

NCHRP 8-70 - *Target-Setting Methods and Data Management To Support Performance-Based Resource Allocation by Transportation Agencies*

presented to

AASHTO SCOP

Data Issues in Transportation

presented by

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September 17, 2009

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- **Performance Targets**
 - **Public Sector**
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- **Data Stewardship and Management**
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 - **Relationship to target setting**
 - **Success factors**
 - **Topics for guidance**



Project Overview

Guide to Target-Setting and Data Management for Performance Resource Allocation (PBRA)

- **Public and private sector state of the practice**
 - Comprehensive framework for performance management
 - Target-setting process
 - Data Management practices
- **Guidance**
 - Target Setting to support PBRA
 - Data management systems needed to implement performance-based resource allocation

Project Overview

- **Phase 1 – State of Current Practice**
 - Key elements of a PBRA process
 - Descriptive list of organizations that use PBRA
- **Phase 2 – Performance Target-Setting Process and Methods**
 - Factors likely to influence the setting of performance targets in transportation agencies
 - Fundamental approaches to setting performance targets
 - Case Studies

Project Overview

- **Phase 3 – Data Management Systems and Institutional Relationships to Support PBRA**
 - **Technical/institutional considerations to guide setting data requirements, data management system development**
 - **Elements of effective data stewardship**
 - **Guidance on effective data management systems/institutional relationships to support PBRA**

Phase 2 and 3 Concurrent Case Studies

State DOTs

- Florida DOT/State Government
- Minnesota DOT
- Ohio DOT
- Washington DOT/State Government
- Maryland DOT/Maryland Port Authority

Local Government

- City of Coral Springs, FL
- Hennepin County Public Works

International

- Austroads and VicRoads
- Japan Ministry of Land, Infrastructure, and Transport

MPOs

- San Francisco Bay Area Metropolitan Transportation Commission
- Portland METRO

Other Public Agencies

- Orlando-Orange County Expressway Authority
- Port Authority of New York/New Jersey
- Kansas State Department of Education
- U.S. Army ARDEC

Private Companies

- RCG Information Technology
- International Logistics Company
- Do-it-Yourself Retailer
- Multinational Conglomerate
- Rail Services Company

Performance Management Framework

Linking Goals/Objectives to Resources and Results



Role of Targets in Performance-Based Allocation Process (PBRA)

- Serves as key player in process of linking goals to resources/results
- Provides transparency and clarity to PBRA
- Provides perspective for evaluating investment impacts
- Provides means in which relative effectiveness of an investment can be clearly communicated

Public Sector Approaches For Target Setting

- Policy Driven
- Consensus Based
- Customer Focused
- Bench Marking



Private Sector Experience

- Also set goals
- Strategic perspective drives decisions about organization and processes
- Resources are allocated with the aid of performance targets
- Gap between actual performance and target is basis for resource allocation



Preliminary Topic Areas for Guidance

- **Context**
- **Use of Targets**
- **Target –Setting Process**
- **Approaches to Target Setting**
- **Adjustments in Performance Measures and Targets Over Time**

