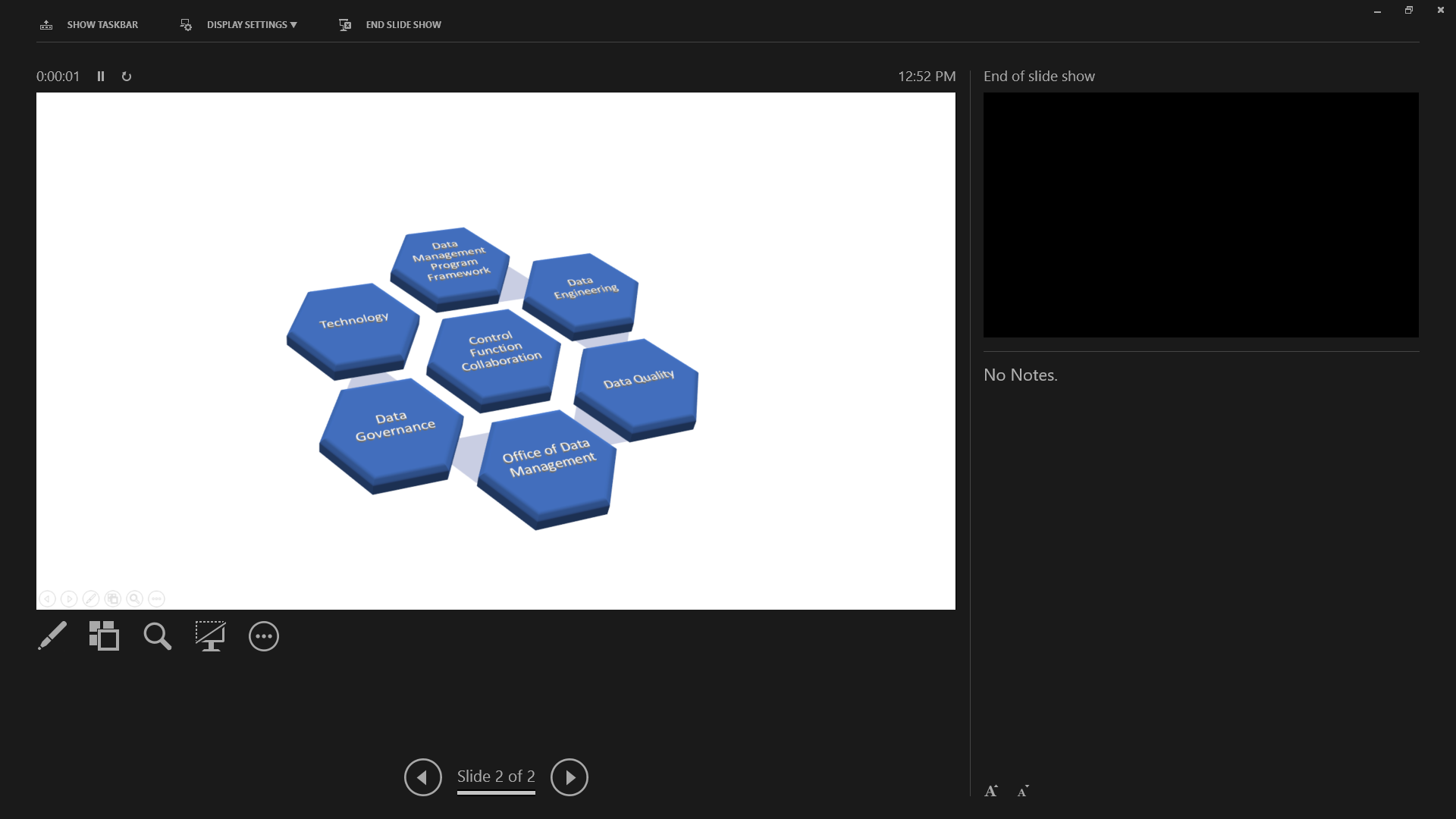


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| February, 2017 | Best practice guide to developing, measuring and sustaining an effective data management program |











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**EDM Council**

**Version 2.0**

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**INTRODUCTION**

The Data Management Capability Model (DCAM™) was created by the Enterprise Data Management Council based on the practical experiences and hard won lessons of many of the world’s leading organizations. It is a synthesis of best practices associated with the management of data content across the horizon of interconnected processes. The Data Management Capability Model defines the scope of capabilities required to establish, enable and sustain a mature data management discipline. It addresses the strategies, organizational structures, technology and operational best practices needed to successfully drive data management. It addresses the tenets of data management based on an understanding of business value combined with the reality of operational implementation.

To manage data in today’s organizational environment starts by recognizing that proper data management is about managing data as “meaning”. This is a relatively new concept for many organizations. It is not easy to articulate and not very well understood. Data exists everywhere within an organization and must be managed consistently within a well-defined control framework. The DCAM™ helps identify this framework by defining the capabilities required to make data management a critical part of a firms’ everyday operational fabric.

The challenges of properly managing data are significant. There are many legacy repositories and a plethora of functions to unravel. There are social and political barriers to overcome. There are real IT challenges and execution gaps to address. Data ownership and accountability are hard to implement. Funding is often project based. And many firms simply don’t have the strong executive support that is needed to ensure that the organization stays the course in the face of short term measurement criteria, operational disruption and conflicting stakeholder challenges to properly address the realities of the data management challenge.

We understand this reality because we’ve been there and we have the scars across our back to prove it. Data is foundational. It is the lifeblood of the organization. The “bad data” tax is a significant expenditure for many firms. Unraveling silos and harmonizing data is the prerequisite for eliminating redundancy, reducing reconciliation and automating business processes. Managing data is essential if we are to gain insight from analytics, feed our models with confidence, enhance our service to clients and capitalize on new (but often fleeting) business opportunities. DCAM™ provides the guidance needed to assess current state, and provide the objectives of target state, for your data program.

The DCAM™ is organized into six core components.

1. The ***Data Management Strategy and Business Case*** discusses the elements of a sound data strategy and business case, why it is important and how the organization needs to be organized to implement.
2. The ***Data Management Program and Funding*** discusses what’s organizationally needed to stand up and fund a sustainable Data Management Program
3. ***Data Architecture*** focuses on the core concepts of “data meaning” – how data is defined, described and related.
4. ***Technology Architecture*** focuses on the relationship of data with the physical IT infrastructure needed for operational deployment.
5. ***Data Quality*** refers to the concept of fit-for-purpose data and the processes associated with the establishment of both data control and data supply chain management.
6. ***Data Governance*** defines the operating model and the importance of policies, procedures and standards as the mechanism for alignment among (and compliance by) stakeholders.

Each component is preceded with a definition of what it is, why it is important and how it relates to the overall data management process. These are written for business and operational executives so as to demystify the data management process. The components are structured into 37 capabilities and 115 sub-capabilities. These capabilities and sub-capabilities are the essence of the DCAM™. They define the goals of data management at a practical level and establish the operational requirements that are needed for sustainable data management. And finally, each sub-capability has an associated set of measurement criteria to be used in the evaluation of your data management journey.

Welcome to the world of data management. The EDM Council is indebted to the dozens of members who have contributed to the development of the Data Management Capability Model. We are always searching for ways to enhance and improve the model. We encourage your feedback. We are interested in your rants, raves and alternative points of view. For more information on the DCAM™ and on the EDM Council, please contact us at [info@edmcouncil.org](mailto:info@edmcouncil.org)

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# **FOREWORD**

The concept of data as a foundational component of business operations has arrived. It is now understood as one of the core factors of input into the full spectrum of business and organizational processes. The common theme for firms that are effective in their use of data to reduce operational costs, automate manual processes, consolidate redundant systems, minimize reconciliation and enhance business opportunities is the implementation and management of a data control environment. The reason why firms implement a control environment is to ensure trust and confidence among consumers that the data they are relying on for business processing and decision-making is precisely what they expect it to be – without the need for manual reconciliation or without reliance on data transformation processes.

The core components associated with the implementation of a control environment are needed to ensure that all data elements/attributes are precisely defined, aligned to meaning, described as metadata and managed across the full data lifecycle. The key to establishing a control environment however, is the achievement of “unambiguous shared meaning” across the enterprise as well as the governance of the processes related to ensuring definitional precision. Data must be consistently defined because it represents a real thing (i.e. a product, client, account, counterparty, transaction, legal entity, location, process, etc.). All other processes are built upon this foundation.

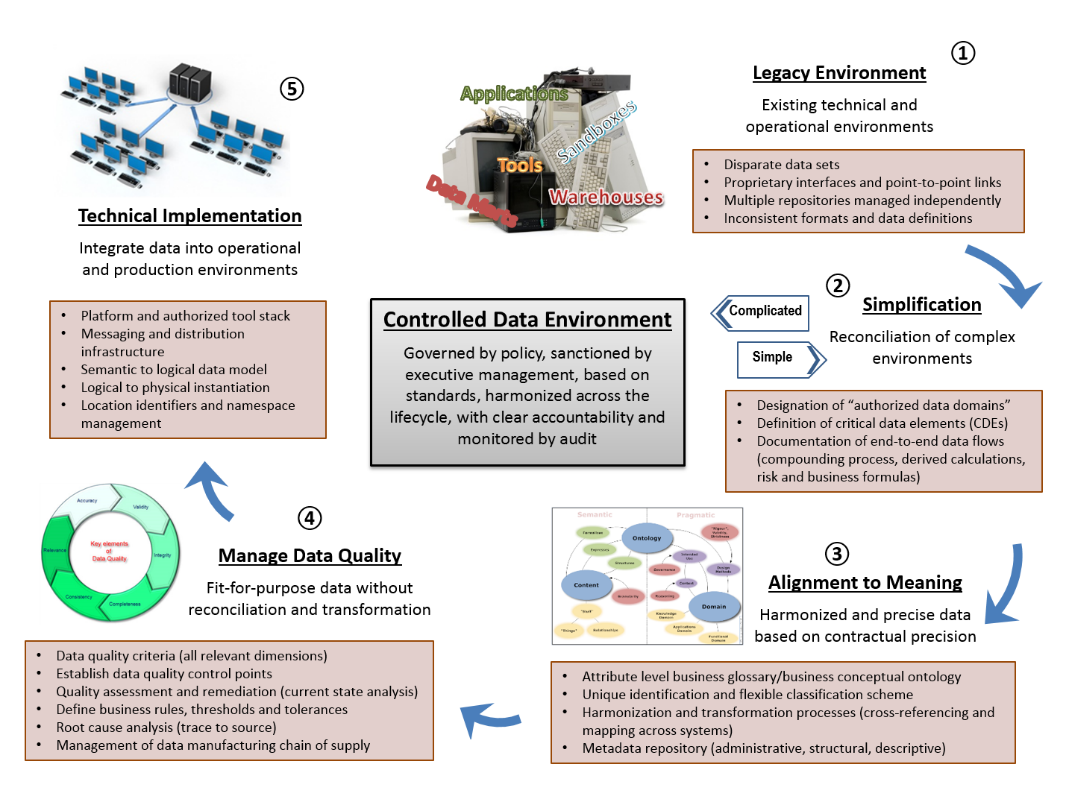
In a fragmented data environment (the opposite of a control environment) applications development can result in ad hoc naming conventions which exacerbate the problem of common terms that have different meanings, common meanings that use different terms and vague definitions that don’t capture critical nuances. For many firms this challenge can be debilitating because there are thousands of data attributes, delivered by hundreds of internal and external sources, all stored in dozens of unconnected databases. This fragmentation results in a continual challenge of mapping, cross-referencing and manual reconciliation. In order to achieve a control environment, every data attribute must be understood at its “atomic level” (as a fact) that is aligned to business meaning without duplication or ambiguity. Managing data as meaning is the key to alignment of data repositories, harmonization of business glossaries and ensuring that applications dictionaries are comparable.

Achieving alignment on business meaning (including the process of how terms are created and maintained) can be a daunting task. It is not uncommon to experience resistance from business users and IT - particularly when there are multiple existing systems linked to critical business applications. The best strategy for reconciliation in a fragmented environment is to harmonize on the legal, contractual or business meaning rather trying to get every system to adopt the same naming convention. Nomenclature represents the structure of data and unraveling data structures/data models are expensive and not necessary. It is better to focus on precisely defining business concepts, documenting transformation processes and capturing real-world data relationships. Once established, existing systems, glossaries, dictionaries, repositories, etc. can be cross-referenced to common meaning.

Managing data as meaning is the cornerstone of effective data management. It needs to be managed along with other “metadata” to ensure consistency and comparability across the enterprise. The other components of metadata can be organized into three core categories: descriptive metadata (i.e. information that identifies where data is located); structural metadata (i.e. information about the physical data layer and how the data is structured) and administrative metadata (i.e. information about when the data was created, its purpose and access rights). Data meaning and metadata management are best understood as the core of your content infrastructure and the baseline for process automation, applications integration and alignment across linked processes.

The implementation and management of a control environment is governed by standards, policies and procedures. These are the essential mechanisms for establishing a sustainable data management program and for ensuring compliance with a control environment in the face of organizational complexity. Managing meaning is the key to effective data management. Meaning is achieved through the adoption of semantic standards. Standards are governed by policy. Policy is established by executive management, supported by data owners and enforced by Corporate Audit. Get the data infrastructure established and governed – it represents the foundation for operational efficiency and must not be compromised.

The following illustration summarized the challenges that a data management professional faces today in their quest to create a control environment.



Summarized into one illustration, achieving a control environment first requires an understanding of the existing legacy data environments (inventory of data; point-to-point links; inconsistent definitions; etc.). Once understood, this disparate environment must be simplified, organized and categorized into defined data domains, with clearly identified data elements and documented data flows. These elements must be aligned to unambiguous shared meaning across the organization through the implementation of controls, policy and governance. Once established, data can now be measured and tracked to ensure quality and consistency with minimal reconciliation. And finally, close alignment to technology throughout this exercise is required to ensure the principles and best practices that have been established are enabled across all the organization’s IT infrastructures.

It is this journey that must be taken to bring about a control environment needed to ensure the highest quality of data is delivered to critical functions throughout your organization.

**Control Environment Capability Objectives**

1. The concept of a control environment is understood by relevant stakeholders and adopted by the organization (standards-based, harmonized across lifecycle, unique identifiers, aligned to meaning). The organization recognizes the need for a control environment to meet business, operational and regulatory objectives.
2. The components associated with a control environment have been defined, verified by stakeholders (i.e. inventoried and confirmed), aligned with technical capability and approved by executive management. Policies, procedures and standards exist for all relevant areas including data quality, data access/distribution, authorized use/entitlement control, data privacy and data security.
3. The framework for implementing a control environment, including reconciliation of disparate systems, have been fully resourced.
4. The standards that are needed to implement the control environment are defined and verified by stakeholders (for relevant products, accounts, clients, business partners, legal entities, counterparties, vendors, etc.). Business processes are identified, documented and aligned with data requirements.
5. Data attributes for relevant business processes are known, segmented according to criticality and understood in the context of how data is compounded/how derived data elements are calculated. Existing systems, processes, repositories and consuming applications across the full data lifecycle are mapped to the control environment standards and aligned with systems of record. Rules and conversion procedures for transformation and cross-referencing are documented. Shared data attributes are identified and mapped to processes and sub-processes.
6. Standard identifiers, metadata and taxonomies are established and integrated across the enterprise for all functions and processes. The process for new standards adoption is documented and implemented.
7. Data in all repositories are aligned to “common meaning” as an ontology. The ontology is modeled and verified by SMEs. There is a common method for defining, achieving agreement, updating and promulgating the concept of “single term, single definition” based on how business processes work in the real world. All changes to the corporate ontology are synchronized and aligned to the systems of record.
8. Procedures are in place to manage changes and exceptions to the control environment.
9. A centralized/aligned metadata repository is implemented and maintained. The metadata repository is managed from descriptive, structural and administrative dimensions.
10. All new product development initiatives, data integration activities and data consolidation efforts use the control environment standards.
11. The control environment is governed across the enterprise with clear accountability. The governance process consists of a combination of IT infrastructure, program management offices, data administrators and data owners.
12. Compliance with the control environment is monitored, measured and audited. Results of the compliance audit is shared with executive management.
13. Communications mechanisms are in place to ensure that the goals, policies and procedures of the control environment are implemented; that business and IT can communicate with each other; that issues can be escalated as appropriate; that priorities are established; that policies and standards are implemented and that employees are in compliance with the control processes.
14. There is close cooperation between the Board of Directors, executive management, lines of business, information technology and operations on the implementation and management of the control environment. Stakeholders receive training in the policies that exist and the procedures that need to be followed to achieve organizational compliance.
15. Executive management sets expectations and gives authority to implement the control environment. Expectations are translated into incentives and operational constraints. Lines of business are managing within established boundaries. Performance is linked to implementation of the control environment.

