



CMMI Institute

Data Management Maturity: Why We Need It, and How It Can Propel You to Data Management Leadership

Data Management Association, Phoenix

June 14, 2018

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SM DMM Model, EDME, EDM Associate, CMM Integration, SCAMPI, SCAMPI Lead Appraiser, TSP, and IDEAL are service marks of CMMI Institute.

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Your Presenter and Introductions



Melanie Mecca

**Director, Data Management
Products & Services
CMMI Institute**

- Development lead and primary author, DMM
- Led creation of DMM certification courses and Assessment method
- 30+ years DM solutions, program planning and implementation
- EDM Expert

- Please introduce yourself
 - Name
 - Organization
 - Functional Role
 - What is your primary focus (passion)?



Agenda

- CMMI Institute Background
- Starting with the Data Architect - data modeling is the “Axis Mundi”
- Data Management Measurement
 - Data Management Maturity (DMM)SM Model
 - Measurement, capability and maturity
 - DMM In action – Class exercise
- Comparative EDM - Case Studies
- Decomposition – how DMM Process Areas interact with data modeling



CMMI Institute Background

- Evolved from Carnegie Mellon's Software Engineering Institute (SEI) - a federally funded research and development center (FFRDC)
- Continues to support and provide all CMMI offerings and services delivered over its 20+ year history at the SEI
 - Industry leading reference models - benchmarks and guidelines for improvement – **Data Management, Development, Services, People, Acquisition**
 - Training and Certification program, Partner program
- Dedicated training, partner and certification teams to support organizations and professionals
- Now owned by **ISACA** (CISA/M, COBIT, IT Governance, Cybersecurity) and joint product offerings are underway



CMMI – Worldwide Process Improvement



CMMI Quick Stats:

- Over 12,000 organizations
- 94 countries
- 12 National governments
- 10 languages
- 500 Partners
- 1900+ Appraisals in 2017

Where it all started

“The achievements of data modelers over the past decades have been a solid foundation for transforming the thinking of the data management industry.”

“Data models and modeling form the conceptual background for almost all data management disciplines.”

Data Model Scorecard

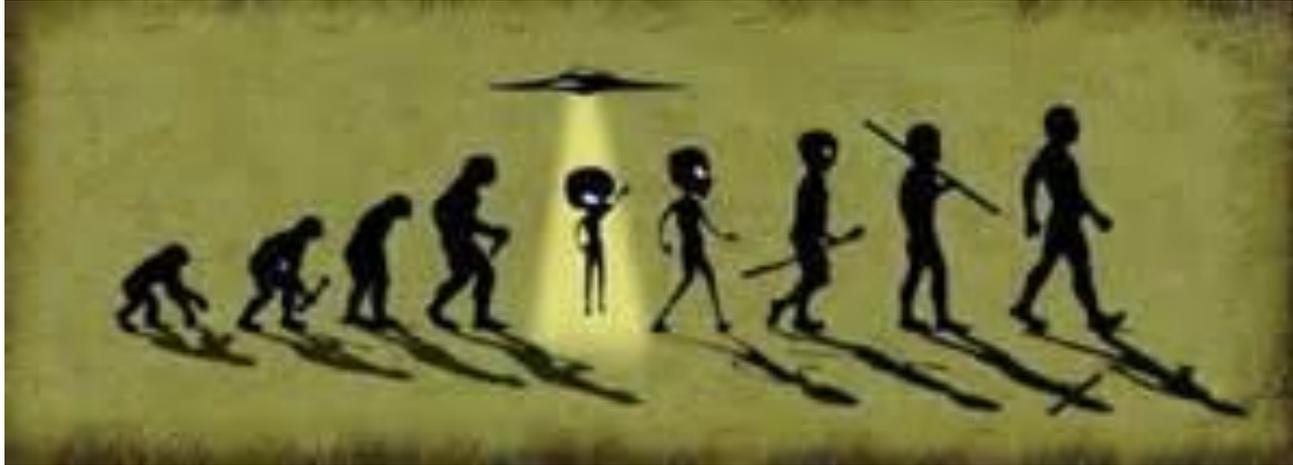
Chapter 3, DMM Context

And let's add the premise of today's seminar:

“If you've been a data architect / modeler, you already know virtually everything you need to know to plan and implement an enterprise data management program.” - Melanie Mecca, today



Data Modeling as a Transformative Discipline



- **Standards 101** – colonizing data standards terrain
- **Compliance 101** – project teams required to meet standards
- **Metadata 101** – names, definitions, values, lengths, sources, etc.
- **Governance 101** - business agreements about shared data
- Incremental business engagement - education of business data representatives and gradual adoption of a common language
- Incremental architecture awareness – understanding of and focus on the target data layer

Modeling is Cornerstone of Data Management

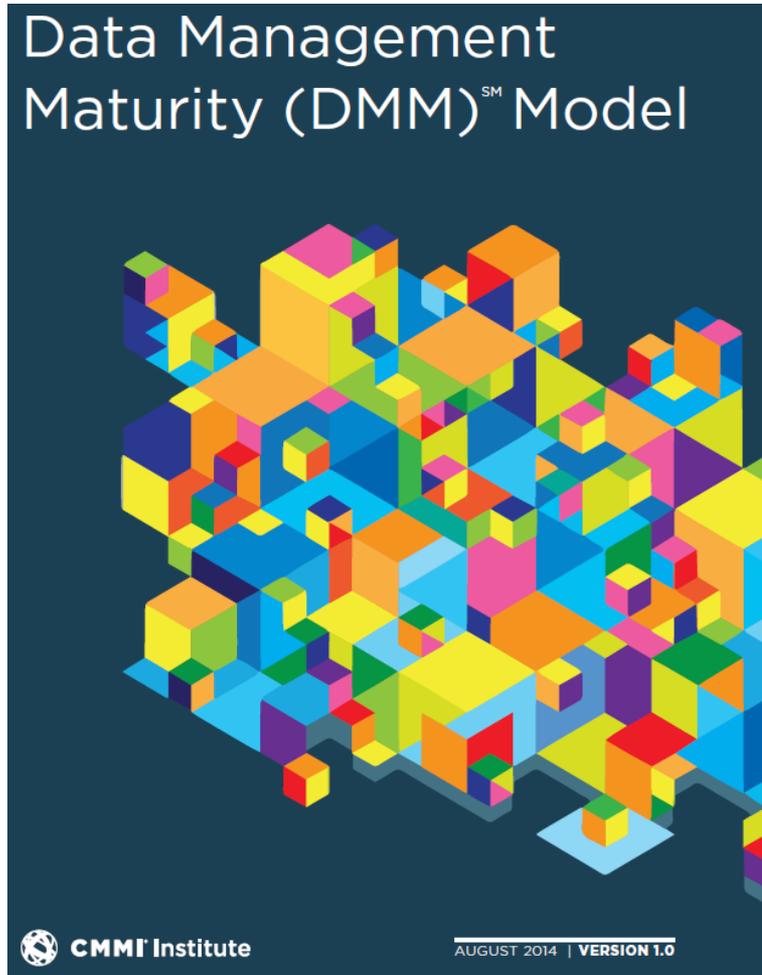
Data Modeling Integration with EDM Process Areas in the DMM



“Everything is connected”
- Cloud Atlas, 2012



Data Management Maturity (DMM)SM Model



- DMM 1.0 released August 2014
 - 3.5 years in development
 - Sponsors – Microsoft, Lockheed Martin, Booz Allen Hamilton
 - 50+ contributing authors, 70+ peer reviewers, 80+ orgs
 - 6 categories
 - 25 process areas
 - 414 practice statements
 - 596 functional work products