Data Stewardship and Management

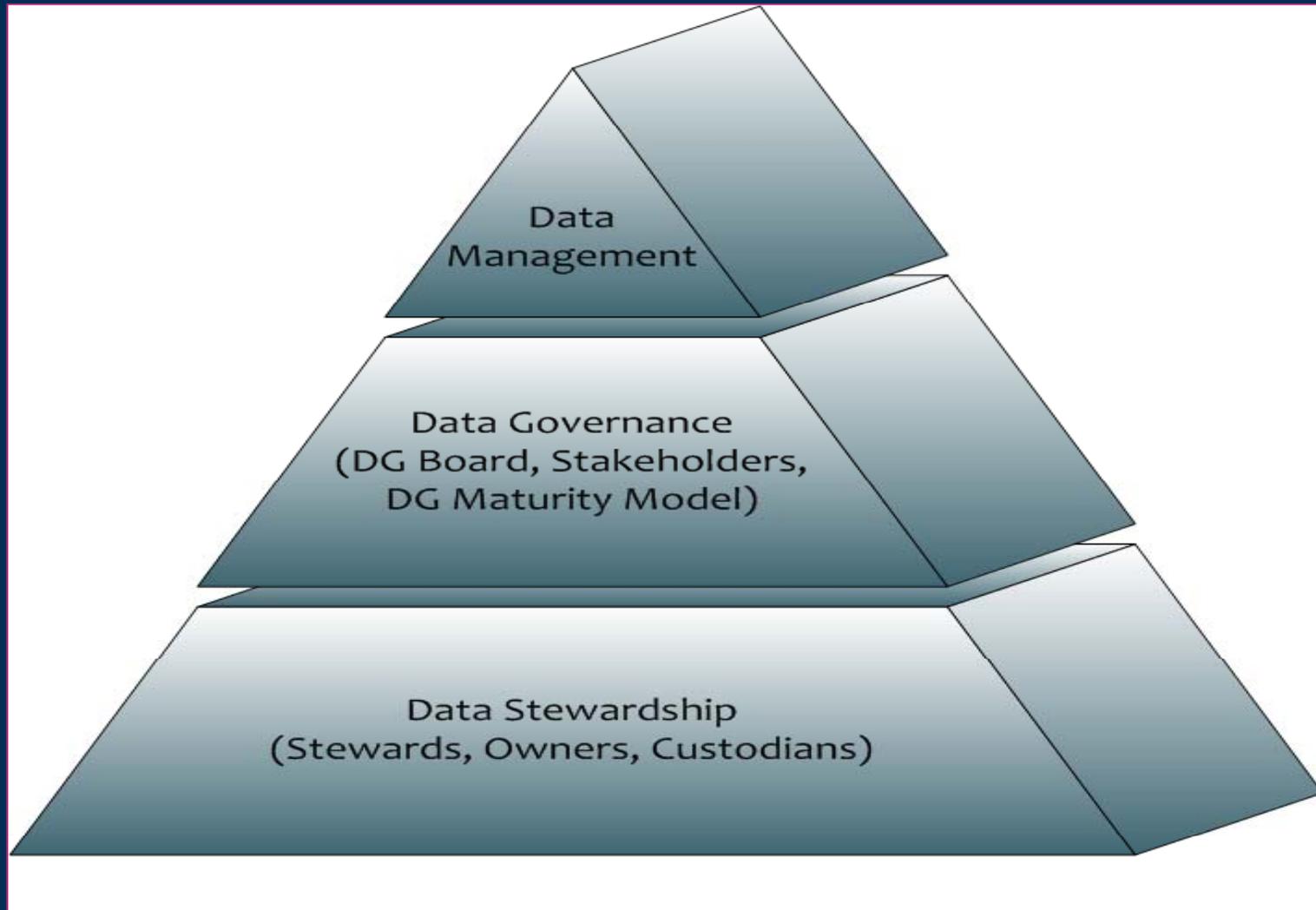
Phase 3: Data Management Systems

- **Elements of Effective Data Stewardship and Management**
 - Organization and Governance
 - Data Sharing
 - Documentation and Reporting
 - Technology
- **Relationship to Target Setting and Resource Allocation**
- **Summary of Success Factors**
- **Preliminary Topic Areas for Guidance**

Summary Findings

- **Common success factors**
 - Data governance from the top down
 - Data Business Plans
 - Data champion
 - Coordination between IT and business functions
 - Achievable goals
- **Common obstacles**
 - Tools
 - B/C
 - Risk Management
 - Data programs not linked

Elements of Effective Data Stewardship and Management



Elements of Effective Data Stewardship and Management - Definitions

- **Data Management**

Development, execution and oversight of architectures, policies, practices and procedures to manage the information lifecycle needs of an enterprise in an effective manner as it pertains to data collection, storage, security, data inventory, analysis, quality control, reporting and visualization

- **Data Governance**

Execution and enforcement of authority over the management of data assets and the performance of data functions

