

# Transportation Knowledge Networks

**Leni Oman**

Director

Office of Research & Library Services

Chair

AASHTO RAC TKN Task Force

AASHTO IS 2009

May 5, 2009

Seattle, Washington



**Washington State  
Department of Transportation**

# Challenges

- Increasing retirements
- Changing demographics
- Unique knowledge
- Doing more with less

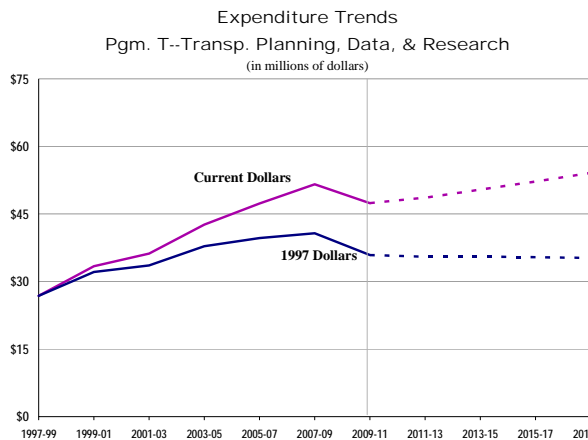
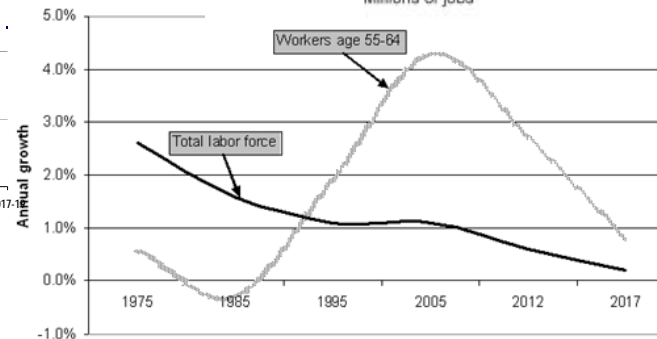
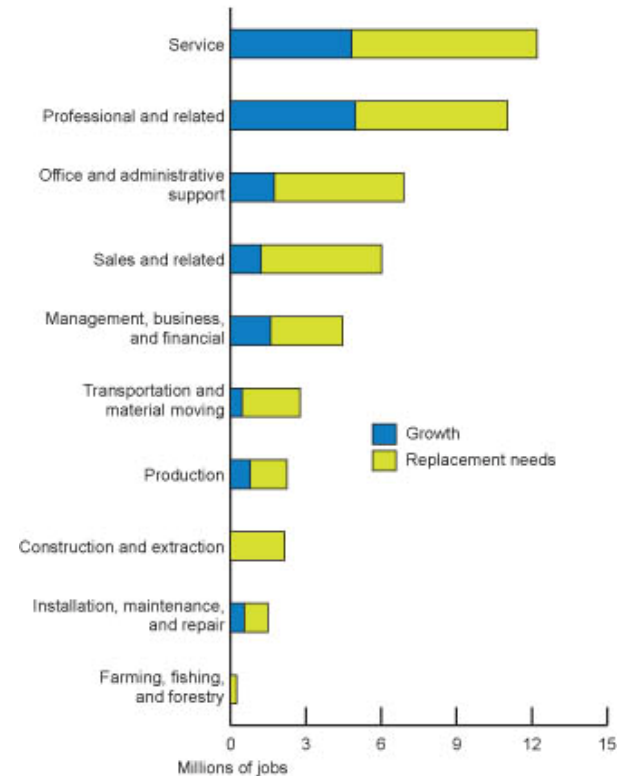


Chart 10. Number of jobs due to growth and replacement needs by major occupational group, projected 2006-16

Occupational Outlook Handbook, 2008-09 Edition

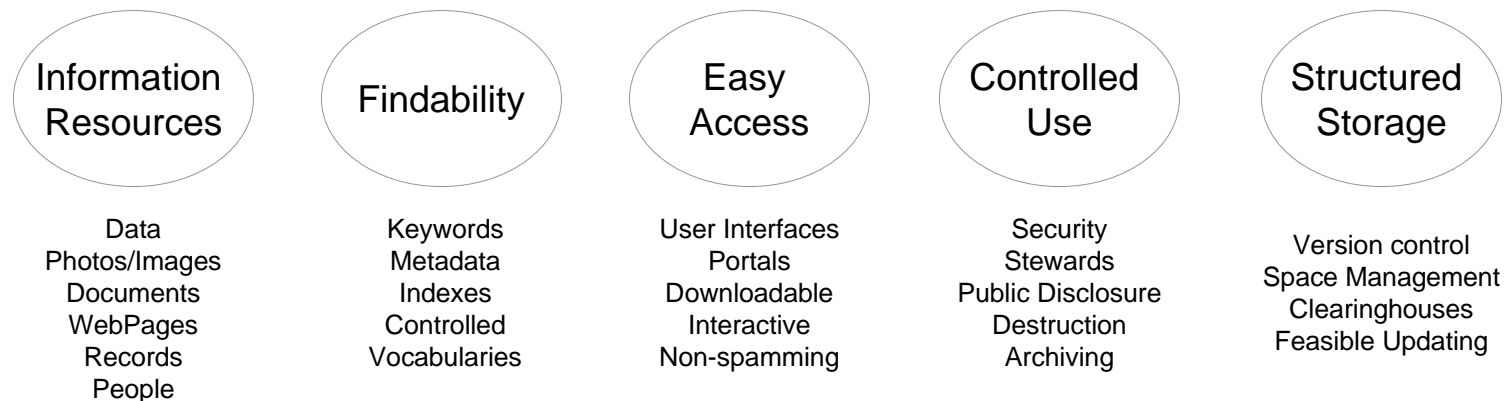


# What is Knowledge Management?

- The systematic processes by which knowledge needed for an organization to succeed is created, captured, shared, and leveraged.

