research, institutional knowledge and other information available and accessible is a basic necessity for the public agencies charged with managing the transportation system. Whether through physical or digital information sources or a combination, transportation librarians and other information services providers play a vital role in ensuring that the agencies they serve have access to the credible, authoritative information needed to perform this critical work.

Over the past decades, the transportation, technology and information landscapes have changed, as have transportation agency resources and user preferences and expectations. Pushed by these technological and cultural changes, transportation libraries and information centers are evolving to meet challenges and take advantage of the opportunities presented by these trends. A sampling of the findings from this synthesis can inform a productive path forward for transportation libraries and information centers:

- Information services programs should be intentional in design, proactive in implementation and aligned with agency priorities and culture. A strategic planning exercise may assist in ensuring effective program development and management.
- Whether because of space constraints or other resource issues, changing scales of availability or user preferences, physical books and print information sources are ceding ground to digital collections and access.
- While digital collection development and management can be complex and challenging for many agencies, collaborations with a variety of external partners may have significant payoffs and greatly increase access.
- Individual access to resources is highly valued by agency staff, however, services provided by information professionals, such as literature searches and other research assistance, are extremely important to information services users and agency leaders.
- Education, outreach and demonstrating value are critical to a thriving information services program.
- Much of the information and experience pertinent to maintaining complex transportation systems resides with the legions of experienced staff transportation agencies currently employ. As these people retire, and in general across agencies, this knowledge needs to be identified, preserved and managed. Transportation libraries and information services programs are well suited to spearhead or participate in an agencywide KM program.
- Profound changes in external forces impacting transportation libraries and the contexts within which they operate are providing opportunities for reimagining the library. Libraries, in general, may need to transform into "information commons." (37)
- Just as information programs benefit from being intentionally aligned with overall agency strategy, proactively demonstrating this alignment and the overall value of the program can encourage ongoing support.

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