- **Data Stewardship**

Formalization of accountability for the management of data resources

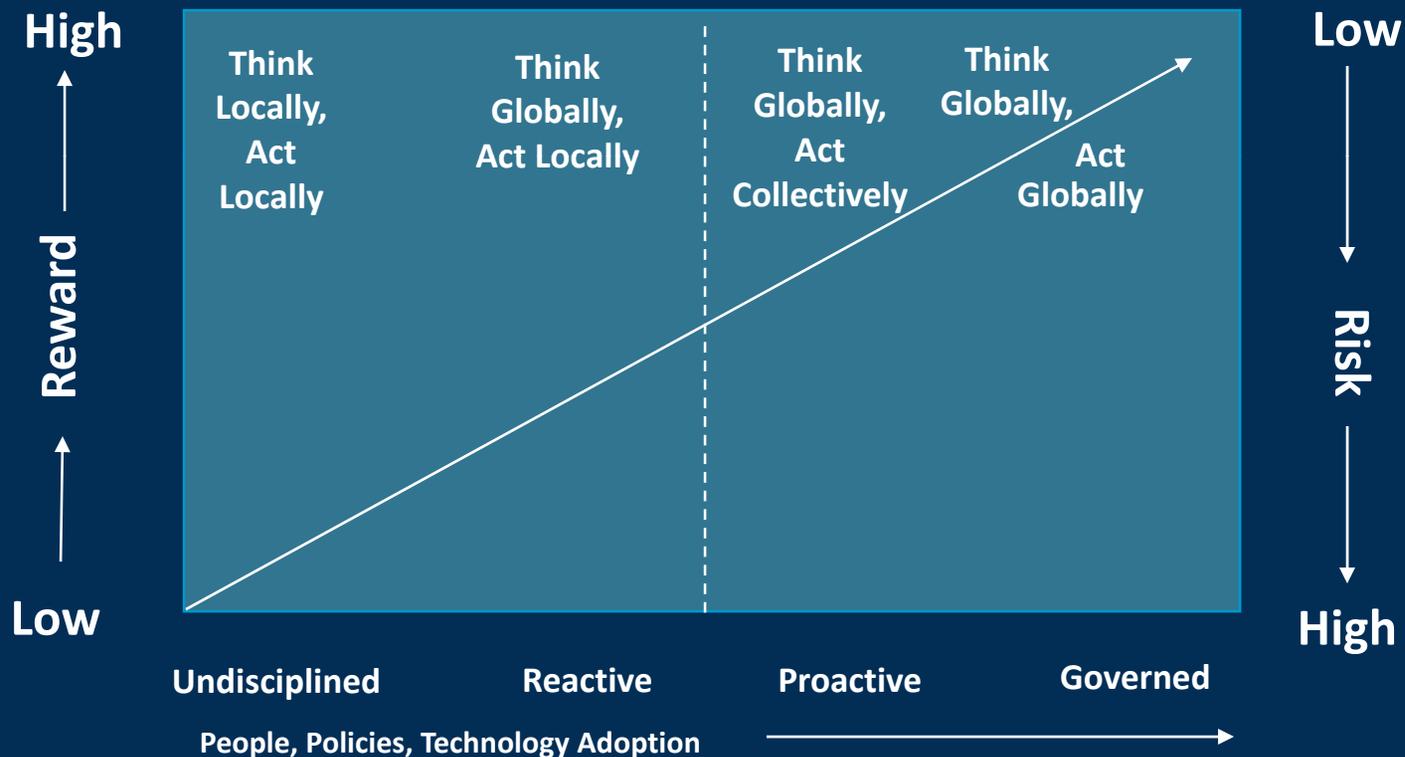
Organization and Governance, cont.

- **Roles/responsibilities of data governance participants**
 - **Data governance board or council**
 - Responsible for the oversight of data programs
 - **Data users and stakeholders (Communities of Interest)**
 - Use data according to approved policies, standards, and processes
 - **Data Stewards and Custodians**
 - Providers, caretakers of data
 - Responsible for technical application support for data systems
 - **Internal work groups**
 - IT and business partnerships
 - Collect and provide data and establish business rules for data systems



Organization and Governance, cont.

- The Data Governance Maturity Model – indicates evolution of data governance within an organization



Organization and Governance, cont.

- **Data Governance across organizations:**
 - **Undisciplined: approximately 30%**
 - **Reactive: 45% to 50%**
 - **Proactive: less than 10%**
 - **Governed: less than 10%**



Organization and Governance, cont.

