Leadership Guide for Strategic Information Management for State DOTs

NCHRP Report 829

Information Age | Strategic IM | Charting a Course | Equipping the Org. | Implementing Change | Resources
NCHRP is a State-Driven Program

• Sponsored by individual state DOTs who
  - Suggest research of national interest
  - Serve on oversight panels that guide the research.

• Administered by TRB in cooperation with the Federal Highway Administration.
Practical, ready-to-use results

- Applied research aimed at state DOT practitioners
- Often become AASHTO standards, specifications, guides, syntheses
- Can be applied in planning, design, construction, operations, maintenance, safety, environment
Additional NCHRP Publications Available on this Topic

- NCHRP Report 813: A Guide to Agency-Wide Knowledge Management for State Departments of Transportation
- NCHRP Report 754: Improving Management of Transportation Information

You can learn more about this and other publications by visiting www.trb.org
Today’s Speakers

• Doug Couto, *Project Overview and Key Trends*
• Gary Allen, *Strategic Information Management: Challenges and Opportunities for DOTs*
• Frances Harrison, *Guide to Strategic Information Management: An Overview*
2014 CEO Forum:
“Data is the currency of the future’s automated and connected vehicle environments.”

State DOT CEO Leadership Forum A Focus on Transportation Futures
Participant List

Bud Wright, Executive Director, AASHTO
Robert Arnold, Director, Office of Transportation Management, FHWA
Jim Wright, AASHTO
Gummada Murthy, Assistant Director Engineering, AASHTO
Tom Hufnagel, AASHTO
John Halikowski, Director, Arizona DOT
Dr. Anne Ellis, Arizona DOT
Malcolm Dougherty, Director, CalTrans
Donald Hunt, Executive Director, Colorado DOT
Shailen Bhatt, Secretary, Delaware DOT
Ananth Prasad, Secretary, Florida DOT
Keith Golden, Commissioner, Georgia DOT
Paul Trombino III, Director, Iowa DOT
Mike Hancock, Secretary, Kentucky DOT
Kirk Steudle, Director, Michigan DOT
Mike Flynn, Assistant Director, Ohio DOT
Michael Lewis, Director, Rhode Island DOT
Carlos Braceras, Director, Utah DOT
John Barton, Deputy Executive Director, Texas DOT
Jason Sims, KC Scout Traffic Center Manager, Missouri DOT
Claire Depre, European Commission
Chris Herrick, Director of Planning and Development, Kansas DOT
Transportation and Technology Trends

**Smart City Trends:** transparency, citizen engagement, generational divides, economic divides, collaboration, shared services, cyber risks, mobile first, cloud first, 311 services, rapid growth of eGovernment, alignment of IT strategy with legislative and executive priorities, crowd sourcing, customer relationship management, multi-jurisdictional initiatives, efficient government, continuity of operations (dealing with disasters including cyber threats), and promoting innovative solutions.

**Transportation Trends:** shared mobility, smart transportation corridors, growth of shared infrastructure and deployment of transformational technology.

**Technology Trends:** social media, mobility, analytics (Big Data), cloud, sensors (IoT) everywhere, connectivity, customer relationship management tools, maturing communications infrastructure, electronic and mobile payment systems, and cybersecurity.

All Takes Data and Information!
Texas Mobility Summit
(December 2016)

• Smart Cities
• Smart State
• Smart Transportation
and more

Data and Information Management Identified as Highest Priority.
Organization Trends

AASHTO
• Data Management and Analytics Committee
• Knowledge Management Committee

State DOT’s
• Florida
• Virginia
• Texas
Strategic Information Management: Organization for now and the future

- Maximize value from available information
- Maximize the efficiency of information collection and use
- Improve organizational readiness
Goal: Access to information in an integrated fashion

A Rapidly Changing Picture

Shift from paper to digital formats = Opportunity

- Managers: see relevant information about agency performance
- Staff: see information about their projects, “self-service”
- Stakeholders: see information on funding, travel options, projects
- Records/Admin Offices: respond efficiently to FOIA requests
Information is a Strategic Asset

- Improve agency decision making
- Improve safety, efficiency, accessibility
- Identify transportation improvement requirements
- Real time system management
- Improve response for storms and major events
- Provide real-time travel information
- Internal efficiencies
- Communication of agency accomplishments
- Improve accountability & transparency
What are the Challenges?