# **DCAM SCORING GUIDANCE**

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| **SCORE** | **CATEGORY** | **DESCRIPTION** | **CHARACTERITICS** |
| 1 | **Not initiated** | **Not Performed**  [Heroes] | Ad hoc activities performed by heroes |
| 2 | **Conceptual** | **Initial Planning Stages**  [Data Management Group] | Issues being debated; white board sessions |
| 3 | **Developmental** | **Engagement Underway**  [Practitioners] | Key functional stakeholders identified; workstreams defined; meetings underway; participation growing; policies, roles, and operating procedures being established; project/annual funding |
| 4 | **Defined** | **Defined and Verified**  [Business Leads] | Business users active; LOB management with P&L responsibility engaged; requirements verified; responsibilities defined and assigned; policy and standards exist; routines in place; lineage underway; CDEs identified; adherence tracked; multi-year/sustainable funding |
| 5 | **Achieved** | **Adopted and Enforced**  [Executive Management] | Executive management sanctioned; proactive business engagement; responsibilities coordinated; policy and standards implemented; lineage verified; data harmonized across repositories; adherence audited; strategic/investment funding |
| 6 | **Enhanced** | **Integrated**  **[**Board of Directors**]** | Fully embedded into the operational culture of the organization with the goal of continuous improvement |

# **SECTION A: DATA MANAGEMENT STRATEGY & BUSINESS CASE**

# **Chapter 1: The Data Management Program Framework**

## **Data management strategy (DMS)**

*The data management strategy must be specified, shared, reviewed and approved by relevant stakeholders, and it must be enforceable via audit and/or direct executive management support*

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| **1.1.1 Developing the Data Management Strategy** | | |
| *The data management strategy needs to be documented in collaboration with the full spectrum of business, technology and operations management.*  **Sub-Capability Objectives**   * DMS has been documented * DMS has been aligned with business, technology and operations * DMS has been published to all relevant stakeholders | *Advice* | The data management strategy is both a statement of approach and a sales document for stakeholders. Without a formally defined and cohesive strategy, the firm’s approach to data management can become reactive. Without collaboration, the strategy can be viewed as irrelevant to the individual stakeholder |
| *Questions* | * Have all the components of the data management strategy been defined and presented in meaningful terms? * Is the business, regulatory and operational rationales for the data management program defined and verified? * Is the data management strategy aligned with business requirements, implementation plans, technical capabilities and operational processes? * Has the DMS been documented and published? * Is the approach to data management clearly defined? * Are stakeholders aligned on the specified approach? |
| *Artifacts* | * Vision statement – what the data management program will achieve (target state definition) * Definition of the “foundational principles” and illustration of why they are essential * Business requirements and priorities (process for establishing and approving) * Benefits – why are we doing this and what do I get (value proposition and how it aligns to organizational principles) * How the content will be managed (authorized data domains, critical data elements, taxonomies and ontology, identifiers, systems of record) * How data management will be measured (program, outcome, quality, usage) * How data management will be implemented (architectural principles, cross-functional collaboration, operational capabilities, incremental strategy) * How stakeholders will be educated and socialized (communication and training) * How the program will be funded (and monitored)? * How the program will be governed (organizational structure, policy, controls, stewardship/accountability, audit/enforcement * List of stakeholders and evidence of bi-directional feedback * Mapping of strategy to technical and operational capabilities (with verification) * Evidence that the strategy was approved and published |

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| **Not Initiated** | **Conceptual** | **Developmental** | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no data management strategy. | Discussions about the role, function and structure of the DMS are underway. | The DMS concepts are being discussed in collaboration with relevant stakeholders. | The working draft of the DMS is created. The draft has been aligned with business, IT and operations. Discussions are underway with relevant stakeholders. | The DMS has been documented and published to all relevant stakeholders. The alignment of the DMS with IT, business and operations is verified. |  |

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| **1.1.2 Mechanism for Approval** |

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| **Sub-Capability Objectives**   * Mechanism for capturing feedback from relevant stakeholders exists. * Feedback has been collected and incorporated into the DMS. * DMS has been reviewed and approved by relevant stakeholders. | *Advice* | An effective data management strategy needs buy-in from all the key stakeholders within the organization because it has significant operational implications. Stakeholders are more likely to buy-in to the data management program (and make it easier to implement) if they see evidence of their influence over the data management strategy. Data management strategy approval is best managed as an iterative process focused on the needs of business and balanced against the requirements for implementation. |
| *Questions* | * Is there a mechanism for obtaining and verifying feedback from stakeholders on the components of the DMS? * Is there a mechanism for obtaining and verifying feedback from stakeholders on the implementation strategy? |
| *Artifacts* | * Documentation defining the approval process (the mechanism) * List of stakeholders (based on function, not individuals because people leave) * Distribution lists and evidence of bi-directional feedback * Sign-off/approvals |

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| **Not Initiated** | **Conceptual** | **Developmental** | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no approval mechanism. | The need for and mechanism to capture feedback is being discussed. | The mechanism for collecting feedback is defined and shared with stakeholders. | The mechanism for collecting feedback is verified. | Formal mechanism for approval is in place. Feedback has been collected and incorporated into the DMS. The DMS is approved by named stakeholders. |  |

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| **1.1.3 The Strategy is enforceable (by Audit or the equivalent function)** |

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| **Sub-Capability Objectives**   * Audit has reviewed and approved the DMS. * Audit has determined that its implementation can be enforced via existing corporate audit examinations | *Advice* | | Engagement with audit is an important way to ensure that the data management program is viable from an organizational point of view. This will probably require education of audit about data management concepts and principles. This early stage activity (and the development of a partnership) with audit can also help ensure their engagement in oversight as a priority. If the DMS can be audited, it becomes “real” in the eyes of both the organization and the regulators. Audit can be a good friend to the implementation of a sustainable data program. | |
|  | | *Questions* | | * Is audit familiar with the concepts associated with data management? * Has audit reviewed and determined that the data management program can be audited via scheduled exams? |
| *Artifacts* | | * Communication with audit about the concepts in the DMS * Review and approval of the data management strategy * Verification that the DMS can be enforced and audited |

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| **Not Initiated** | **Conceptual** | **Developmental** | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no alignment between the DMS and related audit processes. | The auditability of the DMS is under discussion. | Audit is reviewing the DMS. | Feedback from audit has been collected and is being incorporated into the DMS. | Audit has reviewed and determined that the DMS can be audited via scheduled exams. | Audit is actively conducting examinations of data programs to ensure adherence to the DMS. |

## **Data management goals and objectives**

*The DMS describes the reason and purpose of establishing a data management program, incorporating enterprise and business line objectives and priorities*

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| **1.2.1 Alignment with Organizational Objectives** |

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| *High level organizational objectives are those identified by executive management as organizational goals (i.e.: the organizational objective is to improve customer support and services).*  **Sub-Capability Objectives**   * DMS is fully mapped to and aligned with the high-level organizational objectives * DMS is approved by the executive committee and relevant stakeholders * Process is established to ensure the future alignment of the DMS to organizational objectives | *Advice* | The goal is to ensure that the data management strategy supports the current objectives of executive management. These high-level objectives need to be translated into “data concepts” and evaluated against gaps and inefficiencies (pain points) that currently exist within the organization. A data management program that is not synchronized with the high-level objectives of the organization can result in a misalignment of data priorities and a perception of being irrelevant to executive management. This can reduce the executive “air cover” needed to implement the data management program. |
| *Questions* | * Has the data management strategy been aligned (and mapped) to organizational objectives? * Has the alignment been verified and approved by stakeholders and executive management? |
| *Artifacts* | * Mapping of strategy to organizational objectives to data concepts (with verification from executive committee and stakeholders) * Alignment of strategy to capability (i.e. what’s required from the perspective of data architecture, information technology and operations) * High-level roadmap on how the strategy will be implemented * Evidence of bi-directional feedback * Distribution lists and approvals from stakeholders |

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| **Not Initiated** | **Conceptual** | **Developmental** | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no alignment with high-level organizational objectives. | The alignment between DMS and high-level organizational objectives is being debated. | High level objectives are in the process of being identified and aligned to data management strategy. | High level objectives have been identified. Mapping and alignment of objectives to strategy is verified by relevant stakeholders. | The DMS alignment with high-level organizational objectives has been approved by executive committee. | A process is established to ensure the future alignment of the DMS to organizational objectives. |

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| **1.2.2 Alignment with Business Requirements** |

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| *High level business requirements are those identified by the lines of business, often reflecting the high level organizational requirements identified by executive management. It is important that the DMS reflect both the organizational requirements as well as high level LOB requirements.*  **Sub-Capability Objectives**   * High level business requirements for critical business lines and corporate functions have been documented. * High level business requirements for critical business lines/corporate functions have been verified and incorporated into the DMS. | *Advice* | High-level business requirements (objectives, goals, pain points and priorities) are derived based on discussions with representatives from the lines of business. The discovery process and verification of these requirements is done on an iterative basis and needs to be balanced against operational reality as well as budgetary requirement. The goal is not only to define requirements/objectives – but to prioritize them based on dependency, budget and implementation reality. The overall objectives of the data management strategy are confidence (based on defined objectives) and buy-in (including how the program will operate and what it will mean to/what is expected from the various stakeholders).  The investment in a shared understanding of the objectives of the data management strategy is essential if you want stakeholders to buy-into the long view. You don’t want to build a data management strategy in a vacuum – make sure it reflects the requirements of the LOB. |
| *Questions* | * Have the objectives of the data management program been defined and verified? * Have the high-level business requirements been incorporated into the DMS? * Have the business requirements been verified, prioritized and sequenced? |
| *Artifacts* | * Documentation of the high-level requirements and objectives (verification) * Process for establishing priorities and sequences (approved) * Bi-directional communication |

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| **Not Initiated** | **Conceptual** | **Developmental** | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no formal relationship between business requirements and data management. | High level business requirements related to data management are under discussion. | High level business requirements are being identified. Alignment of the data management strategy to these requirements is in process and shared with relevant stakeholders. | The alignment of high level business requirements in the DMS have been verified. | High level business requirements have been defined and incorporated into the DMS. |  |

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| **1.2.3 Stakeholder Prioritization and Approval** |

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| **Sub-Capability Objectives**   * Business requirements (incorporated into the data management strategy) have been reviewed, prioritized and approved by identified stakeholders. * Regular requirements review cycles have been established. | *Advice* | This should be linked to the process for defining priorities and high-level organizational objectives. Regulators, auditors and stakeholders will want to understand how the firm is addressing the flow of priorities and how they are correlated to both funding and operational realities. Discussions about funding can unveil real LOB priorities. This prioritization and approval process will clarify what will be (as well as won’t be) done as part of the data management program. It is also important to define and expose how the firm will deal with new issues as they arise. |
| *Questions* | * Has the process for prioritizing and approving high-level business requirements been prioritized and approved? * Have the priorities included links and dependencies? * Have the priorities been aligned with data concepts, budget, IT and operations (and verified)? * Is there a process for review and prioritization of new requirements? |
| *Artifacts* | * Documentation of the prioritization process (process diagrams) * Documentation of priorities (verified, approved) |

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| **Not Initiated** | **Conceptual** | **Developmental** | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no prioritization or approval process. | The need for a prioritization of requirements is being discussed. | The process of prioritizing requirements is taking place and being shared with relevant stakeholders. | Business priorities have been identified and verified. | Business requirements have been reviewed, prioritized, approved by stakeholders and incorporated into the DMS. | Regular business requirements review cycles have been established. |

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| **1.2.4 Alignment of Strategy with Business Case** | | | | | | | |
| *The data management business case must align and reflect the enterprise and business-line objectives, drivers and requirements as detailed in the data management strategy.*  **Sub-Capability Objectives**   * The DM Business Case is mapped and aligned with organizational priorities and objectives. * The DM Business Case is aligned with the strategic business line priorities and objectives | | *Advice* | | The Data Management Business Case is the justification for creating and funding a data management program. The DM Business Case answers the "why" questions. It addresses the "so what" challenges. It articulates the major data and data related issues facing a firm or business function and describes the expected outcomes and benefits that can be achieved through the implementation of a successful data management program.  The business case can incorporate a combination of ‘defensive’ (regulatory, risk, compliance) and ‘offensive (business enablement, analytics, operational efficiencies) objectives. Core objectives have to be defined. Implementation approaches have to be articulated. The value propositions need to be clearly stated in ways that are meaningful to stakeholders. | | | |
| *Questions* | | * Does the justification of the business case align with the data management strategy? * Are the objectives defined and verified? * Are the value propositions clearly specified? | | | |
| *Artifacts* | | * Business case documentation * Alignment between business case, strategy, organizational objectives and priorities | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no business case for data management. | The alignment of the data management business case to drivers, requirements and strategy are under discussion. | | The draft business case is being reviewed by stakeholders. | | The business case is aligned with business objectives and strategic priorities of the lines of business. Stakeholder feedback is captured and incorporated. | The business case is mapped to (and aligned with) organizational priorities and objectives. |  |

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| **1.2.5 Defining and Sequencing Business Outcomes** | | | | | | | |
| *A primary function of the business case is to define the challenges of the current state and to define the pathway to improvement.*  **Sub-Capability Objectives**   * Expected outcomes are defined and sequenced. * Current-to-Target State is defined and articulated | | *Advice* | | Data is a core factor of input into many business processes. Dependencies have to be defined and verified across the organization. Because of the scope and breadth of data management, issues need to be prioritized and sequenced. This process needs to be formal (and transparent) if you are to avoid confusion and manage expectations. Strong communication about priorities, sequences and dependencies is essential. | | | |
| *Questions* | | * Have data access and delivery dependencies been defined and verified? * Have critical data management concepts been aligned with business outcomes (prioritized, sequenced and verified) * Is there a communication strategy in place to provide visibility and transparency to stakeholders? | | | |
| *Artifacts* | | * Definition of business outcomes * Sequence plans and schedules * Stakeholder communication (feedback on priorities) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Business outcomes from the data management initiative are not defined. | The expected outcomes and sequence plans from the data management initiative are being formulated. | | The expected outcomes and sequence plans from the data management initiative are under review by involved stakeholders. | | Expected outcomes from the data management initiative are defined and sequenced. | Current to target state is defined and documented. |  |

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| **1.2.6 Stakeholder Business Case Validation** | | | | | | | |
| *Buy-in is predicated on stakeholder validation of the viability of the proposed program*  **Sub-Capability Objectives**   * The DM Business Case has been socialized to program stakeholders. * Target objectives have been reviewed and validated. * Outcomes, benefits, timelines and target thresholds have been reviewed and approved. | | *Advice* | | Key stakeholders (executive management, LOB decision makers) must review the business case and validate both objectives and approaches. This process needs to be formalized and ongoing as new priorities are introduced and existing ones are completed. | | | |
| *Questions* | | * Has the business case been socialized to the relevant stakeholders? * Have target objectives been reviewed and verified? * Have outcomes, benefits, timelines and thresholds been approved? | | | |
| *Artifacts* | | * Stakeholder lists * Evidence of business case distribution * Mechanism for verification and validation by stakeholders | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no business case for data management. | The processes associated with developing a data management business case are being discussed. | | The high-level business case has been socialized with program stakeholders. Feedback has been captured. | | Target objectives have been reviewed and verified. | Outcomes, benefits, timelines and thresholds have been reviewed and approved. |  |

## **Foundational principles of data management**

*It is essential that the data management strategy presents and describes the key data principles – manage and align data content to unambiguous meaning, and establish a data governance structure that ensures adherence to best practices.*

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| **1.3.1 Harmonization to Meaning** | | | | | | | |
| **Sub-Capability Objectives**   * The DMS describes the role of data architecture and data engineering (to identify and define data) * The DMS describes the importance of understanding data harmonization, alignment to meaning, mapping and lineage | | *Advice* | | One of the key principles of any data management program is focus on data content. Data engineering defines how data is identified, defined and modeled, and how these definitions are used throughout the organization. The DMS needs to clearly state this distinction to ensure stakeholders understand the difference and support the objectives of this capability. | | | |
| *Questions* | | * Does the organization understand the objectives of data engineering? * Is there an understanding of how this discipline is needed to work in collaboration with technology? * Are the business stakeholders involved and do they understand their role as staked in the DMS regarding data engineering? | | | |
| *Artifacts* | | * Evidence of data engineering understanding and transparency in the DMS. | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| DMS does not reflect the concept of data engineering and harmonization of meaning. | The concepts of data engineering and the importance in a data management program is being discussed. | | The concepts of data engineering are being articulated and are being added to the data management strategy. | | Data engineering concepts have been added to the data management strategy. | The concepts of data engineering and data alignment to meaning have been communicated, are understood and approved by program stakeholders. |  |

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| **1.3.2 Data Domain Prioritization** | | | | | | | |
| *Data domains are logical categories of data that are designated as prioritized factors of input into critical business functions. For example, “trade data” or “regional sales data” could be designated as authorized data domains. Data domains are identified based on the strategic understanding of business requirements and an awareness of the organizational priorities.*  **Sub-Capability Objectives**   * DMS defines the importance of identifying and prioritizing data domains. * DMS defines the need to create and govern the data domain inventory. | | *Advice* | | Define the concept (and importance) of authorized data domains within the DMS. Establish the principles associated with defining, verifying, mapping dependencies and ensuring the appropriate usage of ADD. In general terms, expect the organization to define between 12-18 domains of data. The specific definitions of ADD are created in collaboration with LOB – but the discussion about “what is a domain” and “whether domains are to be based on risk areas or customer profiles” needs to be incorporated into strategy. The concept of ADD needs to be combined with the concept of “toll gates” to ensure that stakeholders are using the appropriate/authorized data domain. | | | |
| *Questions* | | * Has the concept of authorized data domains been created in collaboration with business? * Has the importance of authorized data domains been socialized? * Are the concepts associated with toll gates defined and socialized? | | | |
| *Artifacts* | | * Definition of the concept of authorized data domains * Definition of the concept of toll gates | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| DMS does not reflect the authorization process for data domains. | The concept of authorized data domains is under discussion. | | The concept of data domain management is being developed and shared with relevant stakeholders. | | The importance of designated data domains is defined and verified. | The DMS defines the requirements needed to create and govern the data domain inventory. |  |

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| **1.3.3 Data Engineering Concepts** | | | | | | | |
| *Data engineering focuses on the design, definition, management and control of data content. This includes giving data business meaning, describing its metadata, and designing and managing taxonomies and ontologies*  **Sub-Capability Objectives**   * Data engineering concepts are defined and incorporated into the DMS. * Data engineering concepts are aligned with stakeholder plans and roadmaps. * Data engineering concepts are approved by relevant stakeholders. | | *Advice* | | Data engineering is the practice of identifying, defining and locating a firm’s information assets and the disciplines that support these objectives. Engineering concepts include…   * Identifying and prioritizing “authorized” data domains * Adhering to data modeling best practices * Establishing standard entity identifiers * Designating critical data entities (CDEs) * Populating metadata * Defining data classifications   Data is the representation of “real things”. The notions of “taxonomies” (hierarchical structure) and “ontology” (definitions, interdependencies and relationships) must exist as a core component of DMS. It is essential that stakeholders understand the data engineering concepts and are part of this process so they can help articulate requirements from a data (not IT) perspective.  This discussion holds the potential to bring a lot of stakeholders (IT, architects, business, operations) into collaboration about the objectives of the data management program. Once the concept of data content engineering is understood, it must be aligned with both IT (integration) and operations (process management). | | | |
| *Questions* | | * Do stakeholders understand the differences between “data processing” and “data content?” * Have the foundational concepts of “identify,” “describe” and “locate” been articulated in the DMS? * Have data architecture concepts been aligned with stakeholder plans and roadmaps? | | | |
| *Artifacts* | | * Lists of (business, IT, operations, architecture) stakeholders * Bi-directional communication about data engineering concepts * Evidence (minutes, agendas) about the alignment of data architecture with IT and operations | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data engineering concepts are not defined in the DMS. | The importance of data engineering concepts is under discussion. | | Data engineering concepts are defined and shared with involved stakeholders. | | Data engineering concepts are verified and accepted by involved stakeholders. | Data engineering concepts are defined and incorporated into the DMS, aligned with stakeholder plans and approved. |  |

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| **1.3.4 Data Governance Concepts** | | | | | | | |
| **Sub-Capability Objectives**   * The DMS specifies the need for the creation of a data governance program. * The DMS articulates the purpose, objectives and expected outcomes of the data governance program | | *Advice* | | Governance focuses on the organizational requirements necessary to ensure that the objectives of the data management program can (and will) be implemented. It is critical that the organization understands what they are governing as well as the practical aspects of getting stakeholders to alter behavior before seeking to implement operational governance structure.  Don’t lead with governance details too early in the data management program development cycle. At the strategy level, the primary goal is buy-in to the fact that data management is a mandatory activity – and that it will change the way people operate. Early and interactive engagement with critical stakeholders will help reinforce buy-in. Think of this as “crafting the governance deal” with an appropriate balance between the concepts of governance (clarity on need), the value of governance (coordination and predictability) and the impact of governance (operational and cultural implications). | | | |
| *Questions* | | * Is the purpose, objectives and expected outcomes from the governance process defined and verified * Has the high-level operational approach been defined, reviewed and approved? | | | |
| *Artifacts* | | * Documentation on the purposes and objectives of governance * List of stakeholders (evidence of bi-directional communication) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data governance concepts are not identified in the DMS. | The importance of data governance is under discussion. | | Data governance concepts are defined and shared with involved stakeholders. | | Data governance concepts are verified and accepted by involved stakeholders. | Data governance concepts and objectives have been defined, approved by relevant stakeholders and incorporated into the DMS. |  |