*The Complete Idiot's Guide to Knowledge Management*

- Getting people the information they need, in the form they need it, when they need it.



# Types of Knowledge

*What individuals know  
Know how to do*

**HUMAN**

*Relationships between  
individuals/within groups*

**SOCIAL**

***Explicit***  
Can write  
down

***Tacit***  
Don't  
know  
you know

**STRUCTURAL**

*Embedded in systems,  
processes, tools & routines*

**CULTURAL**

*Collective understanding  
of how things are done*

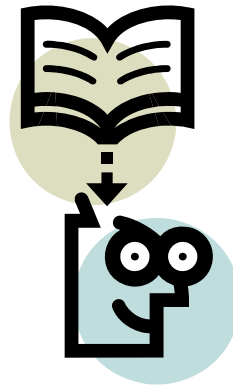
# A Knowledge Retention Culture

## Human Resources

- Risk identification
- Succession planning/career development processes
- Building a retention culture
- Policies to retain workers

## Information Infrastructure

- Technologies that intensify collaboration
- E-learning applications
- Support for problem solving
- Findability



## Knowledge Transfer

- Documentation
- Interviews/Debriefing
- Training
- Social Networks

## Knowledge Recovery

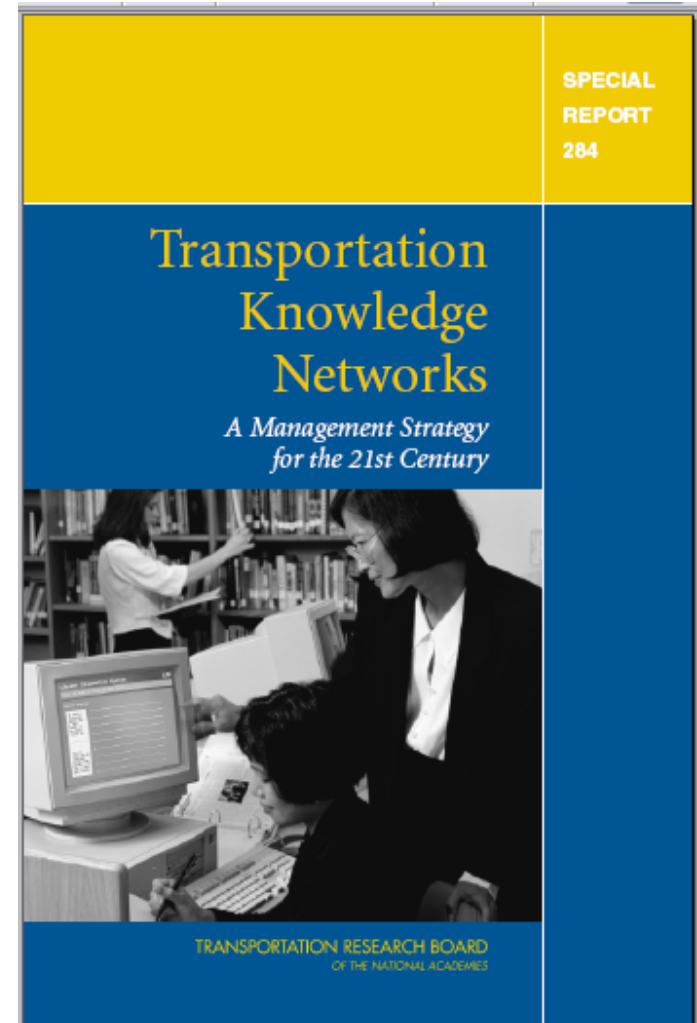
- Using retirees effectively
- Outsourcing
- Regenerating knowledge

# TRB Special Report 284

## Recommendations

- Proposed a network of Transportation Knowledge Networks with a National Coordinating Structure
- Need for a strong governing body to provide policy, oversight, and advocacy
- Seek broad-based funding support to sustain operations.
  - Provide federal grants for start up
  - Grow federal funds
  - Develop local match