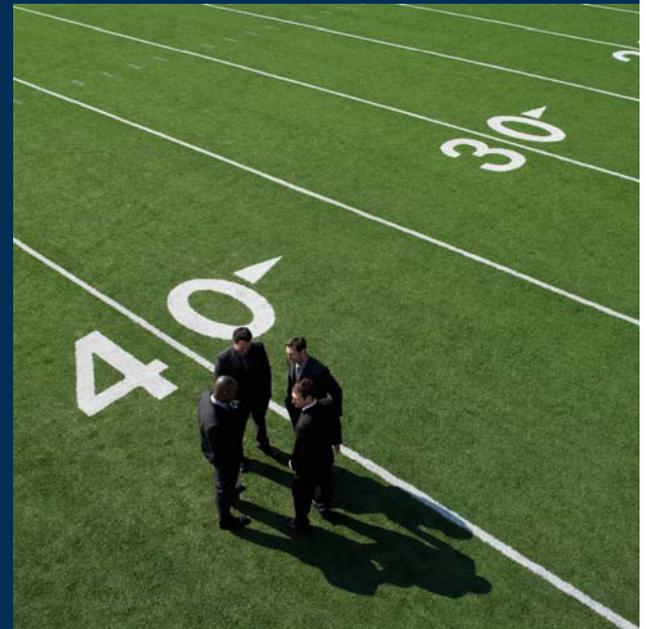
- **Data Governance level of maturity varies from agency to agency**
 - **Alaska and Minnesota DOTs – Developing business plans to include data governance at the DOT**
 - **Hennepin County Minnesota – Well-developed data governance framework**
 - **Kansas State Department of Education – Data governance framework with user manual implemented for data governance**

Organization and Governance, cont.

- **Path to data governance does not follow a one size fits all methodology**
- **Implementing data governance relies on:**
 - **Data Management plan**
 - **Data champions**
 - **Executive level support**
 - **Partnerships between IT and business units**
 - **Use of technology tools**

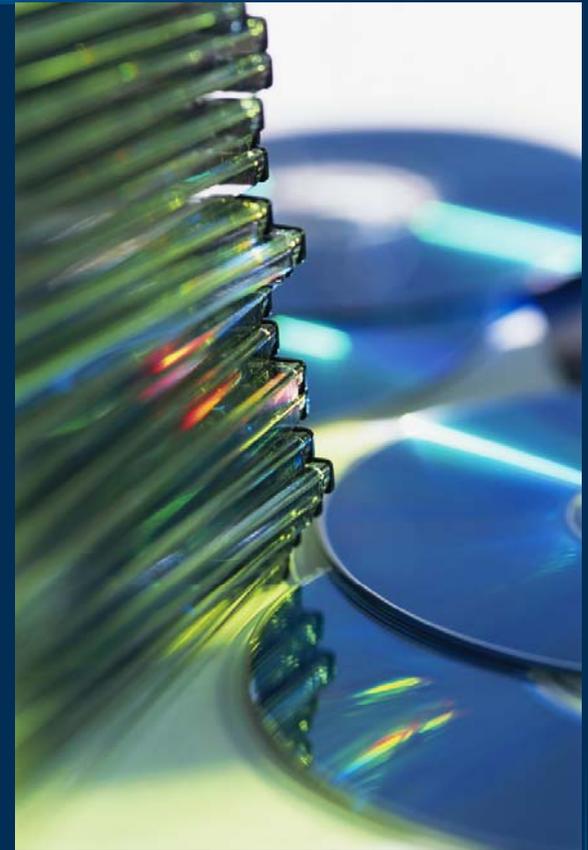
Organization and Governance, cont.

- **Benefits of Data Governance**
 - Ensures data programs support agency mission, vision, goals
 - Improves data quality
 - Improves data sharing and integration through use of definitions, standards and procedures
 - Improves coordination between offices for development of new data programs or enhancements to existing programs
 - Provides formal resolution process



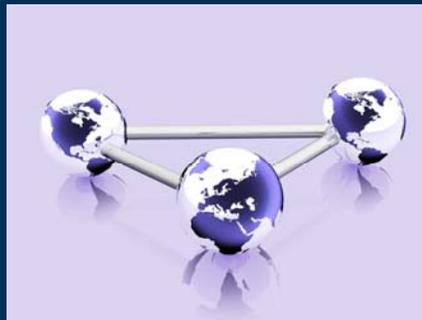
Data Sharing

- **Internal data sharing through:**
 - **Business Intelligence tools – COGNOS, dashboards**
 - **Enterprise databases - data is accessible throughout the agency**
 - **Metadata – ensure data is used for correct purpose**
 - **Knowledge management (KM) systems – retain corporate knowledge about data programs**



Data Sharing, cont.

- **Agency data sharing experiences**
 - **VDOT – established a KM Office and uses MS Sharepoint as their KM system**
 - **US Army Armament Research, Development, and Engineering Center (ARDEC) – established a KM Office to manage KM functions**
 - **Hennepin County Minnesota – uses balanced scorecard & COGNOS Metric Studio dashboard to monitor county programs**
 - **Orlando Orange County Expressway Authority (OOCEA) – shares travel time data with Florida DOT**



Data Sharing, cont.