## **Practical Considerations**

*The DMS must be practical and pragmatic. Therefore, it is important that the goals and objectives stated in the strategy document are consistent with and achievable given the resources and capabilities of the architecture, IT and operations support groups*

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| **1.4.1 IT Concepts and Capabilities** |

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| *Technology concepts refer to the strategy, design and implementation of the physical infrastructure (platforms and tools) in support of the DMS.*  **Sub-Capability Objectives**   * Technology concepts are incorporated into the DMS. * Technology concepts are aligned with stakeholder plans and roadmaps. * Technology concepts are approved by relevant stakeholders. | | *Advice* | | Ensuring the alignment of IT with data architecture is critical. IT should be viewed as the implementation partner for the data management program. It is just as important to align the data objectives with IT reality. Invest in this IT partnership, it is essential for long-term success of the data management program. | | | |
| *Questions* | | * Have the IT concepts related to the data management program been defined, verified and accepted? * Have IT concepts been aligned with stakeholder plans and roadmaps (verified and approved)? | | | |
| *Artifacts* | | * List of IT stakeholders * Alignment of IT concepts with stakeholder plans and roadmaps * Bi-directional communication between ODM and IT | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Technology concepts are not defined in the DMS. | The importance of technology concepts is being debated. | | Technology concepts are defined and shared with involved stakeholders. | | Technology concepts are verified and accepted by involved stakeholders. | Technology concepts are aligned with stakeholder plans/roadmaps, approved and incorporated into the DMS. |  |

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| **1.4.2 Operational Concepts and Capabilities** | | | | | | | |
| *Operational concepts include such areas as uptime requirements; business continuity planning; retention and archiving guidelines; defensible destruction requirements; privacy standards; etc.*  **Sub-Capability Objectives**   * Operational concepts are incorporated into the DMS. * Operational concepts are aligned with operational goals and objectives. * Operational concepts have been approved by relevant operations groups. | | *Advice* | | The data management strategy must reference operational objectives (i.e. uptime, quality criteria, BCP, retention and archive, defensible destruction). | | | |
| *Questions* | | * Have the operational concepts been defined, verified and accepted? * Have the operational concepts been incorporated into the data management strategy? | | | |
| *Artifacts* | | * List of operational stakeholders * Evidence of alignment of operational concepts into the DMS | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Operational concepts are not defined in the DMS. | Inclusion of operational concepts into the DMS are being discussed. | | Operational concepts have been identified and shared with relevant stakeholders. | | Operational concepts have been verified and accepted by relevant stakeholders. | Operational concepts are aligned with stakeholder plans/roadmaps, approved and incorporated into the DMS. |  |

## **Program Implementation Approach**

*Once the foundational elements of the program have been discussed, the DMS must next describe how the program will be rolled out. This will include describing the importance of data governance and how the governance program will be structured and implemented, and the need for a communication and training program.*

*Additionally, implementing data management is impacted by the nature and culture of the organization. The DMS needs to consider the breath, depth and scope of implementation, based on the specific organization. In this, the DMS must consider the best way to demonstrate early successes needed to garner sustainable support.*

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| **1.5.1 Data Governance Framework** | | | | | | | |
| *The operational objectives and approach associated with the data governance program (i.e.: policy driven; centralized vs. federated, assignment of authority, etc.) are addressed in the DMS*  **Sub-Capability Objectives**   * High level objectives of  data governance are addressed * The operational objectives are described. | | *Advice* | | This is the place to address (up-front) some of the more challenging organizational issues about how data governance will affect stakeholders. Don’t underestimate the difficulties associated with (or minimize the importance of) getting agreement on essential concepts like authority, policy and control. | | | |
| *Questions* | | * Has the high-level operational approach been defined, documented and verified? * Does it cover the core areas (i.e. federated vs. centralized vs. hybrid, the role of policy, the types of roles, coordination processes, role of standards, concept of CDEs, requirements for authorizations)? | | | |
| *Artifacts* | | * Documentation of operational approach * List of stakeholders and evidence of communication * Verification and approval of operational approach | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| How the data governance program will operate has not been addressed | The data governance operational model is being discussed | | The high-level operational design of the governance model is being discussed and debated, for inclusion into the DMS | | The high-level data governance operational approach has been designed, and has been reviewed and approved by relevant stakeholders | The high-level data governance organizational approach is included in the DMS. |  |

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| **1.5.2 Governance Structure (roles and functions)** | | | | | | | |
| *High-level structure, roles and responsibilities of the data management organization as well as the roles and responsibilities of the business-line data executives and data stewards are addressed in the DMS.*  **Sub-Capability Objectives**   * The DMS describes the target state structure of the governance program * The DMS identifies the relevant governance stakeholder roles and responsibilities. | | *Advice* | | This is about how the governance process will work in reality. It is important to evaluate roles and functions from all perspectives including sponsors (executive authority), owners (accountable parties), and stewards (both business stewards to manage content and IT stewards to manage technical implementation). | | | |
| *Questions* | | * Has the high-level structure been defined and socialized? * Have the roles and responsibilities of the data management organization been defined and verified? | | | |
| *Artifacts* | | * Documentation of high-level roles and responsibilities * Distribution lists and evidence of communication | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| The data governance structure, roles and responsibilities are not addressed in the DMS. | Governance structure, role and responsibility concepts are being discussed. | | Governance concepts are being developed. | | Governance concepts are defined and are being discussed with relevant stakeholders. | Governance structure, role and responsibility concepts are incorporated into the DMS. |  |

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| **1.5.3 Communication Strategy** | | | | | | | |
| *A communication strategy is a critically important component of a data management strategy and must be designed and implemented according to the culture of the organization. A communication strategy heightens awareness and informs stakeholders of the goals, objectives, scope, priorities, policies and standards of the data program.*  **Sub-Capability Objectives**   * DMS identifies the need for a communication strategy. * DMS defines the goals and objectives as well as the scope and core components of the communication strategy | | *Advice* | | Communications is not a sideline activity. It would benefit from a dedicated staff of professionals. Introduce the concept of continual communications to reinforce data management concepts - this is not a “one and done” process. Think about a variety of communications channels and mechanisms to keep the content fresh. Think about ways to involve the full spectrum of participants (i.e. PR, HR, executive management, audit) in the communications program. There are lots of subtle (but critical) concepts like the difference between “correcting bad data” and “fixing data problems at the source.” Be sure to understand that communication is a two-way street - and needs a mechanism for discussions about value derived vs. the inevitability of operational disruption. | | | |
| *Questions* | | * Has the importance of communication and training been defined as part of the data management strategy (including onboarding of new employees) * Does the communications strategy define the core goals and objectives of the data management program (i.e. data objectives vs. governance vs. ecosystem vs. integration)? | | | |
| *Artifacts* | | * Communications program definition and components * List of stakeholders (bi-directional communication) * Definition of mechanisms for engagement | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| The need for a communication strategy is not addressed in the DMS. | The need for a communication strategy is being discussed. | | The concepts of a communication strategy are being developed. | | The concepts of a communication strategy are defined and shared with relevant stakeholders. | Communication strategy concepts are incorporated into the DMS. |  |

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| **1.5.4 Education and Training** | | | | | | | |
| *An education and training program is needed to ensure stakeholder understanding, buy-in and compliance to the data management program*  **Sub-Capability Objectives**   * DMS defines the need for training on the purpose and objectives of the data management program. * The DMS addresses the approaches and methodologies for a comprehensive data management training program. | | *Advice* | | Training has a broad scope and all components need to be included in the data management program. Consider areas such as “functional” training (i.e. the role of the data steward); “operational” training (the implications of the data management program and where stakeholder go for support); “concept” training (why data management is critical and what is meant by adopting a data management culture); and “dependency” training (how to collaborate to effectively manage data assets). The objective is continual reinforcement of the objectives of the data management program. Top-of-the-house support of the training program resonates across the organization (and helps loosen purse strings). Look for opportunities to partner with human resources and ways to tie data management (and training) into compensation and retention. | | | |
| *Questions* | | * Has the importance of training been defined as part of the data management strategy? * Have the components of the data management training program been evaluated for completeness and value? | | | |
| *Artifacts* | | * Training program definition and components * Approaches and methodologies to be used * List of stakeholders and evidence of bi-directional communication | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| The need for an education and training program is not addressed in the DMS. | The need for an education and training program is being discussed. | | The concepts of an education and training program are being developed. | | The concepts of an education and training program are defined and shared with relevant stakeholders. | Education and training program concepts are incorporated into the DMS. |  |

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| **1.5.5 Scope and Program roll-out** | | | | | | | |
| *Addressing the roll-out strategy is a critical element of the data management strategy. The scope and speed of implementation must fit the culture of the organization to ensure strong support and overall program success*  **Sub-Capability Objectives**   * DMS defines the scope, breadth and depth of the program implementation * The roll-out strategy has been reviewed and approved by program stakeholders | | *Advice* | | Make sure that the issue of program roll-out is discussed in the DMS. Because this program represents change, there will be resistance unless the scope and speed of roll-out is pre-determined and strong support is achieved. | | | |
| *Questions* | | * Is the data program rolling out at the enterprise level? * If the program is rolling out LOB by LOB, what is the order, and are the senior executives from the LOBs aware of their role and responsibility * Has the roll-out strategy been reviewed and approved by program stakeholders? | | | |
| *Artifacts* | | * Rollout strategy is included in the DMS | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| The is no roll-out strategy addressed in the DMS. | The roll-out strategy is being discussed. | | The roll-out strategy is being developed. | | The roll-out strategy has been defined and is being discussed with program stakeholders. | The DMS contains a planned, communicated and approved roll-out strategy. |  |

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| **1.5.6 Prioritization and Sequencing** | | | | | | | |
| *The DMS should articulate the order in which the program will be rolled out and the concept of trail or POCs to begin.*  **Sub-Capability Objectives**   * DMS defines what elements of the program will be implemented and in what order * DMS defines optional proof of concept implementations | | *Advice* | | Does the data management strategy address the order of rollout and does it consider the concept of doing trail projects or POCs? These are often important first steps used to garner support from the LOBs impacted by the new program. Check to see if the DMS addresses these questions. | | | |
| *Questions* | | * What areas of the firm will be impacted by the new data program? (rollout best if aligned to the business case). * Has the organization considered implementing a trial or POC as a way to demonstrate the viability of the data program? (As a rule of thumb, trials or POCs need to be minimal in duration – 30 to 90 days) | | | |
| *Artifacts* | | * Rollout sequence, POC considerations should be addressed in the DMS | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| The is no roll-out sequencing addressed in the DMS. | Roll-out sequencing and POC considerations are being discussed. | | Roll-out sequence and POC are in development. | | Roll-out sequence has been defined; POC have been identified and discussed with program stakeholders. | The DMS has a defined and approved rollout sequence and agreement from program stakeholders on POC implementations. |  |

## **Measurement and Evaluation**

*Developing practical and informative metrics is important to the success of a data management program. This capability ensures that the data management strategy appropriately calls out the need for and describes the high-level strategy for measuring the program.*

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| **1.6.1 Program Metrics** | | | | | | | |
| *Program metrics focus on the progress of the data management program including implementation, operational effectiveness and the progress that stakeholders are making in aligning and adhering to data policies and standards.*  **Sub-Capability Objectives**   * The DMS calls for the development of metrics to track program progress and measure adherence * Metric plans are socialized with relevant stakeholders. * Feedback is received and incorporated into the data management strategy. * Stakeholders review and approve the metric plans and approach | | *Advice* | | The goal within strategy is to call out the need for metrics, define the conceptual categories that will be measured and let stakeholders know that they will be evaluated. We would expect to see measurement concepts that relate to the data management program (policy, standards, skill sets, roles and responsibilities, governance processes, stewards appointed, etc.) as well as notification that these metrics will be used to ensure the success of the DMP. | | | |
| *Questions* | | * Has the concept of metrics related to the data management program itself been defined? * Have the program-related metric plans been socialized and verified? | | | |
| *Artifacts* | | * Definition of program metric categories within the strategy documents * Roster of stakeholders and evidence of bi-directional communication * Approvals and sign-off | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| The need to develop program tracking metrics is not addressed in the DMS. | The concept of developing program tracking metrics is being discussed. | | Program metric concepts are being developed. | | Program metrics concepts are defined, and have been shared with and approved by relevant stakeholders. | Program metric concepts are incorporated into the DMS. |  |

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| **1.6.2 Data Quality Metrics** | | | | | | | |
| *Data quality metrics are part of an overall data quality strategy and program. DMS must identify the importance of developing practical data quality metrics to ensure critical data is accurate, complete and fit for purpose.*  **Sub-Capability Objectives**   * The DMS calls for the development of data quality metrics * DQ metrics (and DQ plans) are socialized with relevant stakeholders * Feedback is received and incorporated into the DMS * Stakeholders review and approve the data quality metric strategy, plans and approach | | *Advice* | | This is about defining the measurements of quality and the concepts of fit-for-purpose data. We would expect to see measurement concepts related to accuracy, consistency, timeliness, conformance to standards, coverage, duplication and consistency – both qualitative and quantitative. Stakeholders need to be clear that metrics are designed to identify process weaknesses and drive remediation. | | | |
| *Questions* | | * Does the DMS call for the development of metrics related to data quality? * Are the categories and objectives socialized and verified? * Is the process for defining fit-for-purpose embedded into the DMS? | | | |
| *Artifacts* | | * Criteria used to evaluate data quality * Distribution lists and evidence of bi-directional feedback | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| The approach to tracking data quality is not addressed in the DMS. | Data quality metrics are being discussed. | | Data quality metric concepts are being developed. | | High-level data quality metric concepts are defined, and have been shared with and approved by relevant stakeholders. | Data metric concepts are incorporated into the DMS. | The approach to tracking data quality is not addressed in the DMS. |

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| **1.6.3 Outcome Metrics** | | | | | | | |
| *Outcome metrics are measurements of the net effect of the data management program. Types of outcome metrics would include such items as lowering of operational fails, streamlined reporting, reduction in data reconciliations, improved data discovery and access to critical data, etc.)*  **Sub-Capability Objectives**   * The DMS calls for the development of outcome metrics. * Outcome metric plans are socialized with relevant stakeholders * Feedback is received and incorporated into the DMS * Stakeholders review and approve the outcome metrics plans and approach | | *Advice* | | So what are we getting for our compliance with the data program? Stakeholders need to understand the concept of “factor of input” and “data interoperability” and “harmonization” and “process automation.” It is important to measure value – but remember - data is only one input component. It is quite possible to have good data, but not achieve the desired outcome because of some operational deficiency. Measuring areas such as STP, reduction of repairs, improved discovery, consolidation of IT are multi-dimensional and not always easy to trace back to data management. When all else fails – send them to this link ([Aristotle Metaphysics](http://plato.stanford.edu/entries/aristotle-metaphysics/)) | | | |
| *Questions* | | * What are the expected operational outcomes associated with data management and proper data hygiene? * How will the organization measure both the defensive (risk and cost) and the offensive (predictive analytics, market penetration) value of data management? * Do stakeholders understand the core concepts associated with data as a trusted factor of input? * Do stakeholders understand the concepts of linked analysis and causality? | | | |
| *Artifacts* | | * Outcome metric categories * Statements about the role of data as a trusted factor of input (i.e. can you respond to this line of questioning) * Distribution lists and evidence of bi-directional communication * Copies of college diploma where they were supposed to learn basic concepts associated with understanding compound relationships | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| The need to develop outcome metrics are not addressed in the DMS. | The concept of outcome metrics is being discussed. | | Outcome metric concepts are being developed. | | Outcome metric concepts are defined, and have been shared with and approved by relevant stakeholders. | Outcome metric concepts are incorporated into the DMS. |  |

# **SECTION B: DATA CONTENT & MEANING MANAGEMENT**

# **Chapter 2: Data Engineering**

## **Data Inventory and Catalogue**

*The first step in developing a data engineering discipline is to identify and inventory your data. This involves catalogues “logical” domains (the categories of data needed to conduct business), and then identifying the existing physical, underlying data stores where these data can be found. Finally, to ensure consistent use, enforcing their use via policy.*

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| **2.1.1 Implementing Logical Data Domains** | | | | | | | |
| *Logical domains of data represent the data (not the “databases”) that are needed to satisfy the business requirements. Logical data domains fall into three categories - reference data; transactional data; and derived data. Identification of these domains must be driven by the Business from the perspective of “what* ***data*** *is needed to perform the required business functions?”*  **Sub-Capability Objectives**   * Business stakeholders have been selected to drive the identification of the logical data domains. * Logical data domains have been prioritized; authorized data domains are established | | *Advice* | | The overall goal is to ensure proper usage of data and to get stakeholders to think about data management in terms of data content concepts and not the physical repositories (databases). All of this needs to be based on an understanding of how the business functions operate in reality. Once the logical domains (categories) are defined, they must be mapped to their physical locations and associated with authorized distribution (provisioning) points. | | | |
| *Questions* | | * Has the firm identified and declared the categories of data needed to satisfy business requirements? * Has this been performed and verified in conjunction with business users? * How will the use of authorized domains be governed and enforced? * Is the distinction between “data categories” and “databases” clear? * Are governance processes in place to ensure the use and maintenance of authorized data domains? | | | |
| *Artifacts* | | * Criteria used to declare data domains as defined and authorized * Declaration of data domains (as authorized) * Identification and definition of authorized distribution points * Policy indicating what authorized data domains are and how they are to be used * Bi-directional feedback from business users and IT (verification) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Logical data domains have not been defined. | Logical data domains are proposed. Business stakeholders are identified to participate in the identification process. | | Business stakeholders are selected to identify logical data domains. Business stakeholders are confirmed, engaged and participate. | | Logical data domains are validated by involved stakeholders. | Logical data domains have been identified, prioritized and sanctioned. |  |