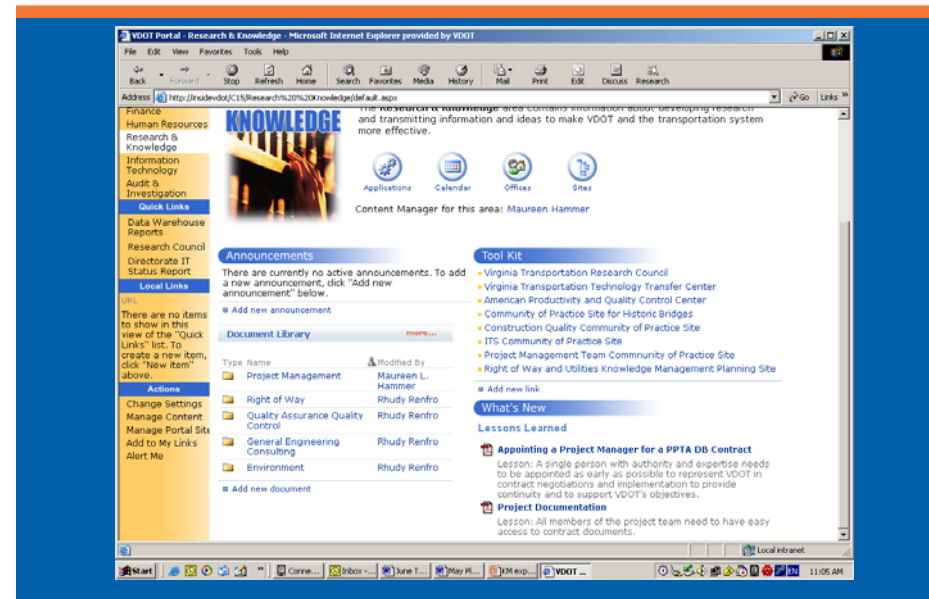
<http://onlinepubs.trb.org/Onlinepubs/sr/sr284ReportSummary.pdf>



# The Vision for Information

An employee, working at their desk  
needs information they don't have...

- Because of good marketing in the agency, they know where to turn to get the information.
- They open their Internet browser to the Information portal and find a user-friendly menu of options.
- They choose the service they are looking for such as a literature review; facts on file; agency templates; access to a database; etc...



# The Employee finds a User-Friendly Portal

- If they are searching for documents or data, the front end application asks them how they want to search for information –
  - geographically, topically, by title/author, or other formats.
  - This interface is visually engaging and easy to use.
  - With a click, they are taken to that search tool/aid (or they are all on the first page).
  - They type in their search phrase or point and click to icons and retrieve information. The databases/systems which are being searched is not belabored but are noted while the search is underway (Now searching BIOSIS...)

Library Catalog

TRAFFIC is in 9024 titles.  
There are 8793 entries with TRAFFIC.

SEARCH SUMMIT ADVANCED SEARCH

KEYWORD: Traffic All Libraries Search

Result page: 1 2 3 4 5 6 7 8 9 10 11 -- 733 Next

Save Marked Records Save All On Page

Num	Mark for BookClt	KEYWORDS (1-12 of 8793)	Year	Entries	8793 Found
1	<input type="checkbox"/>	08 BAC limit saves lives... why every state needs a .08 BAC law	1995?	1	
2	<input type="checkbox"/>	10 smart routes to bicycle safety	1993?	1	
3	<input type="checkbox"/>	101 drunk driving public information ideas... we're getting the word out and you can help	1985	1	
4	<input type="checkbox"/>	10th World Meeting, International Road Federation, Rio de Janeiro	1985?	1	
5	<input type="checkbox"/>	11000 by 2005... Partners in Progress... an impaired driving guide for action	1997	1	
6	<input type="checkbox"/>	11000 by 2005... partners in progress... an impaired driving guide for action	1997	1	
7	<input type="checkbox"/>	11000 by 2005... Partners in Progress... a national initiative on impaired driving	1998	1	
8	<input type="checkbox"/>	12/04 quarterly report up-date and instructions for the HCV evaluation and monitoring report	1995	1	
9	<input type="checkbox"/>	12 tools for improving mobility and managing congestion	c1991	1	
10	<input type="checkbox"/>	12th International Study Week, Traffic, Engineering and Safety, proceedings, 2-7 September 1974 / pa	1975	1	
11	<input type="checkbox"/>	13 ways to lose your life	1954?	1	
12	<input type="checkbox"/>	13th International Study Week, Traffic, Engineering and Safety, Montreal 11-16, September 1978	1978?	1	

Save Marked Records Save All On Page Locate in Results [8793]

Result page: 1 2 3 4 5 6 7 8 9 10 11 -- 733 Next

SEARCH ADVANCED SEARCH

Cooperating Libraries of Olympia, listing

Washington State Department of Transportation

TRAFFIC & ROADS PROJECTS BUSINESS ENVIRONMENTAL MAPS & DATA

## STATEWIDE TRAVELER INFORMATION

TRAFFIC & CAMERAS

- State View (home)
- Seattle Area
- Ferry Cameras
- Tacoma
- Olympia
- Vancouver
- Mount Vernon
- Bellingham
- Canadian Border
- Spokane
- Wenatchee

STATE TRAVEL INFO

- Travel Alerts & Slowdowns
- Mountain Passes
- Weather
- Construction
- Cross-State Travel Routes
- Winter Driving Tips
- Safety Rest Areas
- State Highway Map
- Interstate Exits
- Featured Services

ADDITIONAL INFO

- Bordering State Travel
- Driver & Vehicle
- Localities
- Washington State Tourism
- Contact Us
- Disclaimer

Check the Weather  
Check for Travel Alerts & Slowdowns (road conditions)  
Check the Mountain Passes

Ways to Get Around

Accessible Transportation | Airplane | Bicycle | Bus | Carpool | Compressed Work Week | Ferry  
Traffic & Roads | Train | Vanpool | Walk from Home | Walk to get around town

Click on a camera icon on the map at left or select a route number from the list below.