- Information Silos
- Ownership competition
- Fragmented Information Management Responsibilities
- Information “Findability”
- DOT Organizational Culture out of sync with effective strategic information management
- Information Security and Privacy
- IT Challenges – Legacy systems, Centralization
- Data rich, information poor
To bring the right information, to the right people, in the right form, at the right time

Why? To make wise choices that stand the test of time

- Importance of Leadership
  - DOT leaders need to understand the goal and support the effort
The Roadmap to Strategic Information Management
Definitions

• Information
  – Refers to both raw data and processed or packaged data
  – Includes multiple forms: data files, reports, web pages, pictures, videos, maps, email...
Definitions

• Information management
  – The means by which an organization efficiently plans, collects, creates, organizes, uses controls, stores, disseminates and disposes of information and ensures that the value of that information is understood and fully exploited.
Information Management and IT Management

Information Management

Information Technology Management
Data, Content and Records Management
9 Step Process

• Charting a Course
  • Step 1 Establish a vision for Information Management (IM)
  • Step 2 Assess the current state of IM
  • Step 3 Create a coordinated agency plan

• Equipping the Organization
  • Step 4 Establish leadership
  • Step 5 Establish policies
  • Step 6 Establish a process for evaluation

• Implementing and Sustaining Change
  • Step 7 Implement IM services and technology
  • Step 8 Foster culture changes, build workforce capabilities
  • Step 9 Monitor progress and adjust strategies
Charting a Course

Step 1: Establish a vision for Information Management

• Process: Involvement of Stakeholders
  – Leadership Team
  – Representatives of major departments
  – Representatives of IM and technology functions
  – Representatives of major data programs

• Content: Focus on desired outcomes
Charting a Course

Step 2: Assess the state of Information Management

Step 2.1 Review the Existing Business Plans and Policies
   *Discover gaps and inconsistencies*

Step 2.2 Conduct an Assessment
   *Identify unmet needs, risks, and areas for improvement*

Step 2.3 Summarize Results
   *Develop picture of needs and priorities*

“What problems are we trying to solve?”
Charting a Course

**Step 3**: Create a coordinated plan for Information Management

- **Step 3.1** Establish Goals and Objectives
  - *Practical, Implementable Actions*
- **Step 3.2** Identify Current Initiatives
- **Step 3.3** Identify Strategies
  - *Ex. Changes to decision making structures; investment in technology; building workforce awareness, skills, capabilities*
- **Step 3.4** Set Priorities
- **Step 3.5** Develop a Roadmap
  - *Sequence of activities within a timeframe*
- **Step 3.6** Assign Responsibilities and Track Implementation
Equipping the Organization

**Step 4:** Establish leadership and governance structures

- **Step 4.1 Establish Executive Accountability**
  *Balanced governance, executive support and roles*

- **Step 4.2 Designate Governance Leadership Team**
  *Oversight body, policy and guidance*

- **Step 4.3 Define Roles and Responsibilities**
Equipping the Organization

Step 5: Establish Information Management policies

Step 5.1 Define Information **Categories**
*Consistent categories and classifications*

Step 5.2 Establish Information **Storage** Policies
*Where to store data and for how long*

Step 5.3 Establish **Life Cycle** Management Activities

Step 5.4 Establish **Standardization** and Integration Policies
*Master data, geospatial data management*
Equipping the Organization

Step 6: Establish a process for evaluating new information initiatives

Evaluation and Prioritizing Options:

• Agency-wide evaluation?
• Decentralized approval?
• Annual agency-wide budget?
• Project Nominations?
Implementing and Sustaining Change

Step 7: Implement Information Management Services and enabling technologies

Establish standards and processes to implement consistent structure for classifying, defining, describing, integrating and finding data and information.
Implementing and Sustaining Change

Step 7: Implement Information Management Services and enabling technologies

Key Services:
1. Architecture and Standards
2. Records and Content Management
3. Library Services and Information Provisioning
4. Metadata and Terminology Management
5. Enterprise Search
6. Data Integration, Reporting and Analytics
Implementing and Sustaining Change

Step 8: Foster culture change and build workforce capabilities

1. Strategic hires to build technical capabilities
2. Introduce people who can motivate behavioral changes
3. Updating employee position descriptions
4. Proactively identify people with IM skills
5. IM Community of Practice
6. Information literacy training

Communicate, Motivate, Train
Implementing and Sustaining Change

Step 9: Monitor progress and adjust strategies

Information Management is a continuous improvement process requiring:

- Regular updates
- Course corrections

Apply a Management Framework
- Identification of successes
Summary
The leadership guide provides a 9 step process to chart, equip and implement strategic information management.