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| **2.1.2 Documenting and Mapping to Physical Repositories** | | | | | | | |
| *The identification and location of a firm’s data assets must be captured and maintained*  **Sub-Capability Objectives**   * Physical repositories underlying logical data domains have been identified and inventoried * Aggregate databases have been identified and inventoried * Analytic databases have been identified and inventoried * Off-premise; streaming; archive and cloud data have been identified and inventoried | | *Advice* | | Physical repositories exist throughout the organization. They include the reference and transactional used to populate the logical domains. They include aggregate data stores such as warehouses; time-series databases; Hadoop environments; data lakes; BIG data repositories; and analytic databases. And they include off-line storage; streaming data; archiving and cloud.  *All of these data assets must be identified and located, and this information must be actively maintained in a data inventory.* This is a critically important component of a robust data architecture environment. When assessing the data environment, ensure that this step is included and prioritized in the data program. | | | |
| *Questions* | | * Have the inventories of data been compiled and verified? * Have the authorized data domains been mapped to their physical location? * Are controls implemented to ensure namespace integrity and accessibility? * Has policy been drafted, verified and sanctioned on the use of authorized distribution points? | | | |
| *Artifacts* | | * Inventory of data repositories and authorized distribution points * Mapping of authorized data domains to physical location * Policy statements on the use of authorized distribution points | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Physical repositories have not been identified. | The identification of physical data domains is underway. | | The inventory of physical domains is identified and shared with involved stakeholders. | | Physical repositories are linked to logical domains. The linkage has been documented and verified. | Physical repositories have been designated and the inventory is actively maintained. |  |

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| **2.1.3 Data Domain Authorization** | | | | | | | |
| *Authorized data domains are logical representation of a category of data that supports a business function (e.g. “trades” is a data domain that supports capital markets). Data domains include both internally generated data as well as externally acquired (market) data. It is imperative that these strategic data assets are identified and inventoried to ensure their proper use in critical applications*  **Sub-Capability Objectives**   * Authorized data domains are identified. * Authorized data domains are declared. * Authorized data domains are inventoried | | *Advice* | | Authorized data domains identify the “official” categories of data to be used for business and reporting functions. ADDs can be either physical or logical sources of data, depending on the existing legacy environment of the specific categories of data. The goal is to identify, define and inventory these categories of data for future use throughout the organization. It is imperative for business (not just IT) to be involved in the designation of the categories of data that are required to support organizational operations – regardless of their physical existence. | | | |
| *Questions* | | * Has business (as well as IT) been involved in the designation of authorized data domains? * Are all critical business functions represented in the discussion? * Has the reverse engineering (forensics) to define and verify data flows and transformation processes been performed and verified? * Have domain owners (responsible for quality and availability) been identified? | | | |
|  | | *Artifacts* | | * Criteria for determination of ADDs * Inventory of authorized data domains (with formal declaration) * Domain owners and responsibilities * Business process definition and documentation * Bi-directional communication | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data domains are not defined or inventoried | Involved stakeholders are in the process of defining data domains and logical groupings | | Data domains are in the process of being defined. Feedback is being collected from business user and other stakeholders | | Data domains are declared and are in the process of being inventoried | Prioritized data domains have been identified, verified, declared, inventoried and authorized by involved stakeholders. |  |

## **Unified View of Data Meaning**

*The first step in developing a data engineering discipline is to identify and inventory your data. This involves catalogues “logical” domains (the categories of data needed to conduct business), and then identifying the existing physical, underlying data stores where these data can be found. Finally, to ensure consistent use, enforcing their use via policy.*

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| **2.2.1. Conceptual and Logical Modeling** | | | | | | | |
| *Data modeling describe how data is defined, related and identified for a given business purpose. Consistent data modeling is necessary to ensure that data is properly managed within the application as well as across the information eco-system and that the definitions and relationships are maintained in well managed and controlled manner. All new development should adhere to the documented data models, enforced through proper policy and standards.*  **Sub-Capability Objectives**   * Conceptual models are defined, documented, and verified by key stakeholders * Logical models (fully attributed versions of the conceptual models) are defined, documented and verified by key stakeholders | | *Advice* | | Data modeling defines how business processes work in reality. Data models verify requirements, discover areas where problems with meaning might arise and reconcile different perspectives. They force business analysts and users to define the requirements and ensure that the required information is aligned to common meaning – essential for achieving automation, performing complex analytics and/or generating critical and trusted reporting.  Modeling best practice dictates the development and use of conceptual and logical models in representing business requirements. Conceptual models identify, at a high-level, critical data objects and their relationships to one another. Logical models are fully attributed versions of conceptual models. Both modeling techniques express business function independent of the physical instantiation or database management system. In some advanced firms, use of semantic data modeling and RDF-OWL (Web Ontology Language) may be in use.  When determining the state of data modeling capability of an organization, look for established and governed modeling processes and techniques. Ensure that these processes are integrated into the software development lifecycle (SDLC process). Look for evidence of routine maintenance of existing models. Look for evidence of consistent utilization of models in all new development. Finally, look for evidence of model development across legacy systems. Often, older systems are not properly documented, which puts firms at risk when utilizing data from these environments. | | | |
| *Questions* | | * Does the firm have an established data modeling practice? * Does the firm have a maintained inventory of data models and are these models used throughout the organization? * Are there mechanisms in place for easy for access to the model inventory (i.e. glossaries) that can be used as reference points for implementation? * Is the modeling creation part of the firm’s SDLC process (as a prerequisite to application development)? * What processes are in place to ensure models are validated against business reality? Are they validated by business stakeholders? | | | |
| *Artifacts* | | * Evidence of conceptual and logical model inventory * Expression of terms, definitions and relationships in diagrams and spreadsheets for human use as well as axioms, rules, restrictions, attributes, classes and objects for processing * Agreement on business meaning (verification by stakeholders) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Conceptual and logical models for authorized data sets do not exist. | The concept of developing conceptual and logical models is being discussed. | | The organization is in the process of defining conceptual and logical models for new and existing data sets. Models are being created in collaboration with relevant business and technology stakeholders. | | Conceptual and logical models have been defined for prioritized data sets. Models have been socialized and approved by relevant stakeholders. | The process of developing, maintaining and utilizing conceptual and logical data models is part of the enterprise business, data and technology process, fully supported by existing policy and standards. | Semantic modeling and W3C Web Ontology Language (OWL) are established and in use within the organization. |

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| **2.2.2 Identifiers and Symbology** | | | | | | | |
| *Data Identification schemes and methodologies are used to ensure precise identification of data factors of input. Customer ID; Legal Entity ID; Product ID are examples of unique identification. Establishing ID methodologies are critical for data aggregation, classification and analysis. Unique identification is a foundational concept and is emerging as a required component for regulatory reporting and risk analysis.*  **Sub-Capability Objectives**   * Identifiers have been defined for critical business entities (e.g. product; customer; account; etc.). * Internal entity IDs have been assigned, published and are being used across business processes. * Internal IDs are aligned (and cross referenced) to industry standard identifiers | | *Advice* | | Identification schemes for instruments, entities, customers and products need to be unique and precise. Standard identifiers need to be mapped to any proprietary identifiers used in consuming applications. Unique identification is a core foundational tenet of data management that is governed by policy and enforced by standards.  When evaluating this capability, look for evidence of internal standards. See if the organization has established requirements regarding the use and maintenance of standard entity identifiers. Question if the firm is using and aligning to industry standards. | | | |
| *Questions* | | * Have unique and precise (officially sanctioned) identified been established for all instruments, entities, customers and products? * Has policy been developed and approved to ensure these identifiers are used in business applications? * Have standard identifiers been published are cross-referenced to any proprietary identifiers? | | | |
| *Artifacts* | | * Policy about standard identifiers * Inventory of identification standards being used * Cross-referencing and transformation documentation | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Disparate or inconsistent identification schemes are being used in silos throughout the organization. | The areas that need unique and precise identifiers are being debated. | | Areas that need unique identifiers have been defined and verified for critical business domains (i.e. product, client, entity, etc.). | | Identifiers have been assigned, published and are being used across business processes. Plans are being debated on the approach for concordance (cross-referencing) of legacy identifiers to the new standard. | Identifiers for specific data domains are declared as "standard" for the firm. Legacy identifiers have been cross-referenced and aligned. New applications are required to use the new standards. | Identifiers are cross-referenced to industry standard identifiers. |

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| **2.2.3 Defining and Capturing Metadata** | | | | | | | |
| *Metadata must be captured and inventoried into a metadata repository so it is usable by all relevant development teams*  **Sub-Capability Objectives**   * Metadata is captured and inventoried into a metadata repository * Metadata has been reviewed and approved by relevant stakeholder * Metadata is in production, supported by policy and standard | | *Advice* | | Metadata is often the ‘forgotten’ element of data architecture. It is now clear, that robust metadata is a requirement for successful data management, therefore, firms must prioritize, focus and invest in their metadata infrastructure.  Metadata falls into four categories:   * ***Descriptive Metadata***: describes attributes used for discovery and identification (i.e.: author; title; keywords; abstracts; sources, etc.) * ***Technical Metadata***: describes the physical (table) structures; indexes; run-times; performance averages; utilization metrics; etc. * ***Structural Metadata***: describes how objects are put together – i.e.: pages; chapters; tables of contents; indexes; etc. * ***Administrative Metadata***: provides information related to the creation, classification and/or appropriate use of data. Administrative metadata also includes “rights management metadata” (data access rights; information security classifications, sensitivity classifications; etc.), as well as “preservation metadata” (archive; retention and defensible destruction requirements).   In evaluating an organization’s metadata capabilities, inquire into how the organization is capturing; maintaining and utilizing this data. Does a metadata repository exist? Where in the development cycle is metadata enriched? Is it officially part of the software development cycle? Are their policies and standards in place to ensure metadata is properly supported and utilized? | | | |
| *Questions* | | * Are all categories of metadata being captured? (required by policy)? * Is metadata maintenance part of the SDLC process? * Is metadata located in a central repository? * Is the metadata complete and verified by business stakeholders and information technology? | | | |
| *Artifacts* | | * Metadata strategy and approach * Evidence of an operational metadata repository * Evidence of review, verification and approval by stakeholders | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Metadata is not defined. | Elements of metadata (types; how to capture and use; etc.) are being discussed. | | Metadata from physical repositories is being captured and inventoried. | | Metadata has been captured and stored in an organizational metadata repository. | Required metadata use is operational for all development. Stakeholders have reviewed and approved the metadata policies and standards. |  |

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| **2.2.4 Attribute-Level Business Definitions** | | | | | | | |
| *Business definitions are non-technical descriptions of data attributes that are based in contractual, legal and/or business facts. Capturing and documenting these definitions create the Business Data Glossary)*  **Sub-Capability Objectives**   * Business definitions are documented and verified by relevant stakeholders * Business definitions are properly maintained and are appropriately used * Policy and standards require use of consistent definitions of glossary terms throughout the data supply chain | | *Advice* | | Business definitions define and describe the “meaning” of data. The meaning of data should be unambiguous and shared across the organization. In many environments, due to the nature of disparate and legacy technology applications, business terms are defined locally without reconciliation of the definition across the enterprise, creating inconsistencies. Lack of a centralized data glossary exacerbates this scenario. Misalignment of definition between front-office and back-office systems; between sales systems and finance systems, creates excessive data reconciliation and/or operational fails.  When evaluating the business definition capability, look for the development of a centralized data glossary; easy access to the glossary; policy and procedures in place that require use of the glossary in business process and new application development. Ensure that the business glossary is built, maintained and validated by business stakeholders, and that there are appropriate governance processes in place ensuring changes to the glossary are properly reviewed and validated. | | | |
| *Questions* | | * Has a business data glossary been developed? Have the business terms been properly defined and verified by appropriate business, technology, legal and compliance stakeholders? * Are policy and standards in place ensuring proper maintenance and use of the business glossary | | | |
| *Artifacts* | | * Business glossaries * Complete front-to-back stakeholder engagement * Evidence of feedback and verification among stakeholders | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Business definitions are not maintained. | Establishing the creation and use of a business glossary is being discussed. | | Attribute level business definitions (and their relationships) are in the process of being defined. | | Business definitions are verified by key stakeholders. Business definitions (and their relationships) are assigned to fully-attributed logical models. | A populated data glossary has been developed and approved and is in use across the organization. |  |

# **Chapter 3: Data Quality**

## **Data Quality Program**

*The prime directive for the data management program is the delivery of data that business users and regulators have trust/confidence in to be precisely what they expect it to be without the need for transformation or manual reconciliation. The processes for meeting this “directive” cannot be arbitrary or informal. Establishing a data quality program brings focus and strategic awareness to the discipline and practices needed to ensure data is fit for its intended use*

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| **3.1.1 The Data Quality Strategy** | | | | | | | |
| **Sub-Capability Objectives**   * DQ strategy and approach has been designed and developed * DQ strategy and approach has been communicated to relevant stakeholders * Feedback from stakeholders has been incorporated into the final version of the DQ strategy. * Stakeholders and senior management endorse and support the DQ program and strategy | | *Advice* | | Data quality strategy and approach encompasses the “what/how/who” of data quality. It needs to address the scope of the data to be scrutinized and reviewed; how the DQ assessments will be performed (metrics defined) and who will be responsible (defined roles and responsibilities). A data quality program needs to be closely aligned with the organization’s business objectives to ensure that the (most important) data is properly maintained and monitored. Data quality involves cultural change. It is critical that a documented DQ strategy and approach is socialized with relevant stakeholders (technology, business and operations), to ensure awareness, support and commitment.  The data quality strategy also defines how the program will be funded and resourced. A well-defined strategy helps avoid “brush-fire” management by reviewing business requirements, establishing data quality review processes, being transparent about the causes of data quality problems and defining mechanisms for escalation as well as remediation. A data quality program requires commitment from business, operations and IT stakeholders. Visible support from executive management is needed to provide the air cover required to implement changes to already existing processes. | | | |
| *Questions* | | * Has the DQ strategy been developed, verified and approved? * Is it aligned with business objectives and user requirements? * Is there a communication infrastructure to ensure that stakeholders understand the objectives and components? * Is there consistent engagement and verification from IT, business and operations stakeholders? * Has the DQ strategy been endorsed by senior management | | | |
| *Artifacts* | | * Data quality plan and strategy * Business rules and tolerance checks * Lists of stakeholders and evidence of communication and approval * Mechanism for the identification and exposure of data quality problems * Escalation process for remediation | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no data quality program or strategy. | Data quality strategy and approach are being debated. | | Data quality strategy and approach have been defined and shared with involved stakeholders. | | Feedback from stakeholders has been incorporated into the DQ strategy. DQ strategy has been endorsed by stakeholders. | A data quality program has been formally established and is operational, engaging all relevant stakeholders. |  |

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| **3.1.2 Data Quality Roles and Responsibilities** | | | | | | | |
| *A Data quality program requires a network of data stewards and subject matter experts to ensure data is properly captured, processed and delivered. Accountable parties must be identified and their roles and responsibilities must be clearly and unambiguously communicated.*  **Sub-Capability Objectives**   * Accountable parties have been identified. * Accountable parties have been aligned to the organizational data management structure. * Data quality responsibilities have been assigned. * Individuals are held accountable for the performance of their data quality function via annual reviews and compensation considerations | | *Advice* | | A data quality program involves numerous stakeholders who are responsible for data requirements capture, profiling, remediation, definitions, metadata, transformation, root cause analysis, entitlement control and coordination across the full data ecosystem. This involves the assignment and empowerment of stewards, curators, custodians, and owners. These accountable parties need to be at the right levels of seniority as well as understand all the internal processes associated with the data quality program.  When evaluating this capability, ensure that the program stakeholders have been fully informed of their roles and responsibilities, have been empowered to take the necessary actions to remediate data quality issues, and that these individuals have the full support of enterprise and line of business management. | | | |
| *Questions* | | * Is there a process for identifying and confirming data sponsors (authority), data owners (accountability) and data stewards (both IT and business)? * Are the roles and responsibilities identified (i.e. via RACI matrix), verified, approved and assigned? | | | |
| *Artifacts* | | * Evidence of stakeholder identification * RACI matrix or other evidence of accountability assignment * Evidence of accountability (linked to reviews and compensation) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no data quality accountability structure. | Data quality accountability structures are being defined. | | Accountable parties are in the process of being identified. DQ roles and responsibilities are defined and shared. Feedback is solicited. | | Accountable parties have been identified and data quality roles and responsibilities have been assigned. Accountable parties have been aligned with the DM organizational structure. | Individuals are held accountable for the performance of their DQ function via reviews and compensation. |  |

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| **3.1.3 Data Quality Communication** | | | | | | | |
| *Data quality is everyone’s responsibility.*  **Sub-Capability Objectives**   * The message (and culture) of data quality responsibility has been developed and socialized with executive and LOB management * Roles and responsibilities have been communicated to relevant stakeholders - feedback has been incorporated into the final role definitions. * Stakeholders and senior management endorse and support the defined roles and responsibilities | | *Advice* | | The individuals running the data quality program are not the people that are responsible for the quality of the data. They are best viewed as part of the control function, providing guidance, assurance and oversight. The responsibility of data quality ultimately falls everyone within the organization. Employees who perform the operational tasks, enter data, work with customers, create analytics and reports – everyone in the ‘value-chain’ has a role in insuring data quality and data integrity is achieved.  When assessing this capability, ask about the level of communication and education that is provided across the enterprise regarding data quality. | | | |
| *Questions* | | * Has the accountability of data quality across the organization been communicated? * Is this measure carrying into the lines of business, front office, middle office, back office? * Is the message and importance of data quality being delivered by executive management to the general population? * Are DQ training and education programs established and utilized? | | | |
| *Artifacts* | | * Bi-directional communication about roles and responsibilities | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no culture of data quality being communicated to the organization. | Data quality accountability is being discussed. | | The message of data quality for the organization is being developed. | | The message of data quality as a core enterprise capability has been defined and discussed with executive and LOB management. | Executive and LOB management endorse and support the message of DQ accountability across the enterprise. |  |

## **Data Quality Profiling & Remediation**

*In performing a data quality analysis of existing stores of data, it is important to include all relevant data to determine the true state of data quality. Existing data must be profiled, analyzed and graded. Data remediation plans need to be developed and prioritized.*

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| **3.2.1 Scope and Prioritization of Data** | | | | | | | |
| *Data engineering defines the domains of data as “reference data, transactional data, and derived data”. Across these domains, two states exist – current and historical. All aspects and all states of data must be considered when performing a current state analysis. Across this scope of data, data can be prioritized based on their relevancy to critical business function.*  *Data elements that are important to prioritized business functions are identified and designated as Critical Data Elements (CDEs). Designated CDSs receive the highest levels of monitoring to ensure the quality of these attributes is maintained. CDE designation is a controlled process. Changes (additions or deletions) to the list of CDEs must be reviewed and approved by business stakeholders.*  **Sub-Capability Objectives**   * The scope of data has been prioritized in alignment with the data management strategy and business priorities. * A process is in place to ensure priorities are updated and maintained | | *Advice* | | A data quality analysis of all relevant data (in existing repositories) is essential to define both the current state and the scope of remediation required. All aspects and all states of data must be considered when performing a current state analysis (current, historical, archived). Quality assessment (profile, analyze, grade) should be linked to critical business processes | | | |
| *Questions* | | * Has the scope of data subject to the DQ program been identified, prioritized and verified? * Has the data quality profiling process been extended to all repositories (i.e. uncoupled from specific systems or applications)? | | | |
| *Artifacts* | | * Data domain inventories (prioritized) * CDE inventory (prioritized) * Bi-directional communication about the inventories | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data subject to the DQ program has not been identified or prioritized | The scope of data subject to the DQ program is being discussed. | | The scope of data subject to the DQ program is being identified and shared with stakeholders. | | The scope of data subject to the DQ program is prioritized and aligned with both strategy and business priorities. | The scope and prioritization of data subject to the DQ program has been approved. |  |