- **Benefits of data sharing**
 - **Reduce data collection costs**
 - **Reduce duplicate data maintenance costs**
 - **Reduce errors caused by reporting data from duplicate sources**
 - **Achieve shorter data system development cycles**
 - **Increase network connectivity and communication between internal and external partners**

Documentation and Reporting

- **Standard documentation**
 - **Data dictionaries** – Definitions and formats of data elements for a data system
 - **Metadata** – Descriptions of what data is used for
 - **Data catalogs**
 - Current policies and standards for use of data
 - Links to data dictionaries and metadata
 - Contact information for data stewards
 - **User manuals** – Instructions for proper use of a data
 - Query, analysis, reporting functions



Documentation and Reporting, cont.

- **Reporting methods and uses**
 - **Change tracking reports**
 - Prioritize and monitor requested changes to application systems
 - **Standard reports**
 - Comply with federal, state, and sometimes local requirements
 - Respond to requests for data and information from the public
 - **Public report cards (KSDE)**
 - Monitor performance of programs for an organization
 - **Balanced scorecards (Hennepin County)**
 - Track performance measures and targets for programs

Technology



- **Benefits**

- **Supports data management programs**
- **Supports data system development**
- **Supports integration of multiple data sources into enterprise system**
- **Supports data sharing within an agency and among external partners**
- **Facilitates future integration of external software and data for applications through use of Service Oriented Architecture and Open Database Connectivity (ODBC)**
- **Streamlines QA/QC procedures to improve data quality**

Technology, cont.

- **Uses of Technology:**

- **Business Intelligence (BI) tools**
 - COGNOS
 - Data Models
 - Business Use Case Models
- **Geographic Information Systems (GIS)**
 - WSDOT reduced cost of roadway data collection by using GPS technology to connect data collection on routine maintenance activities
- **Enterprise Resource Planning (ERP) platforms**
- **KM systems**
 - VDOT to leverage expertise across the organization, retain a repository of lessons learned, reduce learning curve for new employees

Relationship to Target Setting and Resource Allocation

- Approaches to PBRA differ between public/private sector:
 - ❖ Private Sector
 - ✓ Historical levels
 - ✓ Achievement of the target(s)
 - ✓ Relative financial performance (ROI, C/B)
 - ✓ Hybrid approach of the above choices
 - ❖ Public Sector
 - ✓ Historical trends
 - ✓ Agency goals



Summary of Success Factors

- 1. Establish need for Data Management/Governance**
- 2. Assess Current state of Data Management in Agency**
- 3. Plan for Data Management**
- 4. Execute Data Management Plan**
- 5. Maintain Data Management Plan**
- 6. Link Performance Measures and Targets Processes to agency planning functions**



Success Factor 1: Establish Need for Data Management/Governance

- Formalize Data Business Plan
- Demonstrate ROI to agency



Success Factor 2: Assess Current State of Data Management

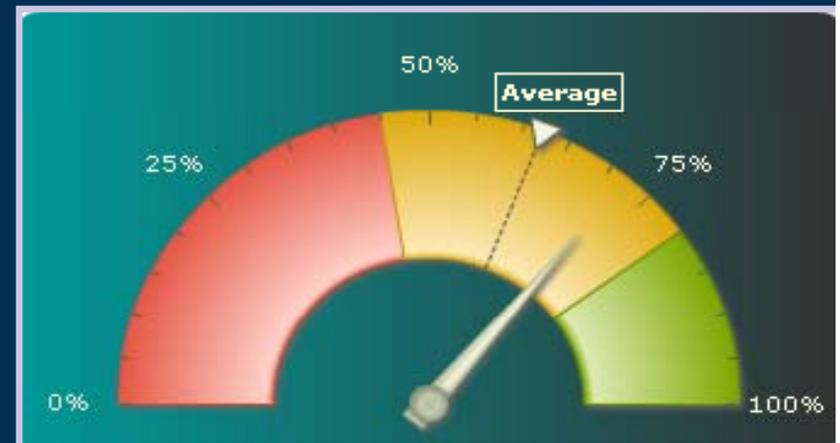
- Perform health assessment of current programs
- Perform risk assessment of current programs to demonstrate their importance to the agency

Success Factor 3: Plan for Data Management

- **Use Data Business Plan to manage programs**
- **Identify data champions from business and IT sides of the agency**
- **Use business models to help document and explain how data programs support business functions**
- **Start with a smaller achievable goal for data governance implementation**

Success Factor 4: Execute Data Management Plan

- **Implement a Data Governance Board or Council**
- **Identify roles/responsibilities of all Data Governance participants - Data Governance manuals and data catalogs**
- **Use Business Intelligence tools to allow for easy access and sharing of data**
- **Maintain communication with stakeholders to sustain support for data programs**



Success Factor 4: Execute Data Management Plan, cont.