Interstate: I5 I82 I90 I205 I405

US Highways: US 2 US 12 US 97 US 97A US 101 US 195 US 395

State Highways: SR 2 SR 4 SR 8 SR 9 SR 14 SR 16 SR 17 SR 18 SR 20 SR 22 SR 28 SR 29 SR 104 SR 109 SR 163 SR 167 SR 169 SR 172 SR 204 SR 205 SR 211 SR 410 SR 433 SR 500 SR 512 SR 516 SR 518 SR 520 SR 522 SR 524 SR 525 SR 526 SR 527 SR 539 SR 543 SR 548 SR 599 SR 900 SR 902 SR 904

Other Cameras: US - Canadian Border Earle's Airport City & County Cams

Not sure which route number you need? View our route description list.

WSDOT Traveler Information System



# The Portal Tools Help Refine the Search

- Can select output: narrative, tabular, geospatial data, or all. To help refine the search questions our librarians typically ask are programmed into the system.
- The results are provided in good English without cryptic abbreviations.
- When the site includes data references, the data platform, relevant uses, authorized users are identified.
- Once they find the data they want, they can save information under a custom account.

The screenshot shows the Washington State Department of Transportation Research Office website. The header includes navigation links for News, Search, Contact WSDOT, and WSDOT Home. Below this is a green bar with the text "RESEARCH OFFICE" and a link for "Another Search?". The left sidebar contains two sections: "RESEARCH OFFICE" with links to Research Home, Library, Funding, Search, Research Staff, Map & Directions, and Contact WSDOT; and "HOT TOPICS" with links to Cool Tools, Staff Recommendations, and Recent Reports. The main content area, titled "Search Results", shows "9 items found." and a list of search results. Each result includes a score, title, and address. The results are as follows:

Score	Title	Address
82%	WA-RD 252.1 USE OF RECYCLED MATERIALS IN HIGHWAY CONSTRUCTION (2/92)	<a href="http://www.wsdot.wa.gov/research/onepages/WA-RD2521.htm">http://www.wsdot.wa.gov/research/onepages/WA-RD2521.htm</a>
80%	Application of the KD-Stiffness Method to Reinforced Soil Wall Limit States Design	<a href="http://www.wsdot.wa.gov/research/onepages/WA-RD5281.htm">http://www.wsdot.wa.gov/research/onepages/WA-RD5281.htm</a>
80%	PCCP Intersections Design and Construction in Washington State	<a href="http://www.wsdot.wa.gov/research/onepages/WA-RD5031.htm">http://www.wsdot.wa.gov/research/onepages/WA-RD5031.htm</a>
80%	A FRAMEWORK FOR WSDOT PAVEMENT RESEARCH	<a href="http://www.wsdot.wa.gov/research/onepages/WA-RD4921.htm">http://www.wsdot.wa.gov/research/onepages/WA-RD4921.htm</a>
80%	WA-RD 259.2 1993 TOUR OF MODIFIED BINDER PAVEMENTS (3/94)	<a href="http://www.wsdot.wa.gov/research/onepages/WA-RD2592.htm">http://www.wsdot.wa.gov/research/onepages/WA-RD2592.htm</a>
80%	WA-RD 259.1 1991 TOUR OF MODIFIED BINDER PAVEMENTS (3/92)	<a href="http://www.wsdot.wa.gov/research/onepages/WA-RD2591.htm">http://www.wsdot.wa.gov/research/onepages/WA-RD2591.htm</a>
80%	WARD Number Report List	<a href="http://www.wsdot.wa.gov/research/onepages/indexnew.htm">http://www.wsdot.wa.gov/research/onepages/indexnew.htm</a>
80%	WSDOT - Search Engine for WSDOT Research Reports	<a href="http://www.wsdot.wa.gov/research/onepages/indexnew.htm">http://www.wsdot.wa.gov/research/onepages/indexnew.htm</a>
77%	WA-RD 315.1 STATISTICAL METHODS FOR WSDOT PAVEMENT AND MATERIAL APPLICATIONS (9/93)	<a href="http://www.wsdot.wa.gov/research/onepages/WA-RD3151.htm">http://www.wsdot.wa.gov/research/onepages/WA-RD3151.htm</a>

# Information is Accessible

- Documents/data can be retrieved by point and click on the retrieved search list and the application highlights the specific text relevant to their search.
- Because the documents and data are tagged, they are able to find specifically what they're looking for.
- The behind the scenes effort to obtain, catalog, index/tag, store information is not obvious.
- The employee is able to pull quotes for the documents with prompts to help them understand copyright laws and appropriate uses/references.

# Most of the Time...

- If a document is not available electronically, the user is offered a menu for delivery
  - Interlibrary loan
  - Electronic document deliver
  - Purchase of paper copies

This document is available to the public through the National Technical Information Service, Springfield, VA 22616.

Washington State  
Department of Transportation

News Search Contact WSDOT WSDOT Home

TRAFFIC & ROADS PROJECTS BUSINESS ENVIRONMENTAL MAPS & DATA

**RESEARCH OFFICE**

**RESEARCH OFFICE**

[Research Home](#)  
[Library](#)  
[Funding](#)  
[Search](#)  
[Research Staff](#)  
[Map & Directions](#)  
[Contact WSDOT](#)

**HOT TOPICS**

[Cool Tools](#)  
[Staff](#)  
[Recommendations](#)  
[Recent Reports](#)

**IMPACT OF HIGHWAY IMPROVEMENT ON  
PROPERTY VALUES IN WASHINGTON**

by

**Social and Economic Planning Section Public Transportation and Planning  
Division, Department of Transportation in cooperation with the Land  
Management Office, Department of Transportation**

**1980**

This study analyzed the beneficial effects of a highway on the values of surrounding properties by determining the real estate price trends in areas where a highway was constructed and comparing these trends with those in comparable areas which did not experience such changes. There were four residential areas utilized for parts of this study: Kingsgate east of Lake Washington on I-405, north King County along I-5 north of Seattle city limits, Spokane near the east city limits along I-90, and the southeast section of Puyallup along SR 512. Because of the lack of an adequate control area for the Spokane study, only the other three areas were used for the benefit estimation.