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| **3.2.2 Data Profiling and Grading** | | | | | | | |
| *The scope of data under consideration must be profiled to determine the full spectrum of data quality dimensions (e.g. completeness, timeliness, coverage, conformity, referential integrity, consistency and levels of duplication and redundancy). This analysis must include both a row-based analysis (accuracy of the record) and a column-based analysis (statistical columnar analysis). Metadata must also be reviewed to ensure the description and intended use of data is properly defined.*  **Sub-Capability Objectives**   * In-scope data has been profiled and statistically analyzed. * Metadata has been reviewed and gap analysis has been performed. * In-scope data has been graded and catalogued | | *Advice* | | Data profiling creates a ‘quality benchmark’ for the organization. Evidence of profiling and grading will be expected in any audit review or regulatory examination. Data needs to be assessed against both fit-for-purpose criteria and the dimensions of quality (i.e. completeness; coverage; conformity; consistency; accuracy; duplication; timeliness). Data quality business rules need to be defined and captured. Statistical and columnar analysis should be included to ensure that data is ‘reasonable.’ Certain data domain types (i.e. time series) need to be evaluated against additional criteria such as gaps, spikes and abnormalities. | | | |
| *Questions* | | * Has all ‘in scope’ data been profiled, analyzed and graded? * Is data quality profiled against business rules (logic) as well as against statistical expectations (reasonableness)? * Are the right resources (business, operational, analytical) involved in defining quality requirements? * Are the results of data profiling captured as metadata? | | | |
| *Artifacts* | | * Business rules and profiling criteria * Reports and dashboards on data profiles * Statistical analysis results * Mechanism for assigning grades for data quality (reporting) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no data profiling program. | The profiling approach for in-scope data is under discussion. Data quality dimensions are being defined. | | In-scope data is in the process of being profiled and assessed. DQ dimensions are being prioritized. Metadata is being defined and shared with stakeholders. | | In-scope data has been profiled and statistically analyzed. Metadata (and gap analysis) has been verified by stakeholders. | In-scope data has been “graded” and catalogued. Metadata has been authorized. |  |

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| **3.2.3 Data Quality Remediation** | | | | | | | |
| *Based on the current state analysis performed, remediation plans must be developed to address the most pressing data quality issues, as well as timelines established for ongoing DQ evaluation and maintenance*  **Sub-Capability Objectives**   * Data remediation plans are developed and prioritized * High priority data remediation is being actioned. * Timelines have been established for ongoing remediation | | *Advice* | | Make sure the remediation activities are not “one off” processes – but rather established as part of a data quality routine. Data remediation needs to be implemented for both data “at rest” and “in motion.” | | | |
| *Questions* | | * Have data remediation plans been developed, verified and prioritized? * Do you have a DQ issues/prioritization process in place? * Are the data quality reports being used to remediate errors? * Has appropriate funding been allocated? * Is there a communications process related to data remediation? | | | |
| *Artifacts* | | * Data remediation plan * Evidence of remediation being accomplished * Evidence of issue prioritization * Bi-directional communications on remediation plans (approval) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data remediation is performed on an ad hoc basis. | Data remediation strategy and approach are being developed. | | Data remediation plans are developed and shared with stakeholders. | | Data remediation plans are prioritized and verified by stakeholders. Timelines are established. | Data is being remediated and repaired. |  |

## **Inbound Data Management**

*To ensure data quality is maintained, all new data entering the information eco-system needs to be analyzed and reviewed, and any data anomalies identified and remediated. Additionally, any data acquired from 3rd party (external sources), must be reviewed and contractual agreements regarding these sources must be enforced.*

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| **3.3.1 Inbound Data Quality** | | | | | | | |
| *Content governance includes oversight of existing data, as well as oversight over new data. All data entering an organization’s “information eco-system”, must be evaluated for quality and fit, and must be processed against existing data management policy and standards (i.e.: developing models; updating metadata; updating catalogues and directories).*  *Additionally, all 3rd party data (Data Vendors; market data; prices; etc.) must be managed and governed to ensure business requirements are satisfied and the spend is justified.*  **Sub-Capability Objectives**   * 3rd party external data acquisitions are governed. * All sources are screened and validated, data quality checked and approved. * All data is processed against cross-enterprise control group policies and standards * All data is modeled, metadata populated, and catalogues updated as per established policy and standards | | *Advice* | | All updates and introduction of new data sets into an organization must be subjected to the policy and standards of the organization to ensure the data is high-quality and fit-for-purpose. When evaluating this capability, inquire about the screening processes in place. Are they aligned with enterprise policy and standards? Are they validated DQ? Are all of the support structures (metadata; models; glossaries) being updated. Without these capabilities, content quality will quickly deteriorate. | | | |
| *Questions* | | * Are there formal procedures (policy-driven) that require the processing of new data into existing data systems? * Are all of the data support systems (models; metadata; glossaries) being updated? * Is there a market data group (or equivalent) within the firm that is managing 3rd party sources/contracts/acquisitions? * Are all of these processes built into the SDLC and other operating processes? | | | |
| *Artifacts* | | * Policy and standards are in place that require the vetting of new data entering into the organization * Communication of these requirements have been sent out to all development teams and businesses * Training | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no formal policies in place that holistically ensures proper vetting of new data. | Formal governance over new data is being discussed. | | Processes to formally govern new data entering the system are being developed. | | Processes (and/or technology tools) have been defined to manage new data to ensure adherence to existing policy and standards | Processes (and/or technology tools and platforms) to govern new data are operational |  |

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| **3.3.2 Managing 3rd Party Contractual Agreements** | | | | | | | |
| *The access, use, and redistribution of data are subject to various regulatory and contractual obligations. The commercial restrictions of data can impact access and availability. All factor into the data quality experience for the end user. It is critical, therefore, that the data function fully understands these obligations and restrictions.*  **Sub-Capability Objectives**   * Contractual terms and conditions are documented and maintained * Contractual obligations, usage and redistribution restrictions are understood and enforced by audit | | *Advice* | | Contractual agreements can impact data feed services and renewals which can impact the accuracy and timeliness of critical data. Usage restrictions, if not properly followed, can expose a firm to legal actions. All of these “administrative” activities can impact data quality if not properly managed.  The purpose of this capability is to ensure that these activities are getting the appropriate attending, funding and support. Inquire into how the organization is addressing these issues. | | | |
| *Questions* | | * Are all market data contracts centrally managed? * Is there an up-to-date inventory of the sponsors of each contract? * Is there a process in place to ensure timely contract renewals? * Are the restrictions pertaining to the use and redistribution of data well-known and documented? * Are the rules and restrictions enforced by audit? | | | |
| *Artifacts* | | * Inventory of all data feed contracts * Assignment of accountability | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| No inventory or tracking of commercial or contractual data obligations. | Concept of identifying and maintaining the commercial and contractual obligations are being discussed. | | Inventory of contractual terms, conditions and restrictions is being developed. | | Inventory of contractual terms, conditions and restrictions has been developed and is being maintained. | Contractual obligations are being followed and are subject to audit. |  |

## **Data Supply Chain Management**

*Data quality and data integrity is dependent upon an understanding of the data’s lineage. Where did the data originate? Is the source trusted? Has the supply chain been monitored to ensure data has not be corrupted during its transportation processes? All this is dependent on understanding the data lifecycle*

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| **3.4.1 Data Lineage Documentation** | | | | | | | |
| *A control environment ensures that the stewardship of the critical data elements (CDEs), and the how these elements flow across linked processes (lineage) are done in coordination with Enterprise Data Management office and are aligned to EDM policy and standards.*  **Sub-Capability Objectives**   * CDE and lineage have been identified and mapped across business lines in coordination with the enterprise data management office * CDE and lineage mappings are in alignment with EDM policy and standards | | *Advice* | | Data lineage is hard to document. With tens of thousands of applications and hundreds of systems the task is arduous. The objective is to evaluate the firm’s operational commitment to this objective including the funds and the expertise needed to unravel legacy environments. Business engagement is essential. | | | |
| *Questions* | | * Are process flows mapped and defensible? * Have business processes been traced from application to source (reverse engineering)? * Are transformations defined, documented and verified? | | | |
| *Artifacts* | | * Documentation of source data and data flows * Documentation of control points and transformation processes * Documentation of processes for archiving and defensible destruction of data * Evidence of appropriate funding * Bi-directional communication including business and IT | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no end-to-end control procedures. | Control procedures for end-to-end data flows (identification of CDEs; data quality controls; etc.) are being debated). | | Control procedures for end-to-end data lifecycle are in the process of being defined. | | Control procedures for end-to-end data lifecycle flows are defined and are being shared and verified by relevant stakeholders. | Control procedures for end-to-end data lifecycle are defined and operational. |  |

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| **3.4.2 The Data Manufacturing Process** | | | | | | | |
| **Sub-Capability Objectives**   * Data transformation processes and calculations have been identified and documented across business functions in coordination with enterprise data management office. * Data transformation processes are in alignment with data management policy and standards | | *Advice* | | Data concepts are constructed from organic reference data combined with business calculations. Firms need to ensure that the calculations are documented and verified (transparent) as they are transformed from process to process. Business rules and transformation processes need to be captured as metadata. Understanding data transformation is a collaborative activity between IT and business (to understand the transformation and analytical logic) | | | |
| *Questions* | | * Have data flows and transformation processes been defined and verified? * Have business rules and derived calculations been captured and stored as metadata? * Is the IT/business collaboration defined and operational? | | | |
| *Artifacts* | | * Data flow diagrams * Business rules and derived data calculations * Documentation of transformation/calculation mechanisms | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no documentation of data transformations along the data supply chain. | The need to capture and define the processes and calculations for derived and transformed data along the supply chain is being debated. | | Compounding processes and calculations are being developed. | | Compounding processes and calculations have been captured and documented and are being reviewed by relevant stakeholders. | Compounding processes are documented and are aligned with data management policy and procedures. |  |

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| **3.4.3 Data Quality Control Points** | | | | | | | |
| *The data quality program requires routine evaluation of data as it flows across the data supply chain. Data quality control points, consisting of data quality rules and tolerance checks, provide that tracking and validate.*  **Sub-Capability Objectives**   * Data Quality control points are in place and fully operational along the data supply chain * Control remediation procedures are documented and evidenced | | *Advice* | | Checkpoints are needed to validate data as it flows throughout the system. Rules need to be developed, workflows need to be verified, quality thresholds and tolerances need to be confirmed and exception handling routines (including escalation) need to be implemented. When evaluating this capability, look for evidence of formal validation processes along the supply chain. | | | |
| *Questions* | | * Are control points defined, verified and documented? * Are business rules defined, verified, documented and approved? * Are business process flows defined and verified in the way they handle exceptions? * Are control points, business rules and process flows operational? | | | |
| *Artifacts* | | * Documentation of control points, business rules and process flows * Control process review and sign-off | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no data quality controls in place. | Data quality control points and operating procedures are being debated. | | DQ control points and operating procedures are being defined. | | DQ control points and operating procedures are defined and are being shared with and verified by stakeholders. | DQ control points are implemented and operational. Control remediation procedures are documented and evidenced. |  |

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| **3.4.4 Critical Data Elements (CDEs)** | | | | | | | |
| *CDEs refer to the individual data attributes that are used to support critical business functions. CDEs must be identified and catalogued to ensure evidence of proper sourcing, lineage and usage.*  **Sub-Capability Objectives**   * CDEs have been identified and inventoried. * CDE sources have been documented. * Approved business definitions have been assigned. * Data lineage has been documented and validated. * CDEs (and their lineage) are maintained in accordance with data management policy and standards | | *Advice* | | CDEs are data elements that have a documented material impact on business functions. CDEs must be identified and catalogued to ensure they are fit-for-purpose. The lineage of CDEs is important. It is important to understand how these data elements assembled. CDEs can be “organic” (granular), or can be the result of derived, calculated or aggregated calculations. CDE designation are based on business requirements. Business users and analysts need to be intimately involved in this designation process. | | | |
| *Questions* | | * Have the core business processes been defined (via reverse engineering: source → to element → to concept → to compounding process → to business process → to application) and verified? * Have the distinctions between organic data, derived data and business calculations been defined and verified? * Are approved business definitions (and relationships) assigned and stored as metadata? * Are CDEs aligned with business processes? * Are the sources of CDEs identified and documented? * Are representatives and SMEs from business and IT involved in the designation process? | | | |
| *Artifacts* | | * Criteria for CDEs (bi-directional feedback, verification and sign-off) * Approach – how to apply criteria * CDE selection, inventory and declaration (with verification) * Business process (reverse engineering) documentation * CDE (and classification) maintenance procedures | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data elements are not prioritized or designated. | The identification of which data element is critical for various applications is being debated by involved stakeholders. | | Critical data elements (and their definition) are designated and under review by involved stakeholders. | | CDEs and business definitions are verified. The process by which data is compounded (lineage) is documented. | CDEs are identified, inventoried and approved. Source and lineage is documented. CDEs are declared. CDEs are routinely maintained. Data lineage is documented and validated. Approved business definitions are aligned across the enterprise. |  |

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| **3.4.5 Root Cause Analysis** | | | | | | | |
| *Data remediation is not only about correcting existing data; it is also about determining the root-cause of the data quality deterioration at the source to avoid damaging data in the future.*  **Sub-Capability Objectives**   * Root-cause is determined * Corrective measures to business and/or technology processes are identified and implemented | | *Advice* | | Remediating data quality issues is not merely an exercise in data correction. Data quality issues can be systemic. Evaluate the depth and breadth of the data quality program to determine if the organization is focused more on tactical repair (find and fix) versus upstream remediation (root cause). A strong reporting structure is needed to ensure that upstream systems are aware of repetitive or continuing data quality problems | | | |
| *Questions* | | * Are root cause analysis problems defined? * Are corrective measures linked to root-cause analysis? | | | |
| *Artifacts* | | * Evidence of root-cause analysis and remediation being performed * Evidence of reporting across the data supply chain | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Root-cause analysis (RCA) is not being performed | The strategy and approaches for determining the root cause of data quality problems is being debated | | The strategies and approaches for determining the root cause of data errors is being defined | | The mechanisms and the requirement for determining data quality root has been identified and is being shared with and verified by stakeholders | The root cause analysis processes are defined and corrective measures are being implemented. |  |

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| **3.4.6 Data Quality Metrics and Reporting** | | | | | | | |
| *Control points capture data quality metrics and produce routine reports for executive management. Metrics are used to track data quality progress and stability and drive data remediation efforts.*  **Sub-Capability Objectives**   * Data Quality metrics are captured on a routine basis. * Data Quality metrics are being reported to executive, business and technology management * Metrics are being used to drive and prioritize remediation efforts | | *Advice* | | Fit-for-purpose and trusted data is the goal of data management. [Standard dimensions](http://www.edmcouncil.org/downloads/20120712_Data_Quality_Dimensions.pptx.pdf) of the categories have been developed and are being used across the industry. Definitions of (and criteria for) fit-for-purpose are derived from the requirements capture process. Metrics are used to track progress and drive remediation priorities. | | | |
| *Questions* | | * Are standard criteria for measuring data quality defined and verified? * Are metrics being collected and reported on a routine basis? * Are they used to track progress and drive remediation? | | | |
| *Artifacts* | | * Definition of quality metrics * Reports, dashboards, heat maps and other forms of output * Distribution lists and evidence of bi-directional communication/feedback | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no metrics for evaluating data quality. | DQ metrics are being discussed and debated. | | DQ metrics are in the process of being defined. | | DQ metrics are defined and are being verified by stakeholders. | DQ metrics are routinely captured, reported to senior management and used to drive remediation. |  |

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| **3.4.7 Data Quality Auditability** | | | | | | | |
| *Data Quality auditing occurs on 3 levels:*   1. *Quality Assurance (QA) Assessment: Business performs self-assessments based on defined data quality processes and objectives.* 2. *Quality Control (QC): The Data Management Function preforms a facilitated audit of a business-line’s data quality processes and is empowered to enforce the business lines to remediate any gaps found to ensure adhere to data quality best practices.* 3. *Corporate Audit: Business line data quality processes are subject to corporate audits. Failure to satisfy this review may result in formal escalated audits written against a business line or function.*   **Sub-Capability Objectives**   * Data Stewards have performed self-assessment of the business-line data quality processes (QA). * The Data Management Organization has performed facilitated assessments of business-line data quality operations (QC). * The Data Management Organization is empowered to force operational teams to remediate gaps found in their operational data quality processes. * Corporate Audit performs routine examinations of business-line Data Quality procedures. * Formal Audit Issues are generated if operational gaps be uncovered | | *Advice* | | Data quality processes (validation, remediation, root-cause analysis, etc.) should be routinely validated and audited. Audit occurs on three levels: (1) self-attestation - where the stakeholders evaluate and assert they are following the data quality rules, (2) ODM – where the data management organization works with stakeholders to validate compliance, and (3) internal review where organizational governance has formally validated that processes are being followed. | | | |
| *Questions* | | * What are the mechanisms to ensure validation, remediation and root-cause analysis? * Is audit involved in the data quality program? | | | |
| *Artifacts* | | * Evidence of self-attestation and ODM review * Evidence of organizational governance engagement and review | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no oversight of data quality processes | Data quality oversight strategies and approaches are being debated | | Data stewards are performing self-assessment of data quality processes | | The DMO is performing facilitated assessments of data quality processes and is empowered to require gap remediation. | Audit (or the equivalent organization) is performing data quality procedure examinations. | Formal audit issues are generated if operational gaps are in data quality processes are uncovered |

# **SECTION C: IMPLEMENTATION**

# **Chapter 4: The Office of Data Management**

# **Part 1: Setup**

## **Establishing the Data Program**

*A Data Management Program is an organizational function dedicated to the management of data. It reinforces the necessity of orchestration, active collaboration and alignment among diverse stakeholders in order to instill confidence that the data being used in operational processes is accurate, timely and fit for purpose.*

*The creation of the data management program elevates the importance of data content management and integrates it as a core component of organizational operations. It establishes data management as a sustainable activity and reinforces the importance of managing “data as meaning” across the organization*