DMM - Guided Navigation to Lasting Solutions

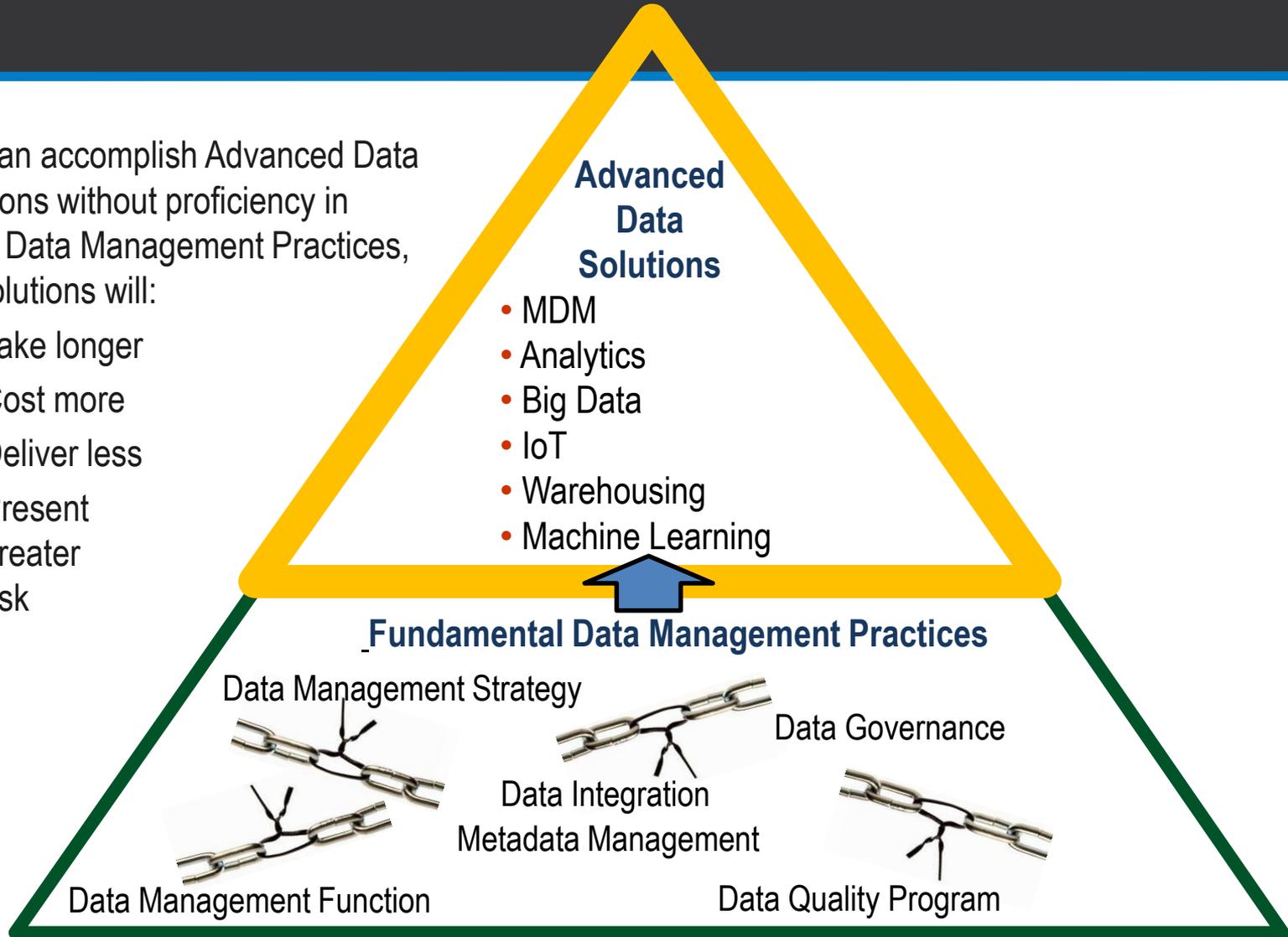
- **Reference model framework** of fundamental data management best practices
- **Measurement instrument** for organizations to evaluate capability maturity, identify gaps, and incorporate guidelines for improvements
- **Answers:** “How are we doing, exactly?”
- **Guides:** “What should we do next?”
- **Baseline for:** Integrated EDM program, high value initiatives, and engaged governance



Foundation for advanced solutions

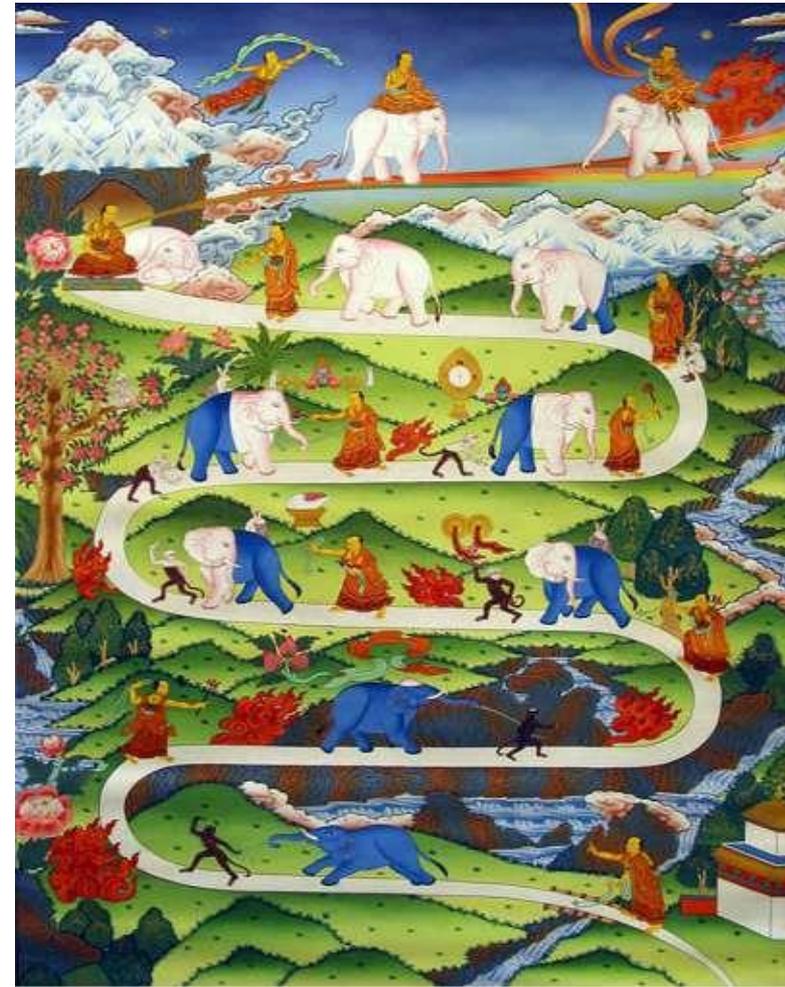
You can accomplish Advanced Data Solutions without proficiency in Basic Data Management Practices, but solutions will:

- Take longer
- Cost more
- Deliver less
- Present greater risk

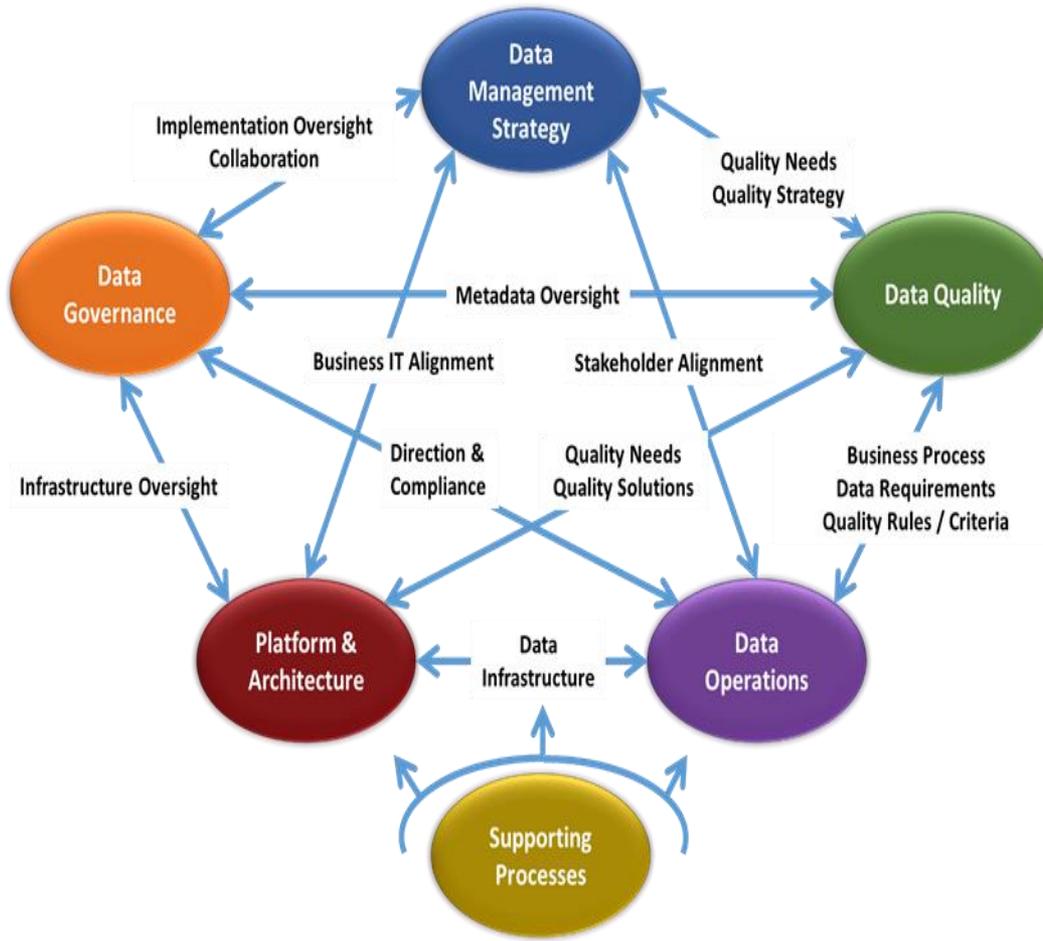


Foundation for Business Results

- **Trusted Data** – demonstrated, independently measured capability to ensure customer confidence in the data
- **Improved Risk and Analytics Decisions** – comprehensive and measured DM strategy ensures decisions are based on accurate data
- **Cost Reduction/Operational Efficiency** – identification of current and target states supports elimination of redundant data and streamlining of processes and systems
- **Regulatory Compliance** – independently evaluated and measured DM capabilities to meet and substantiate industry and regulator requirements



DMM Overview



Data Management Strategy

- ◆ Data Management Strategy
- ◆ Communications
- ◆ Data Management Function
- ◆ Business Case
- ◆ Funding

Data Governance

- ◆ Governance Management
- ◆ Business Glossary
- ◆ Metadata Management

Data Quality

- ◆ Data Quality Strategy
- ◆ Data Profiling
- ◆ Data Quality Assessment
- ◆ Data Cleansing

Data Operations

- ◆ Data Requirements Definition
- ◆ Data Lifecycle Management
- ◆ Provider Management

Platform & Architecture

- ◆ Architectural Approach
- ◆ Architectural Standards
- ◆ Data Management Platform
- ◆ Data Integration
- ◆ Historical Data, Archiving and Retention

Supporting Processes

- ◆ Measurement and Analysis
- ◆ Process Management
- ◆ Process Quality Assurance
- ◆ Risk Management
- ◆ Configuration Management



What's Inside

- Data Management Strategy
- Data Governance
- Data Quality
- Data Operations
- Platform & Architecture
- Supporting Processes
- What's not inside:
 - Technologies
 - Analytics
 - Content Management
 - Data Security
 - Data Design
 - **Data Modeling**

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DMM Themes

- **Architecture and technology neutral** – applicable to legacy, DW, SOA, unstructured data environments, mainframe-to-Hadoop, etc.
- **Industry independent** – usable by every size and type of organization with data assets, applicable to every industry
- **Enables snapshot / baseline of current capabilities** – organization is assessed on existing DM processes and the implemented data layer
- **Launch collaborative and sustained capability improvement** – for the life of the DM program [*aka, forever*].

If you manage data, the DMM will benefit you



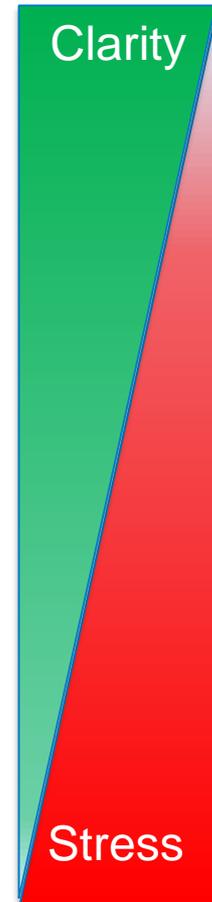
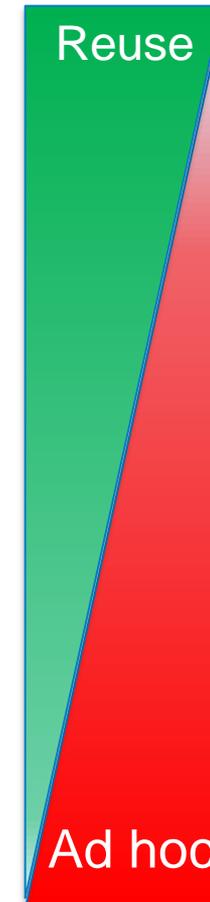
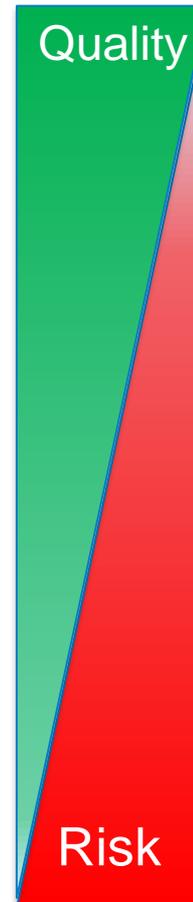
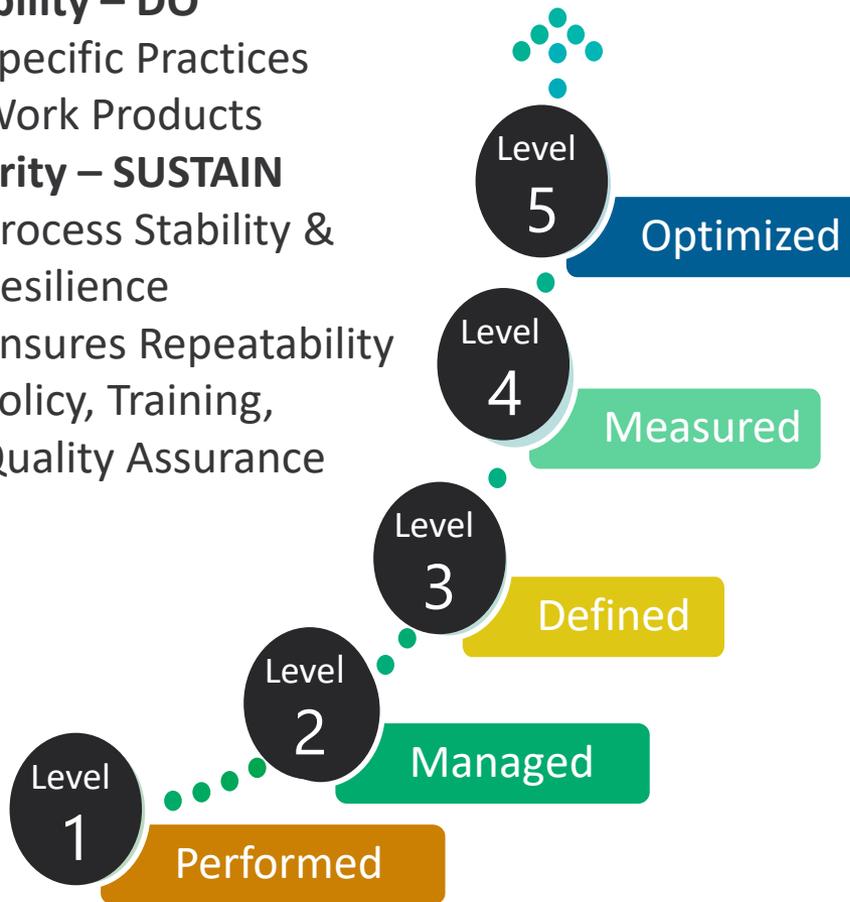
DMM Capability Levels

