

## **The New and Transformational Role of Information Technology Executives at State Departments of Transportation**

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### **Sponsors:**

- TRB ABJ50 Information Systems and Technology Committee
- AASHTO Subcommittee on Information Systems (ASIS)

### **Scope:**

The responsibilities of information technology executives at state departments of transportation (DOTs) have traditionally been focused on the maintenance and operations of their agency's computer systems. Undoubtedly, the advancements and acceleration of technology at transportation agencies has led to needed changes in the roles and responsibilities of the chief information officers (CIOs), IT administrators, and IT managers.

The rapid advancement of information and communication technologies has had a significant impact on the way state DOTs conduct business and communicate with their customers and users of the transportation system, and their vendor partners. Several paradigm shifts are underway that are profoundly changing how state DOTs conduct business such as connected/autonomous vehicles (CAVs), unmanned aerial vehicles (UAVs), 3D project design and delivery driven by technologies such as Civil Integrated Management (CIM). Other technologies impacting DOTs include real-time data sources from smart field devices such as smart signal controllers and RFID devices, and vehicle to infrastructure (V2I) datasets. These technologies are in the early stages of deployment and are expected to expand data and technology needs at state DOTs by several factors of magnitude in the near future.

Faced with limited resources, stagnating and declining manpower, and a trend to centralize technology functions, state DOTs require a new leadership approach to manage the complex demands of their information technology support services. DOT information technology executives need to move from a tactical focus which centers on the demands of day-to-day IT operations to a more strategic focus centering on the emerging technologies that are needed to meet the agencies mission and goals. Issues of strategic importance include topics such as data governance, mobile technologies, knowledge management, organizational change management, application modernization, and other applied technologies (ITS) to support the ever-changing needs of DOTs.

Although some studies on the changing role of information technology executives have been completed, these mostly focus on private industry. There is limited guidance and information available that outlines current successful practices at DOTs needed to assist executives in the paradigm shifts that are visible on the horizon or have already been implemented.

## Purpose of the Study

The purpose of this synthesis study is to identify current research and to document unique approaches and effective practices regarding transformative leadership models being used at state DOTs to meet today's technology demands. Once completed, the study would assist technology executives in the transition to their new and needed leadership roles and responsibilities. The study will also organize, evaluate, and document all relevant information and identify what problems remain unsolved.

## Information to be Gathered

At a minimum, information will be gathered through a literature review, a survey of all state DOTs, relevant private sector partners, US DOT information technology executives, and educational communities that work with state DOTs. The survey will be followed by a detailed interview with five DOT CIOs or equivalent information technology executive personnel considering diverse size and location. The five state DOTs will be primarily identified by their responses to the DOT survey and potential for sharing useful advice and best practices with other state DOTs. An outcome of the study should include a summary of the gaps in existing research and guidance.

Information to be gathered will include, but not be limited to the anticipated or implemented changes to the roles and responsibilities of state DOT information technology executives as a result of:

- Significant expansion of information technology into the day-to-day planning, construction, maintenance, and operations of a state DOT
- Outsourcing significant portions of IT operations
- Intersection and interdependency between Information Technology Services and Operational Technology demands
- The national trend to centralize certain IT functions in the public sector
- Risks DOTs face from cyber security threats
- Increased challenges in recruiting and keeping qualified technology personnel
- Cloud computing, mobile devices, UAVs, CAVs, big data, and sensors

## Information Sources:

- TRB ABJ50 Information System and Technology Committee Members
- AASHTO Subcommittee on Information Systems (ASIS)
- Chief Information Officers or equivalent of Departments of Transportation in the U.S. and Canada
- NCHRP Synthesis 296, Impact of New Information and Communication Technologies on Transportation Agencies
- NCHRP Synthesis 326, Strategic Planning and Decision Making in State Departments of Transportation
- NCHRP Synthesis 349, Developing Transportation Agency Leaders
- NCHRP Synthesis 385, Information Technology for Efficient Project Delivery
- *NCHRP Synthesis Topic 47-05, Data Maintenance Practices*, is currently being completed and is anticipated to be published in 2017.
- Related work that is being performed by specific DOTs, FHWA, TRB, and AASHTO

## Notes:

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Statement submitted on behalf of the TRB Committee on Information Systems and Technology (ABJ50) and ASIS. The TRB Committee ABJ50 and ASIS have reviewed and endorsed this statement.