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| **4.1.1 Sanctioning the Data Management Program** | | | | | | | |
| **Sub-Capability Objectives**   * Data management program is formally established within the organization * Data management program is sanctioned by executive management. * The role of the data management program is communicated across the firm through formal organizational channels | | *Advice* | | The “office of data management” (ODM) should be established as an independent entity. Surveys have shown that firms are moving away from imbedding data management programs into their technology organizations. When evaluating a data management program, look for an alignment that will drive culture change.  Formalization of the program is essential. The creation of a new control function needs a clear announcement from executive management and air cover for inevitable disruption. Support needs to be broad-based (i.e. if lone champion departs, will program survive). | | | |
| *Questions* | | * Has the data management program been formally established? * Has the ODM been formally communicated to IT, business, operations, finance, risk? * How has executive management demonstrated its support? | | | |
| *Artifacts* | | * ODM Charter (strategy and approach) * Communication to stakeholders (with feedback) * Definition of roles and responsibilities | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| The program has not been established. | The function, structure and operational framework of the program are being discussed. | | The components of the program are being developed. | | Stakeholder feedback is captured and incorporated into the components of the program. | The program is established, sanctioned by executive management and socialized. |  |

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| **4.1.2 Program Authority & Enforcement** | | | | | | | |
| *Data Management Program must be formally empowered by senior management and its role communicated to all relevant stakeholders.*  **Sub-Capability Objectives**   * Data Management Program is operating collaboratively with program stakeholders. * Data Management Program has the authority to enforce adherence and compliance through policy and documented procedure | | *Advice* | | Creating the program without empowerment is useless. As a change function, the ODM needs authority to enforce behavioral change. The authority granted must be formal. Support from audit is very useful to ensure compliance with policy and standards | | | |
| *Questions* | | * Has the DMP been established as mandatory? * Has authority been granted to implement and enforce best practice via policy and standards? * Has authority been communicated? * Is there a functional partnership in place with audit? | | | |
| *Artifacts* | | * Communication from executive management (and distribution lists) * Policies and procedures associated with making data management mandatory * Bi-directional engagement with stakeholders on ODM authority | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no mechanism for enforcing DMP program adherence. | The strategies and approaches for ensuring adherence with (and compliance to) the DMP are being discussed. | | The policies and procedures associated with adherence are defined and shared with program stakeholders Senior management is championing the program and defining the expected authority of the data office. | | Feedback is captured and incorporated into the DMP. The DMP is operating collaboratively with program stakeholders. Senior management is endorsing and managing communication about the objectives and authority of the DMP. | The DMP has the authority to enforce adherence and compliance through policy and documented procedure. |  |

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| **4.1.3 Making Funding Operational** | | | | | | | |
| *The goal is to ensure that the business case and funding model (see section 2.0) is successfully executed and administered across the organization.*  **Sub-Capability Objectives**   * Data management budgets (across the business) are operational * Budgets are aligned to organizational funding cycles and key business objectives * Accountable parties for the budgets have been identified * Enterprise governance team is empowered to govern data management budgets | | *Advice* | | An operational funding model means that budgets are secured and aligned to expected deliverables. It means that data program executives are empowered to support the funding commitments and that data management is included in the funding cycle of the organization to secure appropriate levels of funding moving forward. The funding approach must be formalized (ideally as a stand-alone budget). | | | |
| *Questions* | | * Is the funding model secured and aligned to expected deliverables? * Does the ODM have the “authority to spend?” * Is the funding model incorporated into the organizational funding cycle and process? | | | |
| *Artifacts* | | * Funding model * Formal approvals from stakeholders and budget owners | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| A funding model for data management has not been defined. | The funding model strategy and approach are being discussed. | | The approach to the funding model is being developed and is being socialized with relevant stakeholders. | | Funding model is finalized, aligned with governance processes and extended beyond the annual funding cycle. Governance processes associated with the funding model have been approved. | The funding model is implemented across the data management program and operational. The funding model is aligned to organizational funding cycles. |  |

## **ODM Organizational Structure**

*The creation of the Office of Data Management (ODM) formalizes the data program. The creation of the office defines its charter, identifies required skillsets and secures funding. Data management must be part of the organizations every-day activity. The formal creation of the office helps drive that message throughout the organization.*

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| **4.2.1 Creating and Implementing the ODM** | | | | | | | |
| *The ODM refers to the centralized organization responsible for championing the data program.*  **Sub-Capability Objectives**   * ODM is designed and planned. * ODM is chartered and approved. * ODM is created | | *Advice* | | The data management office formalizes and runs the data program. The ODM needs visible and strong commitment from executive management. A formal (official) office is necessary to create policy, implement standards, coordinate governance, run interference across control functions and manage organizational collaboration. | | | |
| *Questions* | | * Is there a formal and sanctioned Office of Data Management? * Is it recognized as part of the official corporate structure? * Does the ODM have the authority it needs to implement change? * Does it have a clear mission and charter? * Does the ODM have strong (and visible) executive support? * Does the ODM have sufficient funding and the skill sets needed to accomplish the data management objective? | | | |
| *Artifacts* | | * Data management charter and approvals * Specific and identifiable organizational structure * Formal communication from executive management (notification to stakeholders of function and authority) * Bi-directional communication and feedback from stakeholders | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| ODM doesn’t exist. | The concept of a data management organization is under discussion. | | The data management organization is being developed. | | The data management organization has been designed and chartered and has been approved by relevant stakeholders. | The data management organization is operational. |  |

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| **4.2.2 Funding Approval Process** | | | | | | | |
| **Sub-Capability Objectives**  Funding is secured   * DM funding model is proposed and socialized with program stakeholders. * Feedback is being collected and incorporated into the model. * Key business driven data requirements are properly funded * Funding levels have been aligned to business requirements * Funding levels enable the appropriate delivery date of key data initiatives * Appropriate funding levels for sustained data operations have been approved * All funding commitments have been reviewed and approved by relevant stakeholders   Funding is sustainable   * DM funding addresses current year budget cycle. * DM funding is mapped to a multi-year implementation plan. * Data management funding is integrated as a sustainable corporate function | | *Advice* | | The goal of the funding model is to ensure that resources needed to deliver against objectives are available – and to ensure that the business requirements can be satisfied. It is important that the proposed funding model is evaluated by all stakeholders and that feedback is captured.  The model must also be synchronized with the overall funding processes of the organization (i.e. budget cycles, escalations, approvals) to ensure program sustainability. Successful programs leverage existing mechanisms because they are already established and enforceable | | | |
| *Questions* | | * Can the IT infrastructure deliver against requirements? * Can the operations team sustain and support the objectives of the data management program? * Is the funding model appropriate for the program? * Has the funding model been socialized and approved? * Is the funding model for the current year or does it span multiple years? | | | |
| *Artifacts* | | * Alignment of budget with business requirements and delivery schedules * Alignment of data management goals with IT and operational capability * Stakeholder lists and approvals * Mapping to current and multi-year implementation plans | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no funding model for data management. | The funding model for data management is under discussion. | | The funding model is proposed and socialized with program stakeholders. Feedback is collected and incorporated into the model. | | The data management funding model has been reviewed and approved by program stakeholders. | The funding model is reviewed and enhanced as part of the annual funding process (to reflect evolving requirements). | Data management funding is integrated into operations as a sustainable corporate function. |

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| **4.2.3 Executive Data Program Owner / Chief Data Officer** | | | | | | | |
| *A senior executive (ex: Chief Data Officer) must be appointed and be given full authority to run the DMO. The role and scope of responsibility of this position must be clearly defined and communicated to the organization.*  **Sub-Capability Objectives**   * Need for executive owner is recognized, socialized and communicated. * The role and responsibility of the chief data executive is clearly defined and communicated * Executive owner is hired or appointed. * Duties and authority of the executive owner have been communicated to all relevant stakeholders | | *Advice* | | A single (executive) throat to choke is essential. The data management program cannot be run by committee. To ensure that the data management program is sustainable, a senior executive with authority and executive support must be appointed. The executive in charge needs to be the visible advocate for data management (with vision and passion), chief diplomat for collaboration as well as person that runs the program. Simply appointing the executive is not sufficient. The role and authority necessary to implement change of this magnitude needs to be communicated to all stakeholders. | | | |
| *Questions* | | * Has the function of the CDO (executive) been defined, socialized and documented? * Has a senior executive/CDO been hired to run the data management program? * Has the executive been empowered with the authority necessary to implement the program? * Have the lines of authority for the CDO been defined and established? * Has the role of the DMP and the CDO been sanctioned and communicated to stakeholders? | | | |
| *Artifacts* | | * CDO job definition (skills and expectations) * Named individual performing the data management executive function * Executive management communication to stakeholders (strategy for visibility) * List of stakeholders for communication about CDO | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data management is performed by individuals (heroes). | The need for an executive owner is recognized. | | The concept of an executive owner is being socialized with key stakeholders. | | The organization is actively seeking to hire the CDO (or equivalent). | The CDO is hired and the duties and authority of the executive owner has been communicated to all involved stakeholders. | The CDO is an organizational peer with dotted line relationships to the other control functions (i.e. CTO, CIO and CFO). |

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| **4.2.4 Staffing the ODM** | | | | | | | |
| *The DMO is appropriately funded and staffed with the required data management skill-sets*  **Sub-Capability Objectives**   * Funding for the DMO is approved * Approval to hire is granted | | *Advice* | | Be wary of data management programs that are approved but not given the authority to hire (or acquire) operational talent. It is not necessary for the ODM to “own” staff for all of the tasks associated with data management. Whether it exists as a stand-alone group or whether many of the operational functions are embedded into the business (with a small central coordination function) is dependent on the strategy and culture of the firm. Regardless, the data management program needs dedicated resources with appropriate skill sets. Finding the right people (and managing inevitable turnover) requires ramp-up time and contingency plans. Be careful about “single points of failure” and the creation of operational bottlenecks. | | | |
| *Questions* | | * Is the operating model for the ODM established? * Are the resources needed to support the program defined and acquired? * Does the ODM have the authority to hire (or approval to acquire) the skill sets needed for implementation? * Has ramp-up time for staff onboarding and funding commitment been anticipated? | | | |
| *Artifacts* | | * Operating model (and resource plan) for the ODM * Job descriptions for the defined organizational structure * Gap analysis of skills needed/in place * Confirmation of approved budget and authorization to hire | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| The data management organization is not funded. | Funding for the data management organization is being discussed. Required skill-sets are being defined. | | Data management organization funding is in process. Skill-set recruitment (internally and/or externally) is in process. | | The data management organization funding is approved. Required skill-sets have been identified. Hiring is taking place. | The data management is funded and staffed. |  |

## **Data Governance Accountability**

*Data Governance is the process of setting standards, defining rules, establishing policy and implementing oversight to ensure adherence to data management best practices. Data governance establishes the control environment needed to ensure data is being properly acquired, processed, managed, and delivered, and is being appropriately used throughout the organization.*

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| **4.3.1 Data Governance Plan and Charter** | | | | | | | |
| **Sub-Capability Objectives**   * The roles and responsibilities have been articulated * The plan and charter have been shared with relevant stakeholders. * Feedback has been captured and incorporated * The plan and charter have been approved | | *Advice* | | Data governance requires planning, coordination and the allocation of dedicated resources. The plan is designed to be the expression of all the components of governance. It defines the governance mechanisms, identifies the key stakeholders, outlines the review/approval process and helps ensure alignment across the organization. The charter describes the roles and responsibilities of the governance function and its stakeholders. When evaluating this capability, make sure the plan and charter have been properly socialized with the critical stakeholders and feedback solicited.  Make sure the timing associated with the establishment of governance is appropriate. Programs fail if governance structure is established before there is clear agreement on what is being governed and why (the communication of the data management strategy). | | | |
| *Questions* | | * Are the executive champions for the data program fully engaged in the data initiative? * Do stakeholders understand (and buy-into) the objectives of the data management program and the role of governance in ensuring compliance? * Is the implementation schedule associated with data management aligned with operational reality? * Is there sufficient authority behind the policies, procedures and standards to ensure compliance by business and operational stakeholders? | | | |
| *Artifacts* | | * Data governance charter and objectives * Roster of stakeholders * Bi-directional communication about the data management program (including compliance expectations and schedules) * Approvals and authorizations needed for implementation | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data governance plan and charter do not exist. | The plan and charter are under discussion. | | The plan and charter are being developed, in alignment with the data management program objectives. | | Plan and charter have been developed and socialized with critical program stakeholders. | Feedback and been received and incorporated into the plan and charter. Both have been reviewed and approved by critical stakeholders. |  |

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| **4.3.2 Data Governance Staffing (Roles & Responsibilities)** | | | | | | | |
| *The data program will require the coordination of many stakeholders across an organization. The central governance team will be charged with managing and coordinating the governance workload. The authority and responsibility of the governance team must be defined and communicated to all relevant stakeholders.*  **Sub-Capability Objectives**   * The roles and responsibilities of the enterprise governance team are defined and communicated * The enterprise governance team is staffed and funded. * The enterprise governance team is authorized to ensure and enforce alignment of projects to data management policy and standards | | *Advice* | | Data management is no different from any other organizational function. It requires coordination. Program coordination must be formalized, appropriately staffed and empowered to ensure alignment among the stakeholders and adherence to program deliverables. It is the job of the enterprise governance team to coordinate across the data governance stakeholders (i.e.: line of business data stewards) and other critical stakeholders to ensure all of the governance activities are getting done. When evaluating this capability, make sure this team is in place since it is foundational to the rest of the governance program. | | | |
| *Questions* | | * Is the enterprise governance team in place? * Is it appropriately staffed and funded? * Does the enterprise governance team have the authority needed to be effective? * Have the roles and responsibilities been defined, documented and socialized? * Have milestones, metrics and measurements associated with governance program been established? | | | |
| *Artifacts* | | * Evidence of enterprise governance team (i.e. charter and approvals) * Description of roles and responsibilities * Staff assignments and qualifications * Gap analysis of skills needed and in place * Bi-directional communication to stakeholders (empowerment) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no enterprise governance office. | The need for an enterprise team is recognized - initial plans are being discussed. | | The enterprise team is being staffed and its role, responsibility and charter are being developed. | | The enterprise team is approved and being implemented. Skill sets required for sustainability are being defined. Funding requirements and resource sharing plans are in process for approval. | The enterprise governance team is chartered, staffed with required skill sets. IT is authorized to ensure and enforce alignment of projects to policies, procedures and standards. |  |

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| **4.3.3 Line of Business Governance Process** | | | | | | | |
| *Enterprise governance structure refers to the organizational construct across the enterprise. Individuals must be appointed in business lines and control functions and given the responsibility of data management within those verticals, preferably, reporting into the COO or business leader within that group*  **Sub-Capability Objectives**   * Governance structure has been defined, documented and shared with relevant stakeholders. * Organizational governance structures have been implemented. * Working committees are established with written and approved charters. * Stakeholders have been appointed. * Stakeholder roles and responsibilities have been communicated. * Stakeholders are held accountable for their participation in the data management program (i.e. via performance reviews and compensation considerations | | *Advice* | | This is how the governance process will work in reality (including the organizational structure, roles, responsibilities and coordination mechanisms). There is no single correct way to define governance structure. It is dependent on the size of the firm, the scope of the activity, the skill of staff and the culture of the organization. Developing a new data governance mechanism will likely require new skill sets. Collaboration with senior business stakeholders (appointment of stewards) and HR (recruiting) will help facilitate implementation. Formal training (i.e. data management boot camp) will help with onboarding. | | | |
| *Questions* | | * Has the data management organizational structure been defined and socialized to make sure it is appropriate for your organization? * Have the roles, functions and responsibilities been defined and verified? * Have potential stewards been identified in collaboration with business stakeholders? * Is there a secession plan in place? * Is there an onboarding and training mechanism to support acclimation to new data management functions? | | | |
| *Artifacts* | | * Governance structure (organization charts, roles and responsibilities) * RACI matrix (or equivalent) denoting accountability * Operating procedures (how are appointments determined, onboarding and training requirements) * Working groups and committee (designations, charters, participant rosters, minutes, directives) * Bi-directional communication (stakeholder rosters, internal memos and distribution lists) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| No governance structure exists. | The concepts associated with establishing an enterprise governance structure are being discussed | | Enterprise-wide governance structure is being developed. Representatives from involved business lines and control functions are participating in the planning process | | Enterprise governance structure has been defined and staffed. Individuals have been informed of their role and responsibilities. | Enterprise governance structures are implemented. Working committees are operational. Stakeholders are held accountable for their participation in the data management program | Stakeholders performance reviews and compensation are aligned with the enterprise governance objectives |

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| **4.3.4 Line of Business Funding Mechanism** | | | | | | | |
| **Sub-Capability Objectives**   * Funding is allocated and approved by the lines of business. * All budgets are reviewed and approved by the data management organization. * Data management organization is empowered to enforce the line of business data management funding allocation in accordance with data management program objectives | | *Advice* | | Funding for the data management program can’t be optional. Enforcement can come from top-of-the-house. IT can come from a centralized “seed funding” approach. It can come from LOB management. Regardless – there needs to be evidence of financial support. | | | |
| *Questions* | | * Is the funding enforcement approach documented and verified? * Are funding sponsors identified and confirmed? * How will the ODM handle budget “haircuts” or other funding challenges? * What is the process for prioritizing both discretionary and non-discretionary funding decisions? | | | |
| *Artifacts* | | * Documented enforcement mechanism * Dependencies map to ensure funding * Communication with stakeholders | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no enforcement process for data management funding. | The methods and approaches for ensuring adequate funding for data management are under discussion. | | Funding is allocated and approved by the lines of business. | | Data related budgets are reviewed and approved by the data management organization. | The data management organization is empowered to enforce data management funding allocation. |  |

# **Part 2: Implementation**

## **Program Management Office**

*A Program Management Office is an organizational function dedicated to the management of the data management activities. It reinforces the necessity of orchestration, active collaboration and alignment among diverse stakeholders in order to instill confidence that the program is functioning efficiently, coordinating effectively, and delivering on time and on schedule.*

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| **4.4.1 Creating the Program Management Office (PMO)** | | | | | | | |
| *The data program will require the coordination of many projects across a firm or division. Resources may be shared. It is important that a PMO is established and appropriately staffed with adequate resources to manage the required workload of the data program. The authority and responsibility of the PMO must be defined and communicated to all relevant stakeholders.*  **Sub-Capability Objectives**   * PMO is approved and chartered. * The roles and responsibilities of the PMO are defined and communicated * PMO is funded and staffed. * PMO is authorized to ensure and enforce alignment of projects to data management policy and standards | | *Advice* | | Data management is no different from any other organizational function. It requires coordination. Program coordination must be formalized, appropriately staffed and empowered to ensure alignment among the stakeholders and adherence to program deliverables. Without the function of the PMO, data management is just another “good idea” that doesn’t get properly implemented (on time and within budget). Management of the details associated with implementation of the data management program is one of the real measures of implementation success. | | | |
| *Questions* | | * Does the function of the PMO exist? * Is the PMO appropriately staffed and funded? * Does the PMO have the authority needed to be effective? * Have the roles and responsibilities of the PMO been defined, documented and socialized? * Have milestones, metrics and measurements associated with program delivery been established? | | | |
| *Artifacts* | | * Evidence of PMO formation (i.e. charter and approvals) * Description of roles and responsibilities of the governance program * Staff assignments and qualifications * Gap analysis of skills needed and in place * Bi-directional communication to stakeholders (empowerment) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no program management office | The need for a PMO for building the data management program is recognized - initial plans are being discussed. | | The need for a PMO is recognized. Some formal project coordination is underway within individual lines of business. The roles and responsibilities of the PMO are being defined and communicated. | | The PMO is approved and being implemented. Skill sets required for sustainability are being defined. Funding requirements and resource sharing plans are in process for approval | The PMO is chartered, staffed with required skill sets. The PMO is authorized to ensure and enforce alignment of projects to policies, procedures and standards |  |