Capability – DO

- Specific Practices
- Work Products

Maturity – SUSTAIN

- Process Stability & Resilience
- Ensures Repeatability
- Policy, Training, Quality Assurance



Structure

- How the DMM is organized
- Contextual information
 - Introduction
 - Goals
 - Questions
 - Related Process Areas
 - **Work Products**
- What counts for scoring
 - **Capability** – Functional Practices
 - **Maturity** – Infrastructure Support Practices

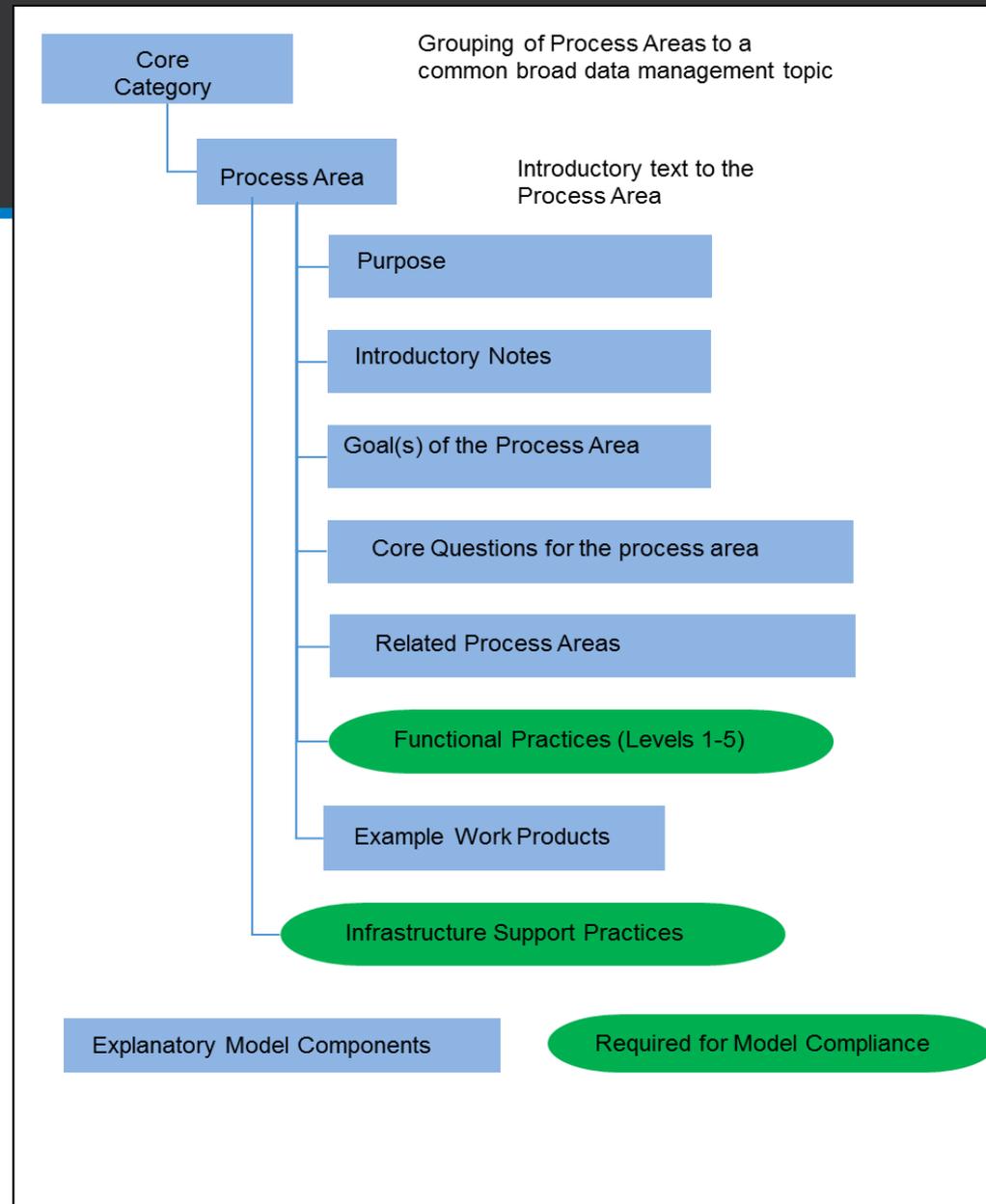


Figure 2. DMM Construct



“You Are What You DO”

- Model emphasizes behavior
 - Proactive positive behavioral changes
 - Effective, repeatable processes
 - Leveraging across the organization
- Activities result in work products
 - Policies, processes, standards, guidelines, templates, policies, etc.
 - Reuse and extension = data value, lower costs, happier staff
- Practical focus reflects real-world organizations – enterprise program evolving to all hands on deck



Let's Test-Drive the DMM

- **Class Exercise – evaluate an organization of your choice on its Business Glossary Practices**
- Why Business Glossary?
- Instructions – 15 minutes preparation
 - Select an organization – your current organization or a previous organization
 - Read the excerpt through Level 3
 - Determine if each statement is **Fully Met**, **Partially Met**, or **Not Met** for the organization
 - Note your answers by statement number
- Then we'll discuss the scores together