- **Develop business terminology dictionary to streamline use of business terms in the organization, especially for IT system developers**
- **Share metadata with managers and policy makers**
- **Establish, update and enforce data management policies**

Success Factor 5: Maintain Data Management Plan

- **Manage data as an asset**
- **Use data sharing agreements to reduce costs of data collection and maintenance**
- **Invest in new technology training for staff**
 - **Gain buy-in for critical programs**
 - **Provide professional development opportunities**
 - **Ease of access to data and information helps staff to attain their specific performance goals**



Success Factor 6: Link PM and Targets Processes to Planning

- Use benchmarking of agency targets and PMs with similar size agencies
- Link PMs and targets to budget allocations for programs
- Do not use *one size fits all* approach
- Include objectives pertaining to resource allocation in the agency Business Plan
- Arrange performance measures in a hierarchical order, allowing agency to translate strategic goals/objectives into operational goals/objectives for each department
- Reward business areas which consistently meet targets and goals

Summary of Obstacles/Challenges

- 1. Establish need for Data Management/Governance**
- 2. Execute Data Management Plan**
- 3. Maintain Data Management Plan**
- 4. Link Performance Measures and Targets Processes to agency planning functions**

Challenge 4: Link PM and Targets Processes to Planning

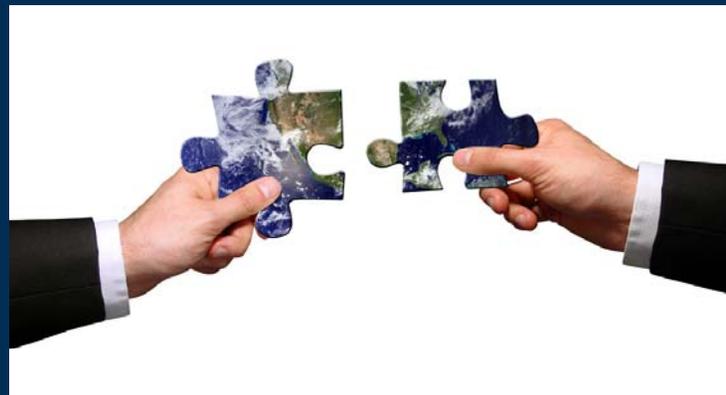
- Difficult to identify performance measures and metrics for programs
- External pressures influence funding for particular programs
- Need to address the gap between data *supported* decisions and data *driven* decisions
- Non-integrated systems, with data in different formats
- Cultural change is required to implement performance-based decision making

Preliminary Topic Areas for Guidance

- 1. Establish Need for Data Management/Governance**
- 2. Assess Current state of Data Management in Agency**
- 3. Plan for Data Management**
- 4. Execute and Maintain Data Management Plan**
- 5. Link Performance Measures and Target Processes to Agency Planning functions**

Guidance Topic 1: Establish Need for Data Management/Governance

- Assist agencies in determining if they are ready for Data Governance
 - The Data Governance Maturity Model
 - Self assessment tool
 - Guidance for moving to the next level in the Maturity Model



Guidance Topic 2: Assess Current State of Data Management in the Agency

- **Identify goals for data program assessment**
- **Connect data programs with agency goals**
- **Instruments for gathering feedback**
- **Compile & analyze results**
- **Perform gap analysis**

Guidance Topic 3: Plan for Data Management

- **Develop Data Business Plan**
- **Make institutional arrangements for implementation of governance standards, policies, procedures**
- **Set goals for use of data sharing and integration technology to support data programs**
- **Link data programs to performance measures, targets, and planning functions**

Guidance Topic 4: Execute and Maintain Data Management Plan

- **Coordinate efforts between teams responsible for maintaining Data Management Plan**
- **Establish and enforce data management policies and procedures**
- **Use Technology for data sharing and integration**
- **Use Knowledge Management to preserve critical business process knowledge and work processes for application systems**
- **Invest in training for staff**

Guidance Topic 5: Link PM and Targets Processes to Planning

- Outline steps to ensuring success with use of Data Management programs

Questions & Discussion