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| **4.4.2 Developing Program Roadmaps** | | | | | | | |
| *Program roadmaps define “target state”, and describe the steps required to attain. Roadmap topics include, but are not limited to governance structure; content management strategy; infrastructure design; data architecture; etc.*  **Sub-Capability Objectives**   * Program roadmaps are developed. * Program roadmaps are aligned to all components of the data management strategy | | *Advice* | | Defined and detailed program roadmaps are needed to establish and communicate the pathway to the target state objective. Roadmaps need to be consistent with strategy. This is the guide for implementation. They don’t have to be fully fleshed out – but do need clear and tangible definition of what will be done (by when). Short term roadmaps (i.e. 30/60/90 day plans) do need to be comprehensive. More flexibility is OK for longer term plans. Questions should be raised about scope, practicality and achievability. Find out what type of dependencies are associated with the roadmaps. Dependencies add risk. | | | |
| *Questions* | | * Have clearly defined program roadmaps been developed? * Are roadmaps and plans tangible (i.e. can they be measured)? * Have the dependencies been defined, documented and verified? * Are any/all dependencies included in respective budgets? | | | |
| *Artifacts* | | * Program roadmaps (including evidence on how they align to data management strategy) * Maps of dependencies associated with implementation * Outcomes and projected deliverables * Budget alignment with roadmaps, plans and dependencies | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no target state roadmaps for the DMP. | Target state objectives and their implications on program roadmaps are being discussed. | | Target state objectives have been defined. Roadmaps being developed, aligned to data management strategy. | | DMP roadmaps are harmonized and aligned with data management strategy. The alignment is documented and verified by stakeholders. | Program roadmaps are fully defined and developed and are aligned to the data management strategy. The relationship between program roadmaps and data management strategy is approved. |  |

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| **4.4.3 Program Roadmap Socialization** | | | | | | | |
| *It is essential that roadmaps are shared with relevant stakeholders. Working with stakeholders during the development phases invites collaborative feedback and buy-in.*  **Sub-Capability Objectives**   * Data management program roadmaps are shared with and aligned to the roadmaps of the program stakeholders (i.e.: architecture; technology; operational roadmaps etc.). * Stakeholders verify and approve data management program roadmap alignment | | *Advice* | | Sharing the program plans with stakeholders helps ensure support. This will require discussion and (likely) modification of plans. The back and forth collaboration is essential if you want stakeholders to own the outcomes, deliverables and commitments. | | | |
| *Questions* | | * Have the roadmaps been shared with key stakeholders? * Has feedback (including suggestions and concerns) been captured and addressed? * Have final (agreed to) roadmaps been developed? | | | |
| *Artifacts* | | * Distribution lists * Evidence of bi-directional communication with LOB (feedback, suggestions and concerns) * Verification and approval of roadmaps * Alignment of roadmaps with data management strategy | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Roadmaps have not been shared and socialized with program stakeholders. | Target state program roadmaps are being developed. Relevant stakeholders are identified. | | Program roadmaps are defined in collaboration with program stakeholders Program roadmaps are shared with relevant stakeholders. Feedback is collected. | | Program roadmaps are drafted and verified by program stakeholders Stakeholder feedback is incorporated into the final version of the program roadmaps. | Stakeholders approve the DMP alignment. |  |

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| **4.4.4 Implementing Project Plans** | | | | | | | |
| *Once roadmaps are agreed to and approved, they must be translated into tangible mechanisms for delivery. The Data management program office is responsible for the creation, coordination and management of the data management project plans.*  **Sub-Capability Objectives**   * Project plans are developed and aligned to program implementation roadmaps. * Routine program review procedures are in place to track progress of development plans | | *Advice* | | Program roadmaps need to be translated into detailed project plans. The management of these project plans should be centralized (via an established PMO) to ensure adherence and delivery. The project plans need to contain practical deliverables and reflect the priorities that were negotiated with stakeholders. They must be in alignment with approved budgets. | | | |
| *Questions* | | * Do practical project plans exist? * Are they aligned with program roadmaps and budgets? * Is there a centralized mechanism (PMO) in place to oversee implementation? * Are routine project review procedures in place to track progress? | | | |
| *Artifacts* | | * Evidence of completed project plans with defined deliverables * Timeframes and milestones in line with implementation roadmaps * Centralized program management office * Program review procedures to track progress | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no project plans for the DMP. | Project plans are in the process of being defined. | | Project plans are defined in collaboration with program stakeholders. | | Project plans are drafted and verified by program stakeholders. | Project plans are developed and aligned to program implementation roadmaps. Routine program review procedures are in place to track progress of development plans. |  |

## **Implementing Data Management Routines**

*Evidence of the data programs operation is an important indication that the program is running in a formal and controlled manner. Details of how committees are being run, how issues are escalated and resolved and how program metrics are being collected and utilized are all indications of a fully functional program*

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| **4.5.1 Defining Data Management Routines** | | | | | | | |
| *Routines for steady-state operations of the data management program are taking place. Routines include but are not limited to regular stakeholder meetings, planning sessions, status reporting, etc.*  **Sub-Capability Objectives**   * Program routines required for operational support have been identified and scheduled. * Program routines, meetings and working sessions are taking place | | *Advice* | | Plans and PowerPoint presentations are great, but unless there is evidence of activity being done on a routine basis, the likelihood of a sustained program is at risk. Routines in the form of standing meetings (with high repeatable attendance), planning sessions and regular communications help ensure that data management objectives are taking place. Ask stakeholders if they are “routinely involved” in data activities and if they are receiving regular communication about data management initiatives. | | | |
| *Questions* | | * Are data management activities part of the normal operational routine of stakeholders? * Are there standing meetings, planning sessions and regular communications about data initiatives? | | | |
| *Artifacts* | | * Meeting minutes, status reports and data management program announcements | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no established routines to support the DMP. | Program routine needed for operational support of the DMP are being discussed. | | Program routines needed for operational support of the DMP are identified. | | Program routines needed for operational support of the DMP are scheduled. | Program routines, meetings and working sessions are taking place. |  |

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| **4.5.2 Business Processes and Data Requirements** | | | | | | | |
| *Identifying data requirements at the beginning of an application development project is mandatory. Clearly defined data requirements impact source selection, use and access rights, stewardship, entitlement, etc. Sustainable processes must be in place to capture, review and verify the data requirements.*  **Sub-Capability Objectives**   * Routines to capture data requirements (as part of the business process design) are established and mandated * Data requirements are prioritized and approved by relevant stakeholders | | *Advice* | | Data requirements need to be defined as part of all new projects. Without this due diligence, access to the required data can become a “fire drill” vs. a well-designed and well-planned development component. The goal is to implement a process (supported by policy) to properly capture data requirements as part of the normal systems development cycle.  When evaluating this capability, make sure there is buy-in from the business users as well as information technology to ensure that data requirements are correctly specified and that they are captured at the early stage of applications development. | | | |
| *Questions* | | * Do business analysts and application users understand the nature of the data manufacturing process? * Does policy exist to ensure that no new projects are initiated without definition (and verification) of data needs? * Are formal “toll gates” (approvals) implemented to confirm, capture and verify data requirements? * Has this data definition process become part of the operational routine? Part of the SDLC process? | | | |
| *Artifacts* | | * Policy and standards requiring formal data requirement capture prior to application development * Data capture and verification processes (as part of SDLC process) * Documentation of business and data requirements (i.e. requirements matrix) * Bi-directional communication (evidence of support from stakeholders) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no formal mechanism for capturing and verifying data requirements. | Data requirements are being discussed with relevant stakeholders. | | Data requirements are in the process of being defined. Interactive discussions with stakeholders are underway in a structured manner. | | Data requirements are defined and prioritized. Processes and mechanisms to continually maintain data requirements have been established. | Routines to capture requirements are operational. Prioritization processes are adhered to by relevant stakeholders. |  |

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| **4.5.3 Project Review and Approval** | | | | | | | |
| *Policy and standards must be enforced in a controlled manner via checkpoints, formal review mechanisms and organizational approval boards. Controlled enforcement must be created to ensure that all new development as well as data access, usage and transmission of data adhere to established policy and standards.*  **Sub-Capability Objectives**   * Review and approve processes and responsibilities for data-related projects have been communicated to relevant stakeholders. * Review and approval processes are operational (includes areas such as “Approval to Build”, “Approval to Access”, “Approval to Use”, “Approval to Send”, etc.). * Data review and approval has been integrated into the firm’s technology development/SDLC process * Review and approval processes are aligned with the control mechanisms of other existing cross-organizational processes (i.e. change management policy must have referenced, and be harmonized with, data management policy). | | *Advice* | | The goal is to establish review and approval processes (checkpoints) along the data management lifecycle to ensure that decisions about acquisition, use, sharing and distribution adhere to policies and standards. The implementation of “authorizations” and “toll gates” requires balance. They must be strong enough to be effective without being bureaucratic and burdensome. The objective is to facilitate business and enable data hygiene. If a request to build/use is denied, it is in the best interest of the data management program to help remediate the reason for denial. | | | |
| *Questions* | | * Are the appropriate toll gates in place at critical decision points? * Are the review and approval processes structured to support business processes (don’t let bureaucracy take over)? * Are the criteria for toll gates transparent and easy to understand? * Are project review/approval processes done collaboratively with other control functions? * Have data control reviews been incorporated into the SDLC process? | | | |
| *Artifacts* | | * Documented review and approval processes * Alignment with existing application development and other control processes * Bi-directional communication with stakeholders | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no formal review mechanisms. | Review and approval processes are being debated. | | Review and approval processes have been drafted. Stakeholders that are in charge of processes, checkpoints, approval boards and formal review mechanisms are identified. | | Review and approval processes are verified and approved by key stakeholders. Processes have been aligned with the other cross-organizational control mechanisms. | Review and approval processes are operational. Processes and responsibilities have been communicated to relevant stakeholders. |  |

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| **4.5.4 Issue Management** | | | | | | | |
| *An established escalation process is necessary to resolve conflicts, reconcile priorities and ensure efficient operations. It demonstrates improved service to the organization, promotes the benefits of an established data management program, and is an important operational routine expected of audit and regulatory reviews*  **Sub-Capability Objectives**   * The issue management and escalation process has been defined and verified. * The issue management and escalation process has been documented and approved. * The issue management and escalation process is operational | | *Advice* | | An established escalation process is necessary to resolve conflicts, reconcile priorities and ensure efficient operations. These escalation and mitigation procedures need to be formalized with clearly established roles and responsibilities as well as defined decision points. | | | |
| *Questions* | | * Do escalation procedures exist for data management issues? * Are the right people with the appropriate levels of authority involved in the decision-making process? | | | |
| *Artifacts* | | * Escalation procedures and communication about conflict resolution * Evidence of implementation (documented escalation procedures) * Evidence of issue logs; KRIs and other performance metrics | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no established procedures for conflict resolution. | Escalation procedures for conflict and prioritization resolution are being discussed. | | Escalation procedures for conflict and prioritization resolution are identified. | | Escalation procedures for conflict and prioritization resolution are defined and verified by stakeholders. | Escalation procedures for conflict and prioritization resolution are documented and operational. |  |

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| **4.5.5 Data Management Training Programs** | | | | | | | |
| *Behavior and culture change are required for effective data management. Formal training is needed to ensure those with data responsibility are operating in accordance with established policy and standards.*  **Sub-Capability Objectives**   * Training programs are designed and operational. * Training is mandated as an operational requirement | | *Advice* | | The skills and operating structures for data management are new to most people. Data stewards are performing specialized functions and need specific training on how to perform their function in the context of the overall data management program. Business users need training to understand the basic principles of data management, the implications of policy and standards and where to go for support. Building data management training as part of the ongoing training for all employees helps spread data management culture. | | | |
| *Questions* | | * Is there a formal training program for data stewards? * Have the training curricula been developed in collaboration with LOB and other control functions? * Is participation mandatory and part of the control process? | | | |
| *Artifacts* | | * Training curricula and materials * Communication about participation (class rosters, certificates of accomplishment) * Training and testing results | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no formal data management training programs. | Training programs categories and staff skill set discussions are underway. | | Training curricula are drafted. Discussions with key stakeholders on skill sets required (and existing staff knowledge gaps) are underway. | | Training programs are designed and tested. | Training programs are operational. The effectiveness of training is monitored. | Training is mandated as an operational requirement. |

## **Engaging Program Stakeholders**

*Commitment and buy-in from program stakeholders is pivotal to the success of the data management program. Data management as a function is NOT executed solely by the data management organization. Instead, data management as a function is something that is executed by the entire firm. Stakeholders represent the various areas and functions of the business and therefore are all responsible for the integrity and security of the firm’s information assets.*

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| **4.6.1 Identifying and Confirming Stakeholders** | | | | | | | |
| *Data management requires participation and cooperation from staff and resources outside the data management program organizational structure, as well as staff and resources from other firm-wide control functions. Those identified as relevant stakeholders must be held accountable for on time and on budget project delivery. To strengthen that commitment, performance in support of the data management program should reflect in stakeholder reviews and/or compensation.*  **Sub-Capability Objectives**   * Roadmaps and program milestones have been communicated to the program stakeholders. * Program stakeholders have reviewed program deliverables. * Stakeholders are in agreement with (and are being held accountable) to program deliverables. * Program stakeholders are committed to the program deliverables through job description modification and/or through compensation/bonus | | *Advice* | | Data management is a collaborative activity. It has implications across the organization and affects multiple stakeholders. Ensuring that data is properly curated, secure and accessible is a shared responsibility. Commitment from stakeholders is an essential component of a successful data management program and comes in many forms. It involves financial commitment. It involves operational (frequently daily) commitment. It involves performance commitment. It requires accountability. You are looking for evidence of these types of behaviors. | | | |
| *Questions* | | * Have stakeholders been identified and verified? * Have stakeholders demonstrated commitment to the objectives of the DMP? * Is funding in place to verify commitment to DMP deliverables? * Is there a mechanism to ensure accountability (i.e. alignment with performance review and compensation)? | | | |
| *Artifacts* | | * Roster of stakeholders * Documentation of commitment/deliverables (incremental, milestone and final) * Evidence of bi-directional feedback and approvals * Mechanisms to ensure accountability (i.e. modification of job descriptions or performance review criteria) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no mechanisms for holding stakeholders accountable to DMP deliverables. | DMP objectives are in the process of being translated into program deliverables Stakeholders impacted by the program objectives and deliverables are being identified. | | Program stakeholders are identified and verified. Program deliverables are defined in collaboration with involved stakeholders Program deliverables are being reviewed with relevant stakeholders. Feedback is collected. | | Program deliverables have been reviewed and verified by stakeholders. | Stakeholder have committed to program deliverables and timelines, supported by their management. Stakeholders are being held accountable to program deliverables. | Program deliverables are implemented via job description modification and reflected in compensation. |

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| **4.6.2 Stakeholder Resource Plan** | | | | | | | |
| *Proper resource levels with appropriate skillsets must be secured by relevant stakeholders*  **Sub-Capability Objectives**   * Resource planning is complete * Resource plans have been reviewed, reconciled and approved by the data management PMO * Approved resources are in place | | *Advice* | | The goal is to ensure that resource plans are sufficient to support the program deliverables, timelines and commitments. Resource allocation plans must be verified and approved. Be aware of the “risk of haircuts.” Data management is collaborative and cuts/inadequacies can have a cascading effect. Make sure the commitments are strong. | | | |
| *Questions* | | * Have stakeholders pledged sufficient resources to implement project plans and meet program roadmaps? * Do the resources exist or do they need to be acquired? * If they need to be acquired, has sufficient ramp up time been incorporated into deliverable timeframes? * Does the ODM have authority to review and modify resource plans of stakeholders? | | | |
| *Artifacts* | | * Resource plans and documents * Processes to review, modify and validate resource plans * Bi-directional feedback (review, reconcile, approve) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Resource planning for the DMP is not formalized. | Resource plans needed to support the DMP are being defined in collaboration with program stakeholders. | | Stakeholders prepare resource plans to support the data management program. | | Resource plans have been reviewed by the data management PMO. Challenges have been reconciled. | DMP resourcing plans have been approved. |  |

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| **4.6.3 Stakeholder Program Funding** | | | | | | | |
| *Sufficient funding dedicated to the data management program must be committed to by business, technology and operations. In a mature data management program, the data management office (or the equivalent) is granted authority to review and approve committed budgets.*  **Sub-Capability Objectives**   * Funding has been allocated and aligned to the program roadmaps and workstreams. * Funding allocations have been reviewed by the data management PMO. * Funding challenges have been discussed and reconciled. * Funding levels have been approved and allocated | | *Advice* | | Funding plans have dependencies and interrelationships. The goal is to ensure that all stakeholder plans are approved and aligned with the objectives of the DMP. There is no single strategy for funding data management initiatives. The strategy will depend on the culture of the firm. Some fund centrally. Some require LOB allocations. Some provide seed funding for early stage activity. Some mix and match. Regardless of the funding mechanism(s) – accountability and predictability are required – and the ODM needs some mechanism to ensure funding commitment. | | | |
| *Questions* | | * Have budgets been prioritized to ensure adequate funding for the DMP? * Are budgets aligned to program deliverables? * Does the ODM have the authority to challenge stakeholders about budget commitments? | | | |
| *Artifacts* | | * Funding plans and budget allocation * Funding approval and authorization to spend * Escalation procedures for budget shortfalls | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Funding for the DMP is not formalized. | The funding required to support the DMP is being defined in collaboration with program stakeholders. | | Stakeholders prepare funding to support the data management program. Funding is aligned to program roadmaps and workstreams. | | Funding allocations have been reviewed by the data management PMO. Challenges have been reconciled. | Funding levels have been approved and allocated. |  |

## **Data Management Communications**

*Many data management programs are an organization’s “best kept secret”. This should not be the case. The objectives and the benefits of the program should be regularly communicated to the organization – to foster an understanding of the program, the benefit from the program, and to advance the program. Additionally, it is important to communicate the program objectives to external regulatory bodies (transparency of the program objectives is key). Finally, it is important to stay abreast of the advances in industry, therefore, having members of the data program involved in industry associations, conferences and other ongoing educational and awareness venues is important to the success of the program.*