How to navigate the model - DMM Assessment Method

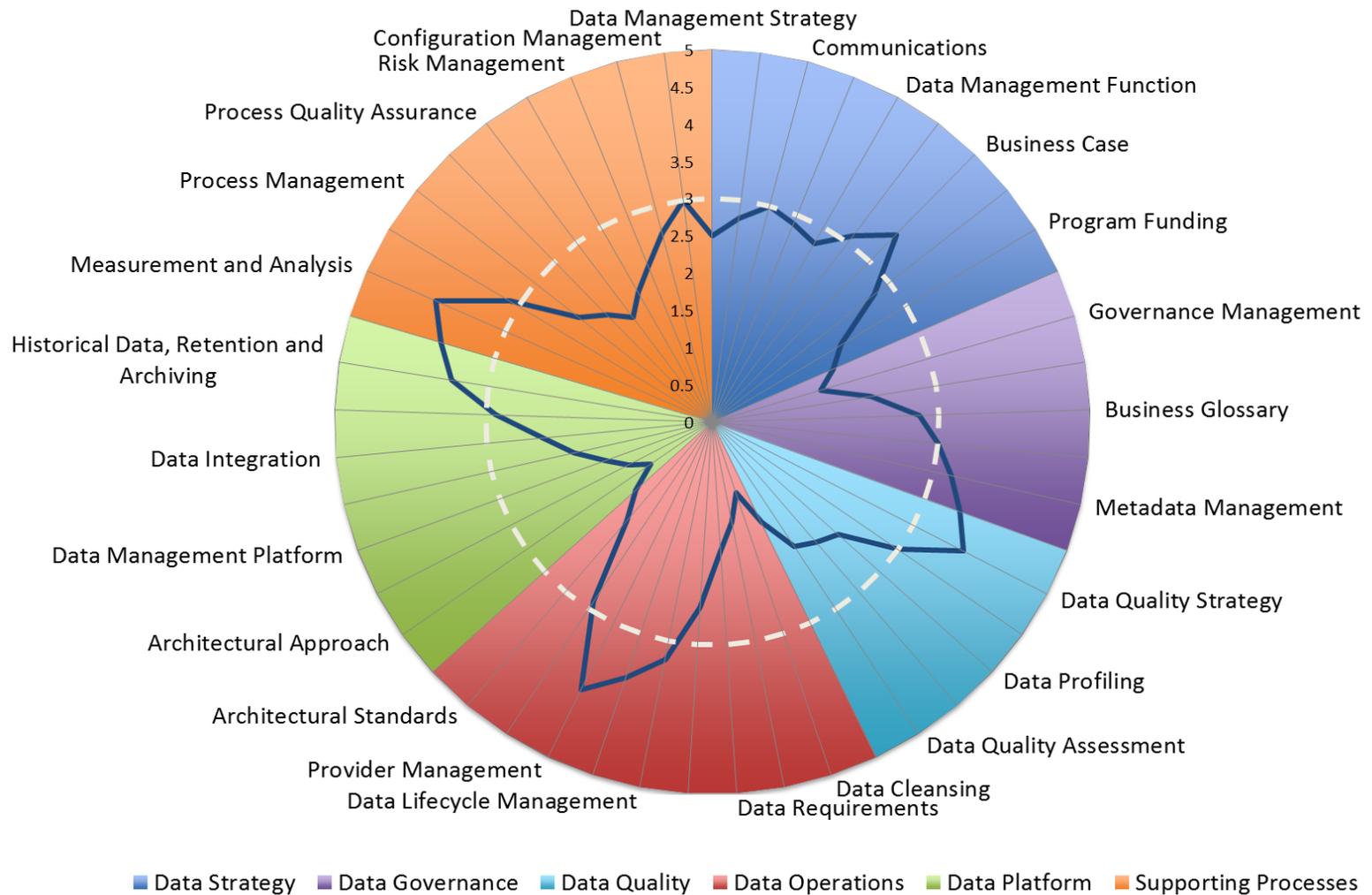
- **Why not** - surveys, smoke-filled back room, IT only, senior managers, one business unit?
- To maximize the DMM's value as a catalyst for forging shared perspective and program acceleration, our method provides:
 - **Collaboration** launch event - broad range of stakeholders
 - Capabilities evaluated by **consensus** affirmations
 - Solicits **key business input** through supplemental interviews
 - Verifies evaluation with **work product reviews** (evidence)
 - Report and executive briefing presents **Scoring, Findings, Observations, Strengths**, and customized specific **Recommendations**.

To date, over 1000 assessment participants from business, IT, and data management have employed the DMM - practice by practice, work product by work product - to evaluate their capabilities.