35 pages

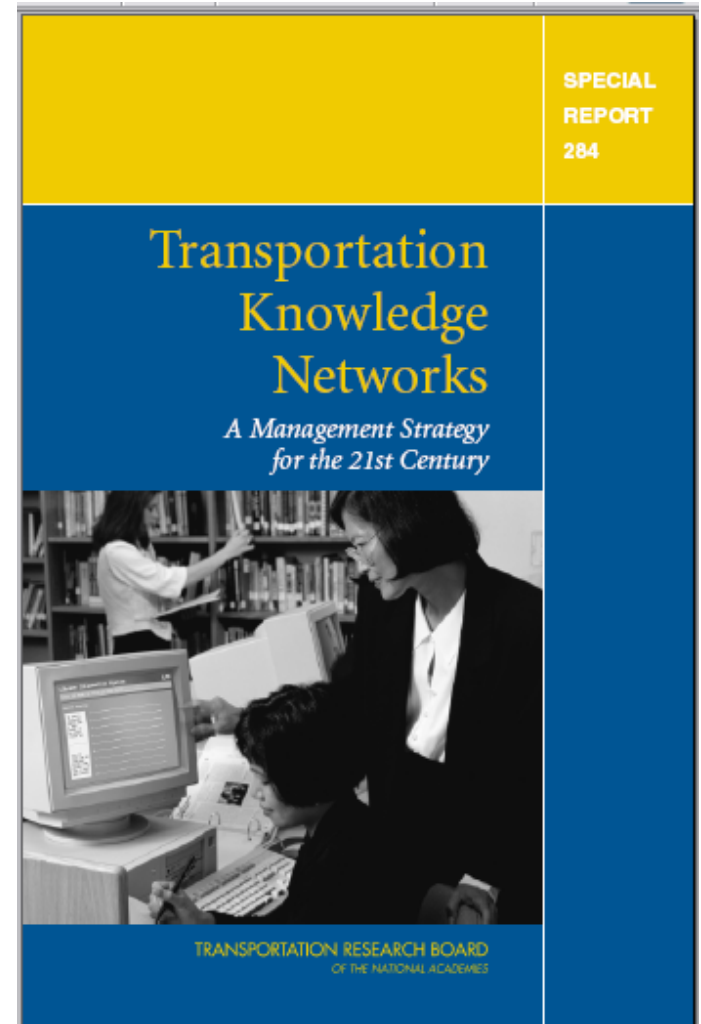
Note: This study was conducted in cooperation with the U. S. Department of Transportation, Federal Highway Administration.

This document is available to the public through the National Technical Information Service, Springfield, VA 22616.

# Special Report 284

## Next Steps

- Develop a business plan
- Determine which office should manage the coordinating structure.
- Provide a strong governance body for the coordinating structure.



# Implementing Transportation Knowledge Networks (NCHRP 20-75)

- Follow up project funded in 2007
- Creates a business plan that:
  - Frames the problem
  - Describes potential solutions
  - Helps communicate the value of a Transportation Knowledge Network
- Principal Investigator:
  - Frances Harrison, Spy Pond Partners
  - <http://www.cts.umn.edu/Research/Featured/NCHRP20-75/>

# AASHTO Standing Committee on Highways

**Transportation Knowledge Networks - A Vision**  
Your trusted source for transportation information

A service of the  
National Transportation Library

[About](#) | [Contact](#)

**Transportation Topics**  
Start here with up-to-date resources on over 1000 topics

**Search Tools**  
Find specific information using customized search tools

**News**  
Search and subscribe to news stories

**Events**  
Find upcoming events and training

**Directories**  
Find contacts in DOTs, Universities, and Firms

**Acronyms & Glossary**  
Look up the meanings of common and uncommon acronyms and terms

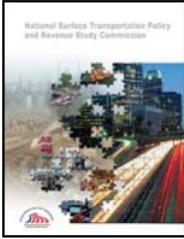
**Communities of Practice**  
Connect with colleagues who share your interests

**CURRENT NEWS**  
[Check out the new alerts services from TKNs](#)  
[New Resource: NTL Integrated Search](#)  
[Search over 19,000 citations for Environmental Impact Statements, provided to TRB by Northwestern University](#)  
[More news](#)

**ASK A QUESTION**  
Get expert help

**FIND AN EXPERT**  
Use our directory information to find people with specialized knowledge or skills

**SUBMIT RESOURCES**  
Share your reports, best practices, tips, stories, and more

**FEATURES**  


**New Report: Transportation for Tomorrow**  
The National Surface Transportation and Revenue Study Commission has released its Report to Congress.  
[View the Report](#)

**UPCOMING EVENTS**  
May 4 - May 8, 2008  
AASHTO Spring Meeting

A survey of SCOH members was conducted in May of 2008. **85% of the respondents thought a TKN would add value for transportation agencies.**