It’s a roadmap to focus limited DOT resources to improve information management and turn it into a valued agency asset.

Each agency can tailor the guide to meet its unique situation.

Thank you.
Questions from the Audience
Leadership Guide for Strategic Information Management

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More Information
OTHER TRB RESOURCES
(There is a growing body of NCHRP work on the topics of data, information, and knowledge management at state DOT’s)

• NCHRP Document 221, Protection of Transportation Infrastructure from Cyber Attacks: A Primer (Web Only).
• NCHRP Report 846 Improving Findability and Relevance of Transportation Information (NCHRP Project 20-97) – publication pending.
Common Terms Defined

- **DOT Information Management.** The means by which a DOT efficiently plans, collects, creates, organizes, uses, controls, stores, disseminates, and disposes of transportation information and ensures that the value of that information is understood and fully exploited.

- **DOT Knowledge Management.** The means by which a DOT builds, sustains and leverages the know-how and experience of its employees and partners to deliver transportation projects and services and manage the systems for which they are responsible.

- **Data.** Representation of facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing by humans or computers. (Source: Association for Information and Image Management (AIIM)). Example: a crash record.

- **Information.** Data and documents that have been given value through analysis, interpretation or compilation in a meaningful form (Source: AIIM). Example: A map showing high crash locations.

- **Knowledge.** The basis for a person’s ability to take effective action or make an effective decision. Example: a safety professional’s understanding of what countermeasures would be appropriate in different situations.

- **Content.** Information objects stored in a variety of formats and available for retrieval, re-use and publication. Content includes text, images, office documents, graphics, drawings, web pages, email, video, audio and other rich media assets. (Source: Adapted from AIIM)

- **Findability.** The art and science of making useful content easy to find, for example applying metadata, taxonomies and other organizing tools, and search technologies. (Source: AIIM)

- **Information Governance.** The accountability for the management of an organization’s information assets in order to achieve its business purposes and compliance with any relevant legislation or regulations (Source: adapted from AIIM)
Common Framework Element: Knowledge and Information Life Cycle
Speaker Biographies
Doug Couto

Doug Couto is a leader in information technology and transportation. He is the former Chief Information Officer of the Michigan Department of Transportation, past Chair of the Information Systems and Technology Committee of the Transportation Research Board (TRB), Director of Information Management for the Air Force Intelligence Agency and currently is a Senior Fellow at the Center for Digital Government. His focus is on public sector technology innovations in transportation and digital cities. He remains active with the transportation technology community as a member of the International Program Committee for the ITS World Congress, and a member of the TRB Information Systems and Technology and Cybersecurity Committees. He was the panel chair for the National Cooperative Highway Research Program (NCHRP) Report 829 that produced a Leadership Guide for Strategic Information Management for State Departments of Transportation.
Frances Harrison

Frances Harrison is Chief Technical Officer and co-founder of Spy Pond Partners, LLC. She has over 35 years of transportation consulting experience, and currently focuses on improving transportation agency decision support through a combination of information systems and business process improvements. Her career has encompassed significant breadth of topic areas including data, information and knowledge management; transportation performance management; asset management; pavement management; transportation maintenance and operations; corridor planning; paratransit, and project evaluation. Ms. Harrison has authored over 100 research reports, design documents, user manuals and handbooks.
Dr. Gary Allen was formerly the Director of the Virginia Transportation Research Council. He also served on executive staff at VDOT as Assistant Commissioner for Research, Technology, and Information Systems from 2002-2011. From 2011 until present, Dr. Allen has been doing private consulting in transportation research and information technology. He is the author of 20+ refereed publications. Dr. Allen has served as chairman of several NCHRP Panels and TRB Committees, and was a member of the AASHTO Standing Committee on Research.