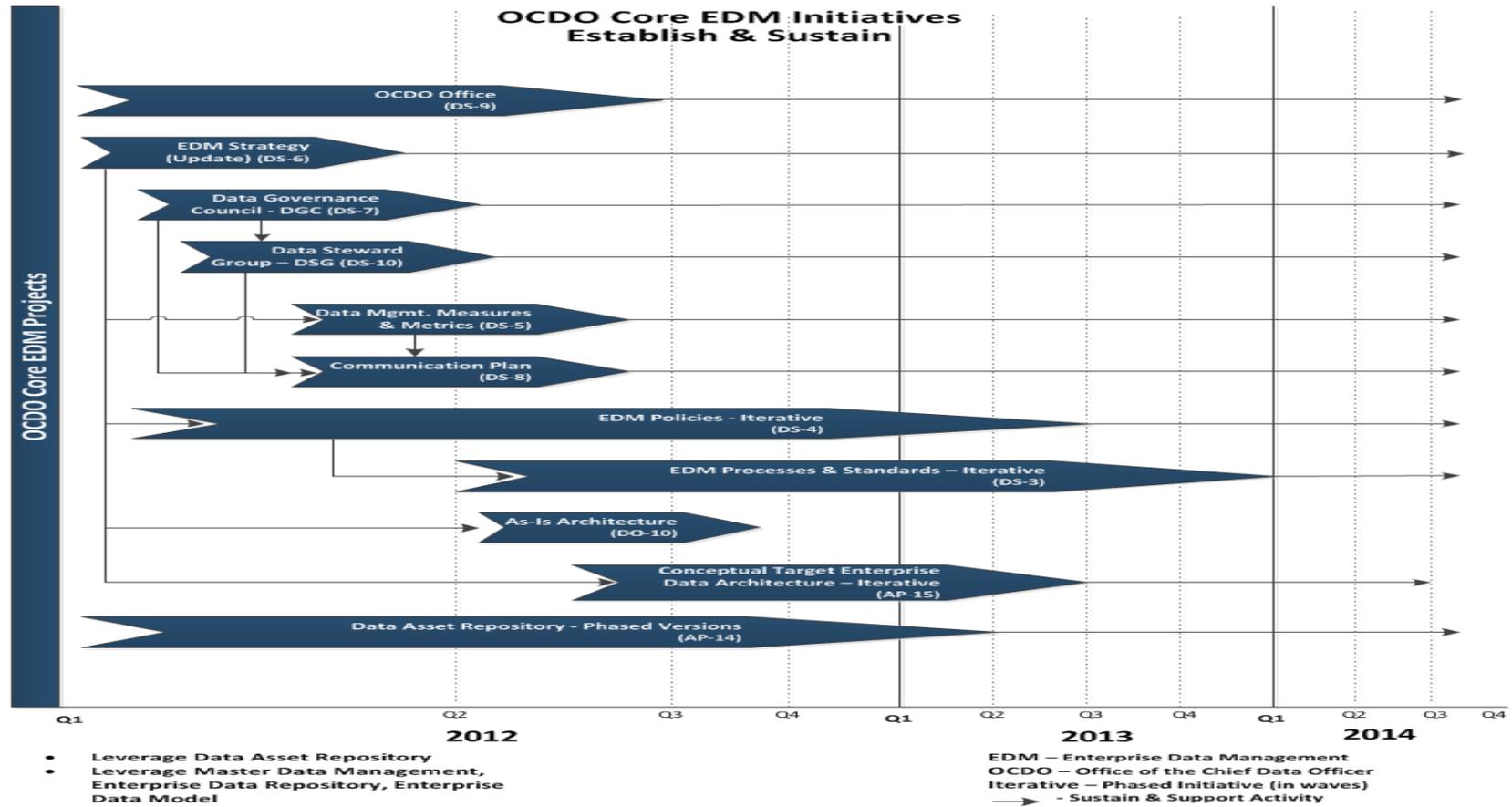
DMM Assessment Summary

Sample Organization



Next Steps - DM Roadmap Sample

Comprehensive and Realistic Roadmap for the Journey



DMM Assessment Drivers

- **Microsoft** – Integrated Information Management supporting transition to the Real-Time Enterprise, enhance data governance
- **Fannie Mae** – Validation of EDM program and governance, discovery for new business priorities, refresh data management strategy
- **Federal Reserve System Statistics** – Validation of inherent strengths, discovery of gaps, leverage capabilities across the Banks
- **Arizona Department of Corrections** – Strategy for data management program to support primary operational system and enable analytics
- **American Board of Family Medicine** – Launch data quality program for physician, licensing, and examination data
- **The Vanguard Group** – Create organization-wide data quality strategy and stand up data management organization to enable analytics

Every organization has unique strategic business drivers for an Assessment

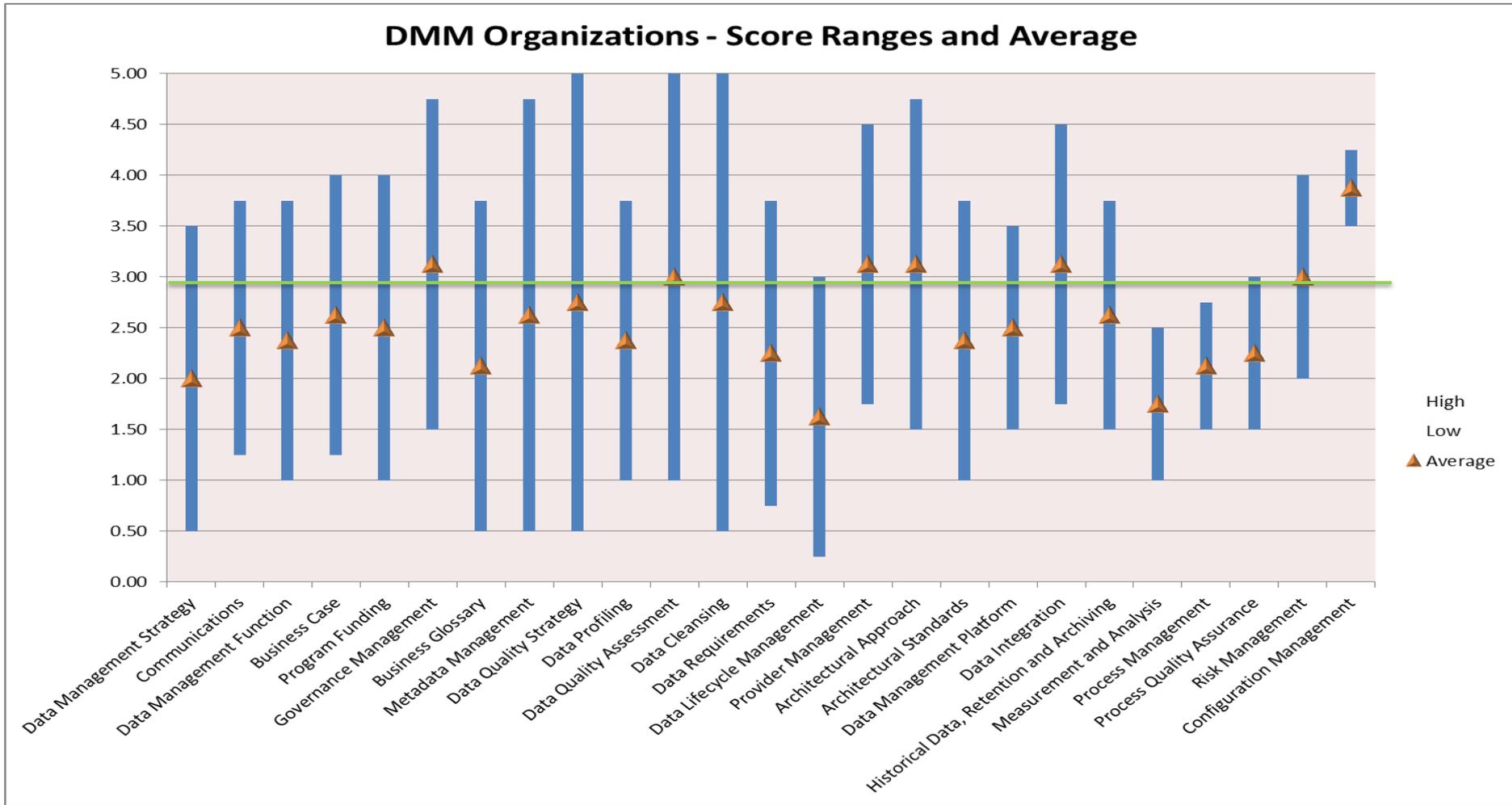


A Few More Recent Stories

- **Barrick Gold** – Establish a data management program to fully enable advanced analytics, machine data, GIS data, and self-service reporting
- **Arizona Water Resources** – Establish an enterprise EDM program to empower data integration and external data sharing
- **Paychex** – Development of data management capabilities for major systems integration, single view of the client, and cross-sale opportunity maximization
- **Arizona Department of Economic Security** – Evaluation of current state to launch governance and a data management organization



Cumulative Benchmark – Multiple organizations



Use Cases - When Should I Employ the DMM?

- Assess current capabilities before:
 - Developing or enhancing DM program / strategy
 - Establishing / enhancing data governance
 - Building an analytics program
 - Embarking on an architecture transformation
 - Initiating a data quality program
 - Implementing a metadata repository
 - Designing and implementing multi-LOB solutions:
 - Master Data Management / EDW
 - Shared Data Services
 - Implementing ERP, etc.