Do you think that a transportation knowledge network/information portal would add value for transportation agencies?		
Yes	85.2%	23
No	0.0%	0
Don't Know	14.8%	4
If you answered No or Don't Know, please explain:		4

If a national transportation information portal were created, what types of content would be useful for the scope of responsibilities you manage?		
Industry Standards and Guidelines	59.3%	16
Current Policies and Procedures	81.5%	22
Data sources	48.1%	13
Directory of transportation professionals across the nation	63.0%	17
Research reports	74.1%	20
State of the practice/Lessons Learned resources	88.9%	24
Key transportation facts (gas tax by state, which states are using	96.3%	26
Event data (national and regional meetings and conferences)	33.3%	9
Other (please specify)		1

# Key Findings – Desired TKN products & services

- One stop shopping for transportation information
- Improved search tools
- Value-added services to filter & annotate information (address information overload)
- Peer-to-peer sharing of best practices
- Capture of “missing” information resources
- Greater access to digital documents
- Cataloging to enable sharing of documents across organizations
- Preservation of information resources to ensure continuing availability

# **Key Findings**

## **Recommended Approach to Implementing TKNs**

- Employ a mix of strategies – no single element alone will be effective
- Emphasize role of the National coordination function, clarify role of the regional TKNs
- Use “hot topics” and innovation to demonstrate value
- Emphasize efficiency benefits
- Incorporate both centralized and decentralized elements
- Establish clear accountability

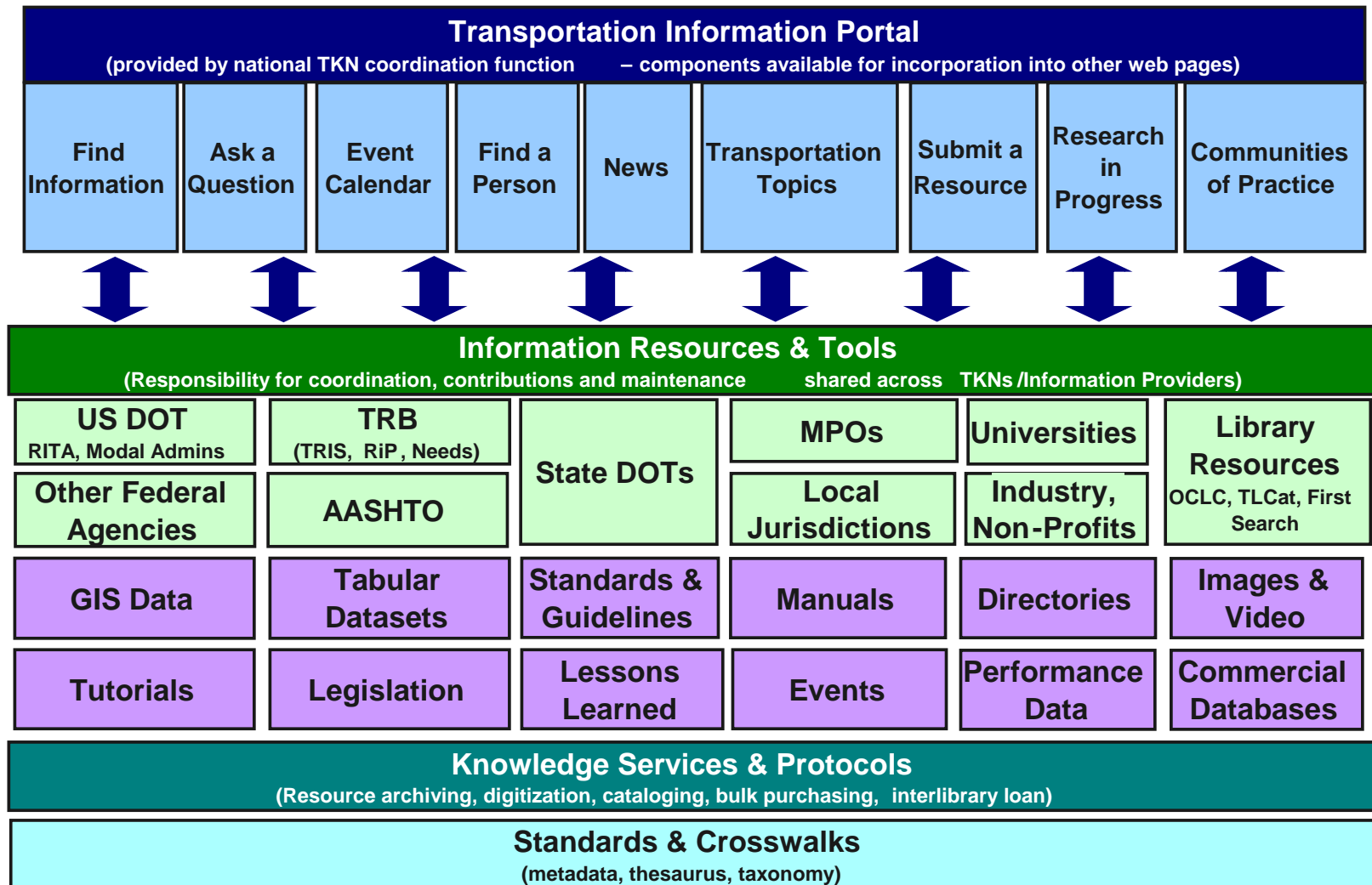


# NCHRP 20-75 Business Plan

- **Context Section**
- **Background**
- **Mission, Goals and Objectives**
- **Market**
- **Products and Services**
- **Stewardship Model**
- **Costs** – \$13.5 million per year
  - \$7.9 mill for content
  - \$3.1 mill technical/administrative infrastructure
  - \$1.5 mill outreach/education
  - \$1 mill research/literature review services
- **Funding Source**

