

6-2017

# Data Governance at State Departments of Transportation

James Hall

*University of Illinois Springfield, jhall1@uis.edu*

Follow this and additional works at: <http://aisel.aisnet.org/mwais2017>

---

## Recommended Citation

Hall, James, "Data Governance at State Departments of Transportation" (2017). *MWAIS 2017 Proceedings*. 24.  
<http://aisel.aisnet.org/mwais2017/24>

This material is brought to you by the Midwest (MWAIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in MWAIS 2017 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# Data Governance at State Departments of Transportation

**James P. Hall**

University of Illinois Springfield

jhall1@uis.edu

## ABSTRACT

In managing transportation operations, state transportation agencies administer a wide variety of data resources across the enterprise. With growing internal and external data use, proper governance of the data resource is essential. Although there is high interest in Data Governance, state Departments of Transportation (DOTs) are struggling with implementing enterprise level Data Governance policies and practices. This is due to a variety of factors including institutional issues, growing complexities of data sources and structures, and rapidly evolving data collection methods. This research in progress will identify the major inhibiting factors for State DOT Data Governance implementation and potential solutions to address the unique characteristics of government transportation agencies.

## Keywords

Data Governance, Transportation, State DOT, Data Quality, Data Management, Public Sector, Institutional Issues, Implementation

## INTRODUCTION

In managing transportation operations, state transportation agencies administer a wide variety of data resources used for decision making throughout the enterprise. Historically, state Departments of Transportation (DOTs) have collected data on roadways/structures, traffic, and roadway crashes. State DOT data-intensive business process areas include asset management, highway program development, design and construction project management, highway/traffic operations, and safety planning.

State DOTs also have an extensive history in data collection and management. Most state DOTs have integrated their data resources, at some level, through Geographic Information System (GIS) technologies. However, implementation of Data Governance has been problematic. One major reason is that the volume and complexity of data resources are growing rapidly. Transportation agencies are adapting to a culture of information delivery, not just transportation infrastructure. Thus, there is a greater emphasis on open and transparent data. External stakeholders, such as other state agencies, US DOT and private agencies, increasingly request data access and use.

The data resource is becoming increasingly complex with the addition of new data elements (e.g. pedestrian facilities, bike trails), sophisticated inventory data collection (LiDAR) and real time operations data collection (traffic flow, snow clearance activities). This has increased the challenge to institutionalize the Data Governance and data management practices.

For this paper, Data Governance differs from Data Management. Cambridge Systematics, in National Cooperative Highway Research Program (NCHRP) Report 666, Target-Setting Methods and Data Management to Support Performance-Based Resource Allocation by Transportation Agencies, defines data management and Data Governance as follows (Cambridge Systematics, 2010):

Data Management: “the development, execution, and oversight of architectures, policies, practices, and procedures to manage the information lifecycle needs of an enterprise ...as it pertains to data collection, storage, security, data inventory, analysis, quality control, reporting, and visualization”

Data Governance: “the execution and enforcement of authority over the management of data assets and the performance of data functions”

In the literature, Wende has defined Data Governance as “the framework of decision rights and accountabilities to encourage desirable behavior in the use of data” (Wende, 2007). Otto emphasizes the role of Data Governance in leading the functions of data management and data quality in organizations to maximize data value (Otto, 2011). Cheong and Chang emphasize the importance of Data Governance in defining “policies and procedures to ensure proactive and effective data management.” They also recommend adoption of a Data Governance framework to enable internal agency collaboration to manage enterprise data and to align data programs with corporate objectives (Cheong and Chang, 2007).

The need for state DOT Data Governance is illustrated in highway safety efforts. In their Performance Measures for Roadway Inventory Data report, the Federal Highway Administration (FHWA) has identified six data quality performance measures: timeliness, accuracy, completeness, uniformity, integration, and accessibility. The document also outlines measure-related governance practices to improve data quality (Council, 2013).

Reflecting the importance of Data Governance, the National Association of State Chief Information Officers (NASCIO) has identified Data Management (including Data Governance) and also Information Governance as two of the State CIO Top Ten Priorities for 2017 (NASCIO, 2016).

However, Data Governance implementation remains problematic. A recent survey of 29 state DOTs by the American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Information Systems indicated that 78.6% of agencies are actively developing or planning to develop a documented Data Governance plan. Yet only 20.7% of the agencies currently have and actively use a documented Data Governance plan (AASHTO ASIS, 2016).

This research in progress will identify major inhibiting factors for State DOT Data Governance implementation and explore potential solutions to address the unique characteristics of government transportation agencies.

## **2015 STATE DOT PEER EXCHANGE**

In 2015, the Transportation Research Board hosted a peer exchange to explore effective Data Governance and data business planning solutions for transportation safety applications. Fifteen state agency representatives (from 10 states) and 11 individuals from federal agencies, universities, and the private sector participated in the peer exchange. State DOT participants represented safety, data management, planning, geographic information systems, information technology and executive business process areas (Transportation Research Board, 2015).

Prior to the peer exchange, state agency participants completed comprehensive questionnaires on their current practices and concerns in safety Data Governance, data management and data integration. At the peer exchange, attendees focused on four major themes: (1) the business case for Data Governance, (2) essential elements of Data Governance, (3) operationalizing Data Governance at a DOT, and (4) using Data Governance to advance data sharing and integration.