Like an executive physical



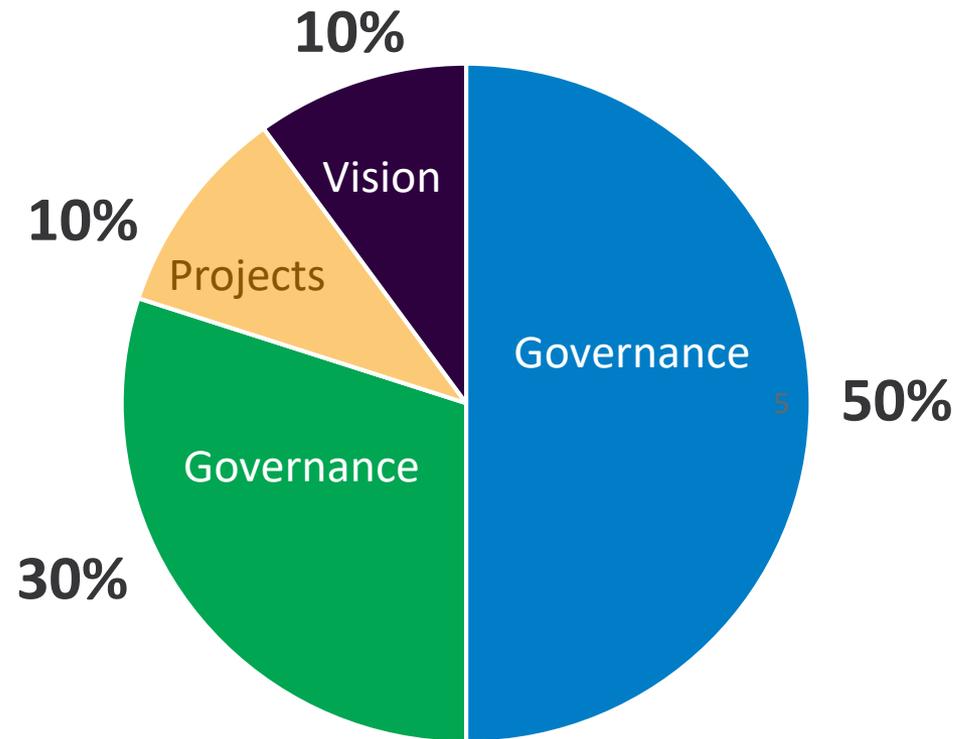
What About Big Data?

Big Data Challenges	Business Goal	DMM Core Categories
IT & Business Disconnected	Effective use of data and resources	Data Management Strategy, Data Governance, Platform & Architecture
Consistent Data for Consistent Reporting, lineage, source	Ensuring confidence with regulators and clients	Data Governance, Data Quality, Platform & Architecture
Trusted Data for Analytics	Informed Decision Making	Data Management Strategy, Data Quality, Data Governance
Collecting the Required Data	Efficient use of data and resources	Data Management Strategy, Data Operations, Platform & Infrastructure
Data Classification & Valuation	Data Monetization	Data Governance, Data Operations, Platform & Infrastructure
Indexing and Locating Data	Decrease time to insight	Platform & Architecture, Data Operations



Governance and the Data Management Executive

How the DME ends up allocating time (regardless of job description)



■ Managing Sideways ■ Managing Upward ■ Managing Downward ■ Creative Vision ■



How the DMM Enables Governance

- Identifies, develops and educates – strengthens collaboration among:
 - Data Management Executive
 - Data Stewards
 - Business Sponsors
 - Data Architects
 - Enterprise Architecture
 - Business Architecture
 - Risk and Controls
 - Internal Audit
 - Enterprise Data Management staff



The Data Culture



Governance Success requires more than Structure

Governance Management in the DMM:

- Processes that facilitate **collaborative decision making** and effectively implement building, sustaining, and compliance functions for the data assets.
- Governance bodies with significant business representation are critical to foster a corporate culture of **shared responsibility for data**.

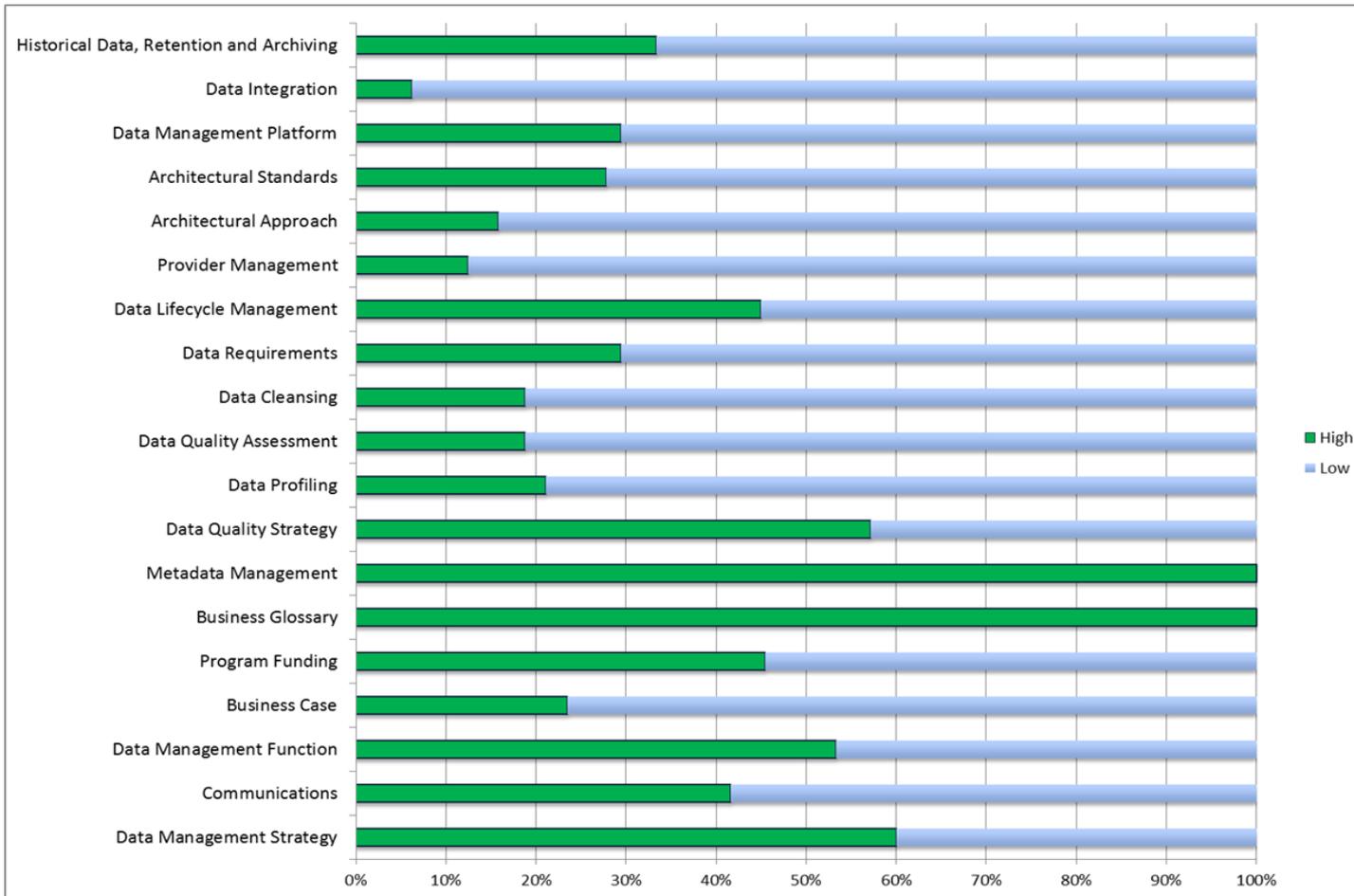
Most approaches focus on solving these primary challenges:

- **Establish governance structures** with clear, successive decomposition of authorities and responsibilities
- **Effective selling** of the data governance program to address:
 - Lack of executive mandate
 - Challenges in securing time from business experts
 - Lack of clear knowledge of responsibilities

Necessary, but Not Sufficient



Governance is Everywhere



25% of DMM practice statements express or imply governance activities – to establish, build, nurture, sustain, and improve the data assets.



What do governance participants need to motivate their engagement?