<http://www.cts.umn.edu/Research/Featured/NCHRP20-75/businessplan.html>

# Overview of TKN Products & Services



# The TKN Ten Products and Services

1. National Digital Repository
2. National Print Repository
3. National Transportation Portal with Federated Search
4. Information Modules
5. Research/Literature Review Services
6. Standards Coordination & Thesaurus
7. Targeted Collection & Digitization Efforts
8. Information Provider Outreach, Coordination and Communication
9. Library Connectivity Support and Advocacy
10. User Outreach & Education

# Recommended Next Steps

1. Continue broad outreach
2. Continue to expand the communications toolkit
3. Use NCHRP (20-75A) *Directory of Transportation Libraries and Information Centers* - to extend the TKN and awareness of the TKN initiative.
4. Encourage state champions to meet with senior management to brief them on the TKN initiative and its potential benefits

# More from NCHRP 20-75

[One-page summary of project](#)

[Listen to testimonials](#)

[View & Listen to an overview presentation as a PDF](#)

And much more:

<http://www.cts.umn.edu/Research/Featured/NCHRP20-75/>

# Transportation Knowledge Networks



**RITA**

U.S. Department of Transportation | Research and Innovative Technology Administration  
National Transportation Library

<http://ntl.bts.gov/networking/national.html>

## Western

**TKN**  
9 States  
16 Orgs



## Midwest

**TKN**  
9 States  
15 Orgs



**REGION 1**



## Eastern

**TKN**  
6 States  
13 Orgs



# **AASHTO Research Advisory Committee on Transportation Knowledge Networks Task Force**

## **Goal**

Serves as a forum to develop the concept, understanding, and application of transportation knowledge networks for the transportation sector. The AASHTO RAC TKN TF advocates and supports the rapid and efficient exchange of information resources through development of strategies and the innovative use of technology.

# Task Group Membership

1. AASHTO RAC Region 1 – 2 members (Massachusetts & Vacant)
2. AASHTO RAC Region 2 – 2 members (Virginia & Louisiana)
3. AASHTO RAC Region 3 – 2 members (Kansas & Wisconsin)
4. AASHTO RAC Region 4 – 2 members (Washington & Oklahoma)
5. Research and Innovative Technology Administration, National Transportation Library
6. Federal Highway Administration
7. Transportation Research Board
8. Council University Transportation Center
9. Special Library Association Transportation Division
10. Eastern TKN
11. Midwestern TKN
12. Western TKN
13. TRB Committee on Library and Information Science for Transportation



# TKN TF Goals

1. Support the formation of the transportation knowledge network to address business needs.
2. Advocate for an effective TKN and supporting information infrastructure.
3. Enhance knowledge exchange within the transportation community.
4. Develop strategies to actively monitor, support, and encourage methods for effective creation, capture, synthesis, transfer, application, and preservation of transportation knowledge.

# TKN TF 2009 Activities

- 1) Articulate the concept and value of knowledge networks and quality library and information services.
  - Before and after descriptions
- 2) Explore and Advocate for sustained funding.
  - [AASHTO Reauthorization request](#)
- 3) Describe a successful TKN model for transportation, including definitions of best practices.
- 4) Develop strategies to capture knowledge and retain institutional memory from retiring and other departing employees.

# How Can AASHTO IS Help?

- Participation in building the vision
  - Best technology and data strategies
  - Metadata
- Advocacy
- Joint leadership?
- Success stories – ROI
- Work the vision
- Other ideas?

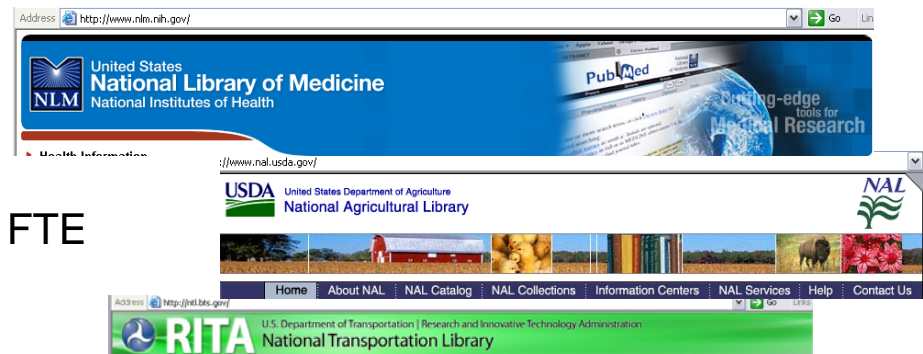
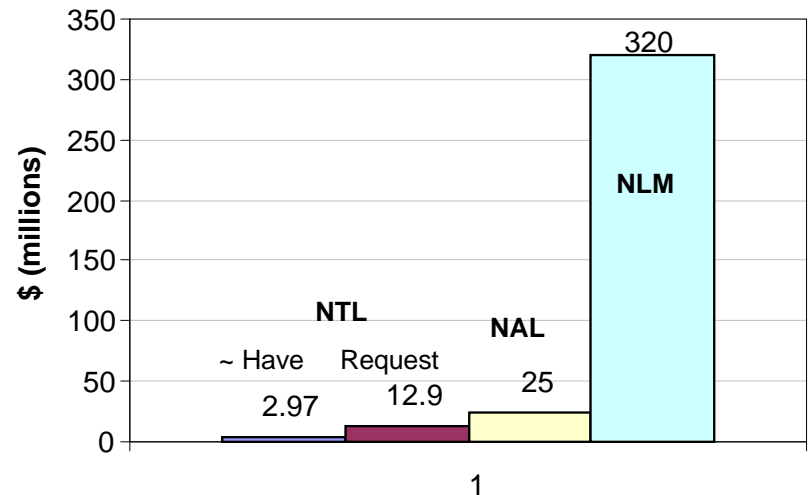
# **A Special Note on Findability**

