

Coordination of IT and TSMO



U.S. Department of Transportation
Federal Highway Administration

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PROJECT EXECUTIVE SUMMARY

Common Understanding

Agency Successes

Staffing Practices

Cybersecurity Practices

This Executive Summary is one of five factsheets that highlight aspects of coordination between Information Technology (IT) and Transportation Systems Management and Operations (TSMO) in transportation agencies. Each factsheet draws from Principles and Strategies for Effective Coordination of IT and TSMO, a Reference Document.

The role of IT is becoming increasingly central to TSMO. Leading edge TSMO strategies involve increasingly complex and interrelated systems, organizations, and institutions. Real-time and predictive tactics, such as active traffic management, integrated corridor management, and vehicle-to-infrastructure systems, are characterized by high levels of complexity and a dependence on integrating with IT.

The reference linked above highlights the need for increased coordination between TSMO and IT practitioners, identifies common challenges experienced by public sector agencies, and presents practices that allow agencies to learn from others that have already addressed similar challenges. The Reference Document:

- Describes the evolution and history of TSMO and IT within typical transportation agencies and current organizational relationships.
- Identifies common challenges experienced within TSMO in relation to the IT resources required to implement operational strategies.
- Identifies practices that transportation agencies have developed and implemented to resolve IT challenges.
- Presents a solution matrix that links common challenges with options, for ease of reference.
- Provides guidance for using practices to address emerging IT-related TSMO issues.

Common Challenges

Transportation agencies experience similar challenges regarding IT-related processes and systems. These challenges can include disconnects, misunderstandings, and points of conflict on program priorities, risks, and differences in standards. The Reference Document discusses 36 specific challenges grouped into the categories described below.

Institutional Challenges

The agency organization itself, including professional culture, organizational structure, staff capabilities, and resource allocation, often influences the interaction between TSMO staff and IT staff. All levels of the organization, from leadership decision-making to front-line implementation, can encounter common institutional challenges regarding the following:

Culture	Any challenge that develops from the values and behaviors that influence personal relationships or interactions among different agency functions and groups.
Staff and Financial Resources	Any challenge that results from the availability, recruitment/retention, and training of staff or the availability, justification, and use of funding.
Organizational Structure	Any challenge that develops from the formal and informal structural arrangements around which staffing and roles and responsibilities are managed and carried out.
Policy	Any challenge that results from legislation, executive-level directives, departmental policy, or requirements.

Business and Technical Challenges

Business and technical processes associated with developing systems, including planning, procurement, security and data, and new technology-specific challenges, can affect the implementation of technology within an agency. An agency can encounter the following common business and technical challenges at any stage of project activity or development:

Strategic Planning	Any challenge that develops from the vision, mission, and objectives of the different organizations and functions and their integration in agency planning and resource allocation.
Procurement	Any challenge that results from the processes and procedures associated with obtaining IT-intensive products or services.
Systems and Technology	Any challenge that involves the hardware and software components of transportation management systems, data acquisition, data management, and utilization of system technologies.
Risk and Security	Any challenge associated with network security, data sharing, third-party applications, hosted/cloud platforms, and automation.

Identified Practices

Through interviews, discussions, and listening sessions conducted with several IT and TSMO practitioners, the consultant team that carried out this project identified practices for overcoming the challenges noted above. The Reference Document discusses 28 individual practices, organized and summarized in the following categories:

Collaboration – The project team identified six practices that relate to collaboration, whether informal or formal.

Examples of informal collaboration include:

- Increasing understanding between IT and TSMO staff.
- Clarifying roles and responsibilities on processes and activities that include IT-related systems.
- Providing opportunities for IT staff and TSMO staff to work together.

More formal efforts relate to things like:

- Modifying organization structures to make IT and TSMO interaction more effective.
- Implementing policies that support both TSMO goals and IT goals.
- Creating agreements to clearly define the intended interaction between IT and TSMO staff.

Staffing – The project team identified five practices that relate to staffing, from identifying staffing needs to recruiting and retaining staff with the needed experience and knowledge. Practices in this category also include ways that agencies have found to increase their flexibility in staffing and obtaining needed technical expertise.

Planning and Programming – The project team identified five practices that relate to planning and programming TSMO projects that require IT support.

These practices include:

- Early coordination with IT staff in planning and program development activities.
- Developing and using asset management systems.
- Establishing long-range IT related needs.
- Considering IT staffing and needs in TSMO budgets.

Program Delivery – The project team identified six practices that relate to program delivery and the incorporation of IT in the project development cycle. Practices primarily revolve around ensuring active IT involvement during project planning, technical reviews, and procurement. Approved product lists are another tool that may aid in project delivery.

Equipment and Systems – The project team identified six practices that relate to technical equipment and systems required to support TSMO functions.

Practices include:

- Involving IT staff in maintaining an Intelligent Transportation System (ITS) architecture.
- Establishing security systems.
- Improving communication infrastructure, data sharing, and data governance/management.

The transportation industry has already experienced significant growth in technology development and adoption, and this growth will accelerate in the future. Foreseeable trends include reliance on edge computing, distributed hardware/networks, cloud-based services, mobile access, connected and autonomous vehicle integration, and a general exploration of vehicle to everything (sometimes referred to as “V2X”) communication.

Transportation agencies and organizations are increasingly reliant on technology and data, and this trend is certain to impact IT and TSMO groups. The practices identified in the Reference Document can be used to form a solid foundation for IT and TSMO collaboration to prepare for emerging technologies and address challenges encountered during their implementation. The Reference Document and the other IT-TSMO factsheets are available at:

https://ops.fhwa.dot.gov/plan4ops/focus_areas/integrating/it.htm

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