Consensus Answers - from an organization-wide perspective -

- ***“What have we accomplished in managing our data assets?”*** - antidote for lack of awareness
- ***“What and who is doing it?”*** - antidote for lack of accountability
- ***“What should we do next?”*** – antidote for lack of shared priorities and agreements
- ***“What is our vision for the data assets?”*** – antidote for lack of collaborative enthusiasm
- ***“What is our plan to carry out the vision?”*** – antidote for lack of a data management strategy and siloed approaches
- ***“How can we build an EDM program together that meets business needs?”*** – antidote for ‘do the same thing, get the same results’

Knowledge and education for all relevant stakeholders underlies governance success



After an Assessment - DMM Compass Empowers Governance

- An abridged version of the DMM reflecting 20 data management process areas through Level 3
- Commissioned by Wells Fargo
- Designed for self-evaluation and measurement of capabilities by data governance leaders within a line of business, following a DMM Assessment
- Compass consists of:
 - Guidelines for Use
 - Evaluation and scoring mechanism aligned with the DMM
 - Introduction to DMM Concepts
 - Training.
- Strong support for organizations to strengthen and monitor capabilities over time.



Back to YOU – Avenues for Growth

- By now, it should be obvious that, through your professional work, and by accumulated experience, you are already well qualified to view data from an enterprise perspective
 - You have witnessed and grappled with the problems
 - You have suggested, or thought about, improvements to data management practices
 - You are able to formulate data issues from a business point of view
- So why don't you "*Run for Something!*"



Data Management Certifications

- If you would like more information, we offer training to advance your skills around enterprise data
 - Building EDM Capabilities – on-site group training, or eLearning
 - ✓ Certification – EDM Associate – June 2018
 - Advancing EDM Capabilities – apply the DMM for consulting and program development
 - EDM Expert – master our evaluation method and become certified to apply the DMM to benefit any organization in any industry
 - ✓ Certification – Enterprise Data Management Expert (EDME)



Coming Soon – Data Stewards CBT

- We developed a two-hour Data Stewards course for the State of Arizona, for an audience of about 20,000 employees
- Worked with our colleague, Bob Seiner
- Bottom-up approach
 - You already are a data steward
 - Here's what you can do right now
 - Here's how you can apply your analytical skills to data
 - Goal – foster interest through acquiring skills
- Templates and reference materials that staff can implement
 - Data governance and stewardship
 - Data definitions and metadata
 - Data requirements (*modeling primer is part of the course*)
 - Data quality.



Questions?

Any questions?



Decomposition - Data Modeling as Axis Mundi



Data Management Function

- Provides leadership and structure for implementing data management principles and best practices across the organization. Knowledge-based continuity for enterprise data and for persistent products and services needed to ensure the quality and sharing of enterprise data assets
- Remember - data management started as data administration
- Backbone of managing, enhancing, and maintaining core foundational artifacts
 - Enterprise Data Model / Business Area Models
 - Business Glossary / Metadata Repository
 - Standards, policies, data management processes
- Compliance



Governance Management

- Establishing a structure to implement collaborative decision making and oversight of the data management program and to assign ownership, stewardship, and executive responsibilities for enterprise data.
- Formative – business data SMEs have worked closely with data architects and modelers in a project context for many years
- Shared data projects, such as MDM, exemplify core governance principles and practices
 - Development of business terms
 - Names, values, lengths, formats, other metadata
 - Subject area / entity type alignment



Business Glossary

- An approved, governed compendium of approved business terms and definitions, which creates common understanding, enables efficient data sharing and controls, and supports business processes and decisions.
- Logically prior to designing a data model, but often occurs in parallel, driven by architect / project needs
 - Models may come first – enhanced and updated by data governance after the fact
 - Natural focus for architects
 - Business term standards / modeling standards



Business Glossary Handout

Business Term Standards Sample

- Approved and implemented with governance engagement at large retailer, major financial organization, and Federal agencies
- As with any sample or template, must be tailored for your organization and approved
- Enjoy!



Metadata Management

- Identifies, describes, and provides content, context, structure, and classifications pertaining to the organization's data assets for effective usage, retrieval, and traceability.
- Knowledge management for the data assets!
- Metadata needs to reflect the implemented data architecture
 - Logical and physical data models
 - Sources and targets
- Metadata implementation best by subject area
- Sound modeling practices require specification of metadata and properties for data at rest and data in motion



Data Profiling

- Developing a comprehensive understanding of the content, quality, and rules of specified data sets under management.
- Physical data divergence from expected metadata
- Essential references are: business terms, logical and physical data models
- Quality rules are based on standard terms, attribute, and column definitions
 - Requirements documentation should align
 - Metadata repository should capture
- Design is 50% of data quality
 - Defects may update models and work products
 - Defects may spur enhancements to design



Data Quality Assessment

- A systematic, business-driven approach to measure and evaluate data quality according to dimensions, employing data quality rules, is established and followed.
- Dimensions are characteristics about data indicated through modeling
 - Terms, definitions, allowed values, ranges, datatypes, nullability, formats
 - Sources for development or derivation of quality rules
- DMM advocates phased approach by subject area, starting with prioritized critical data sets
- You can help the business experts think through dimensions for attributes within scope – comprehensive specification



Data Cleansing

- Mechanisms, predefined rules, processes, and techniques to validate and correct data are defined and followed. The organization uses the results to augment quality rules and improve business processes.
- Root cause analysis results may suggest modifications to data store designs, loading mechanisms, and business processes
- Points to need for well-architected data layer – convince business
- (Don't cleanse the same data again and again!)
- Metadata is frequently updated to formats
- History of cleansing may point to cost avoidance



Data Requirements Definition

- Establishes the process used to identify, precisely define, prioritize, document, and validate the data needed to achieve business objectives.
- Data requirements are often neglected
 - Reference data - data sources – business language definitions of derived data, etc.
- DMM recommends parallel decomposition of functionality and data
- Data model and requirements specification should align
- Data requirements should be expressed in business terms



Data Lifecycle Management

- Definition of data usage and dependencies across business processes for data that is critical for an important business function or needed by multiple business processes, enabling control of the organization's data flows throughout the data lifecycle from creation or acquisition to retirement.
- Business processes which create and update data should be mapped to the business terms, attributes, and columns they manage
 - Enables traceability of data across the life cycle (lineage)
 - Strengthens data ownership and stewardship
 - Identifies authoritative data sources
 - Accelerates impact analysis efforts.



Architectural Standards

- An approved set of expectations for governing architectural elements supporting data representations, data access, and data distribution, which are fundamental to data asset control and the efficient use and exchange of information.
- Modeling is the instantiation of standards in action – standards:
 - Enable evolution toward the target data architecture
 - Assure controlled access
 - Streamline the development lifecycle (EDMModel, etc.)
 - Govern data distribution
 - Support data movement – internal and external.



Data Integration

- Data integration addresses data transport and processing from multiple sources (connecting, combining, transforming, de-duplication, etc.) into a destination environment to improve data availability for business processes that require data consolidation or aggregation such as analytics.
- Architects design consolidated data stores!
- Standard processes and rules for:
 - Distinguishing among sources (e.g. provenance, precedence)
 - Employing authoritative data sources
 - Specifying data sources and targets
 - Compliance with data representation standards
 - Capturing business, technical and operational metadata
 - Structuring optimized data stores for the purpose



How did we do today? (Pick any question)

- Has this seminar helped you to feel that:
 - You have greater confidence in your broad data management knowledge base?
 - You can easily put on the 'enterprise hat'?
 - You're able to begin using the DMM?
 - You can craft your business cases from a holistic data perspective?
 - You're able to help your colleagues and managers to appreciate the bigger picture?



Learn More

mmecca@cmmiinstitute.com – and connect with me on Linked In 😊

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