- Not easy to find the information.
- Internet searches only access ~16% of available information resources
- Full text searching doesn't find most related terms
- Version control management challenges
- “Hidden” communities

# How Do We Compare?

- **National Library of Medicine**
  - MeSH 23,000 terms,
  - >150K supplementary records, thousands of cross references
  - 11 staff managing the thesaurus
  - Index over 4800 professional journals
  - PubMed and MedLinePlus
- **National Agricultural Library**
  - NALT >68,500 terms
  - 7 staff managing the thesaurus
  - Have indexed over 4 million records
  - Custom user interfaces
- **National Transportation Library**
  - TRT <10,000 terms
  - Indexing is a part time duty between 4 FTE
  - 600,000 records in TRIS
  - Very limited customer user interfaces

Annual Library Budget



# Metadata & the TRT

While we're waiting for the semantic web...

- Common metadata to help us find relevant, related information regardless of source
- Uses & limits of “machine language”
- Common language

*“I am hoping that someday a portal would be developed that would prompt the user for keywords AND decisions which would help to refine the quest into a more defined and narrow search.”*

ORGANIZATIONAL
CATEGORICAL
JURISDICTION or LOCATION
JUSTIFICATION
COMPLIANCE
TIME or SCHEDULE
DELIVERABLES/ RESOURCES/TOOLS

# Why Add Library Science?

- Standards for vocabulary and data definitions (ISO -11179 Metadata Repositories, ANSI/NISO Z39.19-2005)
- Experience describing information and documenting it
- Familiarity with user queries
- Familiarity with search techniques and experiences
- Centuries of knowledge development



# Reauthorization

AASHTO Standing Committee on Research and CEO Board of Directors approved a recommendation for reauthorization to establish a Transportation Knowledge Network

- Facilitate the development and implementation of Transportation Knowledge Networks
- Broaden the mission of the National Transportation Library
- Establish an advisory committee on transportation information
- Proposed Funding Level: \$13.5 million per year

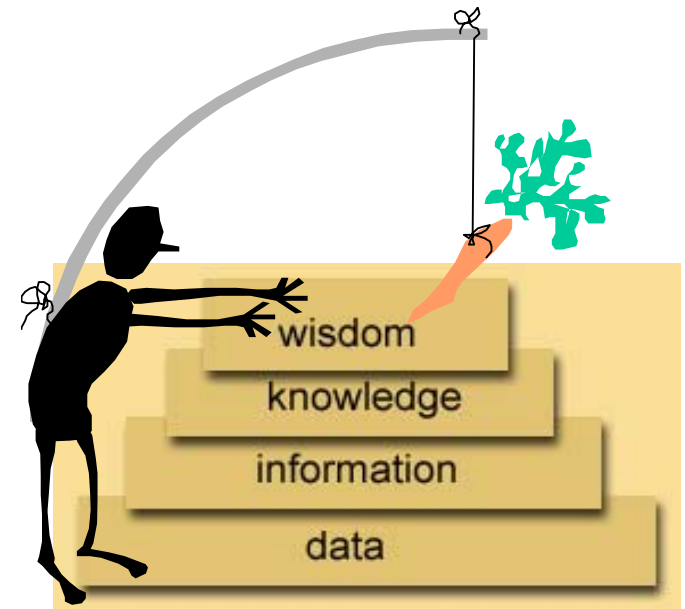
[AASHTO Reauthorization request](#)



# The Time is Right

With revenues tightening  
efficient access to information  
is even more important.

- Saves time
- Saves money
- Improves decision support
- Helps us communicate with constituents



**Wisdom:** The capacity to choose worthwhile objectives

**Knowledge:** The ability to use information to achieve objectives

**Information:** Structured data

**Data:** Pure and simple facts

<http://www.systems-thinking.org/dikw/dikw.htm>

# Resources

- Federal Knowledge Management Working Group  
<http://wiki.nasa.gov/cm/wiki/?id=1926>
- AASHTO RAC TKN Task Force  
<http://cms.transportation.org/?siteid=55&pageid=2449>
- *Lost Knowledge: Confronting the Threat of an Aging Workforce*  
David W. DeLong
- *Ambient Findability: What We Find Changes Who We Become*  
Peter Morville
- *Complete Idiot's Guide to Knowledge Management*  
Melissie Clemmons Rumizen
- *Driving Results Through Social Networks: How Top Organizations Leverage Networks for Performance and Growth*  
Rob Cross and Robert J. Thomas

# Contact Information

**Leni Oman**

Director, Office of Research and Library Services  
Washington State Department of Transportation

[OmanL@wsdot.wa.gov](mailto:OmanL@wsdot.wa.gov)

360-705-7974