At the peer, States indicated there were multiple institutional issues to address in formalizing their Data Governance efforts. A summary of these follows:

- Change in organizational roles/power, culture
- Obtaining and maintaining executive support
- Difficulties implementing enterprise systems while addressing data silos
- State government implementation of centralized Information Technology (IT) operations; impacting DOT operations

- Transportation agency decentralized IT operations e.g. district IT operations impacting central office IT operations
- No standard blueprint to implement a Data Governance process
- Lack of staffing and knowledge workers
- Differences in generational familiarity with IT and analytics
- Difficulties in incorporating enhanced data collection techniques
- Expanding data collection categories, data elements and data types

Harrison et al, in their leadership guide for state DOT strategic information management, identified multiple challenges to improve state DOT information management practices including the lack of a clear strategy, fragmented management responsibilities, and bureaucratic organizational cultures resistant to change (Harrison et al, 2016).

### **DATA GOVERNANCE IMPLEMENTATION**

For strategic information management implementation efforts, Harrison et al recommend setting a vision, assessing the current state and creating a coordinated agency plan for information management (Harrison et al, 2016). In other words, the focus should be on identifying a strategy that fits the unique organizational characteristics of the state transportation agency.

This individualized type of Data Governance implementation is not unique to public transportation organizations. Otto investigated Data Governance implementation in the telecommunications industry for two large service providers. He found that the configuration of Data Governance is contingent on internal and external factors and thus requires an individual organizational design. Otto also was able to identify quantifiable business benefits (Otto, 2011).

More specifically, Spy Pond Partners, through research sponsored by the American Association of State Highway and Transportation Officials and the Transportation Research Board, developed a framework to enable transportation agencies to assess the adequacy, focus and management of their data programs. One of the major areas for assessment is “Data Strategy and Governance” (Spy Pond Partners and Iteris, 2015). Key elements include:

- Management practices to manage data as a strategic asset
- Clear roles, accountability and decision-making authority for data quality, value and appropriate use
- Adoption of principles, policies and business processes for managing data as a strategic agency asset
- Track agency data assets and their value
- Facilitating connections between data producers and users
- Continuity of data management expertise through staff transitions

From this initial research, key implementation components include organizational vision, communication, assignment of responsibilities and the demonstration of value.

### **CONCLUSION**

This research in progress builds on the results of the peer exchange, and other research, to characterize common inhibiting factors for implementation of comprehensive Data Governance practices in State DOTs. This research to date has also identified potential implementation methods to advance and institutionalize Data Governance.

### **REFERENCES**

1. American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Information Systems (ASIS), *Fall 2016 ASIS Information Technology Survey Results*, 2016. Accessed on February 27, 2017 from: <http://www.aashtoware.org/Pages/Public-Downloads.aspx>
2. Cambridge Systematics, Inc., *Target-Setting Methods and Data Management to Support Performance-Based Resource Allocation by Transportation Agencies*, Transportation Research Board National Cooperative Highway Research Program Report 666, Transportation Research Board, National Academy of Sciences, Washington D.C., 2010.
3. Cheong, Lai Kuan and Chang, Vanessa, *The Need for Data Governance: A Case Study*, ACIS Proceedings, 100, 2007.

4. Council, Forrest M., Jonathan P. Soika, Nancy X. Lefler, Robert A. Pollack, and Carol H. Tan, *Performance Measures for Roadway Inventory Data*, US Department of Transportation, Federal Highway Administration Safety Program, Report No. FHWA-SA-12-036, February, 2013.
5. Harrison, Frances, Michael Gordon and Gary Allen, *Leadership Guide for Strategic Information Management for State Departments of Transportation*, Transportation Research Board National Cooperative Highway Research Program Report 829, Transportation Research Board, National Academy of Sciences, Washington D.C., 2016.
6. National Association of State Chief Information Officers (NASCIO), *State CIO Top Ten Priorities for 2017*, Survey Results, 2016, Accessed April 10, 2017 from <http://new.nascio.org/Publications/PID/485/evl/0/CategoryID/46/CategoryName/Top-Ten-Priorities>
7. Otto, Boris, *Organizing Data Governance: Findings from the Telecommunications Industry and Consequences for Large Service Providers*, Communications of the Association for Information Systems, Vol. 29, Article 4, 2011.
8. Spy Pond Partners, LLC and Iteris, Inc., *Data to Support Transportation Agency Business Needs: A Self-Assessment Guide*, Transportation Research Board National Cooperative Highway Research Program Report 666, Transportation Research Board, National Academy of Sciences, Washington D.C., 2015.
9. Wende, Kristin, *A Model for Data Governance – Organising Accountabilities for Data*, 18<sup>th</sup> Australian Conference on Information Systems, Proceedings, 2007.
10. Transportation Research Board, *Improving Safety Data Programs Through Data Governance and Data Business Planning: A Peer Exchange*, Transportation Research Circular E-C196, Transportation Research Board, National Academy of Sciences, Washington D.C., James P, Hall Editor, April 2015.