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| **4.7.1 Data Management Communication Strategy** | | | | | | | |
| *Plans for internal communications are needed to drive awareness and adherence to the data management program. The full spectrum of communications channels (i.e. websites, access portals, reference libraries, documents, training materials, town hall meetings, etc.) are needed to ensure that stakeholders understand the goals, objectives and processes associated with the data management program*  **Sub-Capability Objectives**   * Internal communication plans have been developed, shared and approved by relevant stakeholders * Communication channels are defined. * Communication program is operational. | | *Advice* | | Take advantage of the internal communications infrastructure to develop and implement a firm-wide communications strategy. Communications needs a formal plan and should use all available media (written communication, internal websites, road shows, town-hall meetings, etc.) It is important to evaluate the degree to which executive management is participating in these activities. Their engagement denotes importance and sends a clear/positive message of support for data programs. | | | |
| *Questions* | | * Have the plans been created, published and approved? * Are the communications channels defined and established? * Is the internal communications program operational? | | | |
| *Artifacts* | | * Communications plan and channels to be used * List of stakeholders (bi-directional feedback and approvals) * Evidence/illustration of methods used (and content of) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no communications strategy about the data management program. | DMP communication requirements and plans are being defined. | | Communication plans have been defined and shared with involved stakeholders. | | DMP communication plans have been verified and approved by program stakeholders. | DMP communications strategy is implemented and operational. |  |

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| **4.7.2 Communicating with External Governing Bodies** | | | | | | | |
| *This is for organizations subject to regulatory oversight. Communication with regulators and government authorities are essential as well as functional. The regulatory mandate for data management can be an important component of the overall data management program*  **Sub-Capability Objectives**   * Proactive communications strategy is planned and approved by program stakeholders. * Procedures for regulatory communications are established (in collaboration with Compliance) * Regular communications with regulators and market authorities are taking place | | *Advice* | | Communication with regulators about data challenges and objectives should be proactive and transparent. Regulators are aware of the challenges of implementing a control environment. They have a stake in the matter as well (both market structure oversight and linked risk analysis). Self-identified data challenges and plans for remediation are much wiser than regulatory discovered data challenges with audit issues (MRA) written against the firm. | | | |
| *Questions* | | * Does the firm have a regulatory communication strategy? * Has the strategy been developed in conjunction with compliance and risk (first line of engagement)? * Are routine communications with regulatory bodies taking place? | | | |
| *Artifacts* | | * Regulatory roster (and evidence of communication) * Internal approval process for regulatory engagement (procedure for regulatory communication) * Self-identified audit reports | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no formal process for communicating the data management program to regulatory bodies. | DMP communication plan is being defined. | | Communications plan is being defined and shared with involved stakeholders. | | Communications channels are established and verified by stakeholders. Regulatory bodies have been contacted (if required) and plans for regular review are being planned. | Communications about the DMP are being delivered to program stakeholders. Strategy and plans for communication with regulators and market authorities (if required) are in place. |  |

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| **4.7.3 External Industry and Standards Engagement** | | | | | | | |
| *Engagement with industry trade organizations, research consortia and standards bodies ensure that the organization is aware of and aligned with the latest trends associated with data management and new developments related to the data management best practice*  **Sub-Capability Objectives**   * Stakeholders are kept abreast of changes and events in the data management industry. * A formal function is established with dedicated resources to actively participate in data management industry activities and events | | *Advice* | | Participation in industry organizations (new developments) and standards bodies (standards) need to be formalized. Internal owners and facilitation agents are a good way of ensuring the flow of information across the firm. Embedding engagement with external organizations and standards bodies into job descriptions is useful for clearing participation. | | | |
| *Questions* | | * Do you have a strategy for engagement with the data management industry outside of your organization? * Are the appropriate owners and facilitation agents identified and engaged? * Does executive management understand the value proposition and buy-into the engagement activity? | | | |
| *Artifacts* | | * Evidence of participation and contribution (events, working groups, resources) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no plans for engagement with industry groups or standards bodies. | The value and importance of engagement with industry and standards organizations is being discussed. | | Relevant industry associations are being identified. | | The process for engagement with external bodies is being developed. | Active engagement with external industry bodies is established and part of the "operate model." |  |

## **Tracking Costs and Benefits**

*Like every other program, the benefits of the data management program need to be collected, measured, and acted upon to ensure that the maximum benefit is realized from the investment into the program. For data management, that means developing processes to understanding and capture total cost while identifying and aggregating the measurable benefits*

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| **4.8.1 Tracking Data Management Progress** | | | | | | | |
| *Metrics constitute the empirical evidence required to determine the effectiveness of the data management program. Metrics development is ongoing as new business processes are developed and aligned to the data governance policy and standards. A successful metrics program will not only capture, aggregate and report metrics, but will also affect program change based on metric evaluations.*  **Sub-Capability Objectives**   * Metrics and thresholds are established. * Metrics are tracked and reported to relevant stakeholders. * Metrics are tracked and reported to executive management. * Metrics inform and drive program decisions and modifications | | *Advice* | | This is the implementation of metrics at the end-user level. This is designed to provide evidence of effectiveness as well as to indicate the health/well-being of the data program. All of this can lead to important remediation and keep the data management program on track. There are three types of metrics to consider: (1) measurement of the program itself; (2) measurement of data quality; and (3) outcome metrics. | | | |
| *Questions* | | * Are metrics related to adherence to the data program captured, reported and used? * Are metrics related to data quality captured, reported and used? * Are metrics related to the value of the data program captured, reported and used? * Do stakeholders support the metrics program? * What form of reporting mechanisms are being used? | | | |
| *Artifacts* | | * Definition of program metrics * Reports, dashboards, heat maps and other forms of output * Distribution lists and evidence of bi-directional communication/feedback | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Metrics are not in place to track program adherence, progress and outcomes. | Metric categories and areas of data management program measurement are being defined. | | Metrics and thresholds for the data management program and for effectiveness are drafted. Discussions with key stakeholders are underway. | | Metrics and thresholds are defined and complete. Metrics and thresholds are verified by relevant stakeholders. | Metrics and thresholds are established. Metrics are tracked and reported to relevant stakeholders and executive management. | Metrics are analyzed and used to drive program decisions and modifications. |

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| **4.8.2 Tracking and Analyzing Costs** | | | | | | | |
| *Data and data management expenses occur throughout an organization and need to be assessed in the context of the overall data management program. Determining the current cost at the enterprise level as well as the line of business level establishes a benchmark that can be tracked and compared to as the enterprise data program is established and deployed.*  **Sub-Capability Objectives**   * Current-state data and data management expense is captured at the LOBs and enterprise levels * Total expense is analyzed, maintained and used to establish a cost benchmark for comparison to future costs as the data management program is implemented | | *Advice* | | It is important to establish a cost baseline for the data management program. This is an essential (and valuable) metric. Prepare for interactive discussions on the definition of expenses that constitute “data” as well as on the appropriate methodology to use to capture spend by category. | | | |
| *Questions* | | * What expenses constitute “data”? * What methodology is used to capture spend (i.e. acquire, cleanse, store, manipulate, transform, integrate, distribute) as well as on soft metrics (reconciliation, lack of capability, missed opportunity, capital charges, inefficient operations, collateral calculations, etc.) | | | |
| *Artifacts* | | * Expense categories (evidence of agreement) * Cost allocation methodology * TCO calculation (worksheets, approvals, reporting, ROI criteria) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no methodology for capturing expense associated with data management. | The methodology for calculation of TCO is under discussion. | | The methodology for calculation of TCO is drafted and being reviewed by stakeholders. | | The methodology for calculating TCO for data management is verified by stakeholders. | Total expense is captured, maintained and analyzed at both the line of business and organizational levels. |  |

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| **4.8.3 Capturing Program Benefits** | | | | | | | |
| *Positive cost benefit analysis of the data management program is necessary to ensure organizational buy-in. Keep in mind that data management effects many systems and processes across the organization and may need to be evaluated beyond standard ROI (project based) methodologies.*  **Sub-Capability Objectives**   * A standard methodology for calculating the financial benefits of the data management program at the line of business (either using an established organizational standard or creating a new method) is established * A standard methodology for calculating the financial benefits of the data management program is established to at the enterprise level for aggregate evaluation. * Relevant stakeholders review and approve cost/benefit methodology | | *Advice* | | Capturing benefits is needed to ensure continued buy-in to the data management program. Benefits should be understood in the context of the entire organization (i.e. evaluate all the dependencies associated with trusted data). This will not usually fit into standard criteria for the calculation of (project-based) ROI. Find out what methodology is being used and how the calculations are determined. Think about the value proposition from four dimensions: (1) operational efficiency (cost), (2) trust (model-based strategies), (3) insight (upselling and predictive analysis), and (4) flexibility (ability to adapt to changing circumstances). | | | |
| *Questions* | | * What is the organizational view of benefits associated with data management? * What are the methodologies used to calculate financial and operational benefits? | | | |
| *Artifacts* | | * Documentation of methodologies (and illustrations of how applied) * Roster of stakeholders and evidence of bi-directional communication (and approvals) * Alignment with business case (did we deliver what we promised) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no methodology for measuring the benefits of the data management program. | The methodology for evaluation the return on investment associated with data management is being discussed. | | The approach for capturing the financial benefits of the data management program is being defined in collaboration with program stakeholders. | | The financial benefits of the data management program are being measured, monitored and used for LOB decision making. | The financial benefits are being aggregated at the organizational level. |  |

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| **4.8.4 Utilizing Metrics for Program Decisions** | | | | | | | |
| **Sub-Capability Objectives**   * Financial benefits are measured, monitored and used for LOB decision making. * Financial benefits are aggregated at the organizational level and used to influence data management program priorities | | *Advice* | | Evidence of value is extremely useful in reinforcing the contributions of the data management program. Capturing metrics for the purpose of informing is where the real value is realized. Ensure that captured metrics are being properly used for decision making, resources allocation, task prioritization, and other similar business objectives. Expressions using tools such as “heat maps” help put data management into context. The ability to “name and shame” is useful in helping to release purse strings. | | | |
| *Questions* | | * Are financial benefits measured, monitored and used? * How have these metrics been used to establish and remediate priorities? | | | |
| *Artifacts* | | * Evidence of use of metrics to evaluate, adjust and enhance the data management program * Distribution lists and evidence of bi-directional feedback | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Financial benefits of the data management program are not captured. | The approach for capturing the financial benefits of the data program are being discussed. | | Methodology for capturing the financial benefits of the data program are being developed. | | The methodology for measuring the financial benefits of the data program have been defined, and have been shared with and verified by relevant stakeholders. | The financial benefits are being aggregated at the organizational level and used to influence data management program. |  |

# **Chapter 5: Data Governance**

## **Operationalizing Governance**

*Daily governance routines and escalation procedures are evidence of an effective data governance program.*

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| **5.1.1 Establishing Governance Routines** | | | | | | | |
| *Business requirements are an output of the established routines. All governance and control routines (meetings, metrics, reporting, etc.) are established and put into practice. Sustainable processes are in place to capture, review and verify business requirements.*  **Sub-Capability Objectives**   * Data program governing bodies are meeting and functioning in accordance with their established charters * Metrics are being captured and reported * Program status and progress reports are generated for executive management. | | *Advice* | | Data governance is not a project but part of a sustainable program of work that becomes part of the organizational DNA. A well-functioning governance program is defined by the routines that support it. The goal is to ensure that data management becomes adopted as “business as usual” across the organization. | | | |
| *Questions* | | * Are the governing bodies and working committees meeting on a regular basis? * Is attendance robust (i.e. greater than 80%)? * Are data management program objectives measured and is progress monitored? * Are issues escalated appropriately and according to escalation policy? | | | |
| *Artifacts* | | * List of committees (minutes and actions) * Implementation of toll gates, authorizations and governance processes | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no established routines | The operating model (meetings structure, tracking processes, etc.) are being defined | | Data management meeting structures and routines are defined | | Meeting routines are scheduled | Meeting routines are operational. Formal records (minutes, action items, dependencies) are captured and verified |  |

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| **5.1.2 Documenting Escalation Procedures** | | | | | | | |
| *Formal escalation procedures must be agreed to and documented. Escalation procedures are the mechanism used by the organization to address critical decisions and resolve conflicts.*  **Sub-Capability Objectives**   * Escalation procedures have been defined and documented. * Escalation procedures are in alignment with the organizational governance structure * Procedures have been reviewed and approved by relevant executive management and organizational governance bodies. | | *Advice* | | Escalation is needed for governance as well as for the overall data management program (remember governance follows program). This is about the practice of data management (i.e. definitions, allowable values, quality requirements, access rights, classifications, etc.) as well as any “break-glass” events affecting the organization. Formality is essential for both operational sanity and audit requirements. Make sure escalation procedures are reviewed by audit as well as endorsed by executive management. | | | |
| *Questions* | | * Do verified escalation policies and procedures exist? * Have you made the distinction between program escalation (ecosystem) and governance escalation (data-related)? * Have escalation policies and procedures been reviewed and accepted by audit and management? | | | |
| *Artifacts* | | * Escalation criteria, policies and procedures? * Communication and training about the escalation process for stakeholders? | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no coordinated processes for managing conflicts or handling critical decisions | The processes and procedure for handling critical decisions and resolving conflicts are being discussed with relevant stakeholders | | Escalation procedures are in the process of being defined and are under review by relevant stakeholders | | Escalation procedures and mechanisms for handling critical conflicts have been documented and approved by stakeholders | Escalation procedures are operational. Procedures and processes are evaluated and approved by ex. Mgt. |  |

## **Data Management Policy and Standards**

*An effective data governance program is built on collaboration. In a properly executes data governance environment, everyone contributes to the processes that ensure data is fit for purpose. Data governance must be balanced. Rules and controls (policy and standards) must be strong and effective, but must not impede business, technology or operations. If properly implemented, a data governance program will enable business by creating procedures that enhance data discovery, data access and data usage across the organization.*

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| **5.2.1 Defining Data Management Policy** | | | | | | | |
| **Sub-Capability Objectives**   * Policy and standards are developed in collaboration with (business, technology and operations) stakeholders. * Policy and standards are complete and verified * Policy and standards are in alignment with Data Management Strategy | | *Advice* | | The development and implementation of policy and standards takes the data management program from “conceptual” to “functional”. These are the “rules of data” (to ensure that data is trusted and managed) with described consequences (audit reports; regulatory reviews; MRIA; etc.). They need to be both practical and stringent enough to change the way the firm operates. They need to be implemented via data standards and based on core principles. They must be linked to strategy and integrated into the SDLC process. The development and implementation of data management policy should be viewed as the bedrock of the data governance program. | | | |
| *Questions* | | * Have the data management policies and standards been created and published? * Are they linked to (and aligned with) data management strategy? * Have they been developed and verified in collaboration with stakeholders? * Are they aligned with the SDLC process? * Have they been reviewed and approved by both audit and executive management? | | | |
| *Artifacts* | | * Definition of the areas that are covered by policy and standards * Documented and approved policies and standards * Bi-directional feedback with relevant stakeholders (development process and roster of stakeholders) * Approvals from Executive Committee and Board * Evidence that policies and standards have been communicated (i.e. memos, town halls, announcements) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no formal data policy. | The areas that need to be covered by organizational policies, procedures and standards are being debated. | | Draft policies and standards have been documented and shared with involved stakeholders. | | Draft policies and standards are complete and cover how data is acquired, managed and delivered. | Policies and standards are complete, aligned with DM strategy and verified by involved stakeholders. |  |

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| **5.2.2 Data Management Policy from an Audit Perspective** | | | | | | | |
| *Implemented policy and standards must be enforceable. Best practices suggest enforcement via self-attestation and corporate audit examination. Lack of adherence must be formally escalated to executive management when not resolved.*  **Sub-Capability Objectives**   * The data management office has the authority to examine and enforce adherence to data management policy and standards. * Corporate audit examines (or the equivalent) as the next ‘line of defense’, must be empowered to enforces adherence to policy and standards. | | *Advice* | | Policy and standards must be implemented and adopted by the organization. Once implemented, they must be enforceable. In most organizations, audit plays an important role. When evaluating this capability, ensure that the policies have been implemented and that there is an established procedure to ensure compliance. | | | |
| *Questions* | | * Have policy and standards been properly socialized? * Have the appropriate parties been empowered to force adherence? * Has appropriate time been provided to stakeholders to adopt to the newly published policy and standards (“burn-in” period) | | | |
| *Artifacts* | | * Evidence of established policy and standards * Evidence of alignment with other control processes * Evidence of a documented audit process (enforceability) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no enforcement mechanism in place. | The concepts and procedures for policy adherence is being planning. | | DMO is working with Audit to develop processes and routines needed to ensure compliance to data management policy and standards. | | Processes to enforce adherence has been tested and verified to ensure they are both practical and enforceable. Escalation procedures for non-adherence have been defined and documented. Role and authority of the DMO for policy and standards enforcement has been reviewed and approved by relevant stakeholders. | DMO, audit and/or oversight resources are performing examinations and enforcing adherence. |  |

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| **5.2.3 Approving Data Management Policy** | | | | | | | |
| *Policy and standards must be shared and reviewed by relevant stakeholders to ensure agreement, alignment and buy-in. Policy and standards are critical elements and should be subjected to a rigorous challenge process by stakeholders*  **Sub-Capability Objectives**   * Policy and standards are developed in collaboration with (business, technology and operations) stakeholders. * Policy and standards are complete and verified * Policy and standards are in alignment with Data Management Strategy | | *Advice* | | Policy and standards need to be formally reviewed and approved by key stakeholders. They also need to be practical and grounded in reality. Without this verification and approval process - support and adherence will be difficult to achieve. Investigate the processes used to collaboratively develop and approve policies and standards. Ensure that the participants are at the right level of organizational seniority. | | | |
| *Questions* | | * Have the right stakeholders at the right levels of seniority been involved in the development process? * Have policies and standards been verified and approved by stakeholders and executive management? | | | |
| *Artifacts* | | * Roster of stakeholders and communication trail * Evidence of review and approval (minutes, sign-off) | | | |
| Not Initiated | Conceptual | | Developmental | | Defined | Capability Achieved | Capability Enhanced |
| There is no stakeholder approval process in place. | Stakeholders that need to verify and approve policy and standards are identified and confirmed. | | Stakeholders are meeting to discuss policy and standards. Draft policy and standards are being reviewed. | | Draft policies and standards have been evaluated against rules and guidelines for ownership, definition, lineage, metadata, quality, permissible use, sourcing and controls. | Policies and standards are verified and approved by program stakeholders and executive governing bodies. |  |

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| **5.2.4 Sanctioning Data Management Policy** | | | | | | | |
| *Policy and standards must be recognized and supported by senior executive management. Data governance must be aligned with (and become a component of) the existing governance structures of the enterprise.*  **Sub-Capability Objectives**   * Policy and Standards have been submitted to the organizational governance mechanism for evaluation. * Policy and Standards have been approved | | *Advice* | | Policy needs to carry the authority of executive management. | | | |
| *Questions* | | * Do those involved in corporate-level review fully understand the data management imperative (and challenges)? * Was the approval process formal with the right executives involved in the process (and via established organizational approval processes) | | | |
| *Artifacts* | | * Distribution roster * Evidence of evaluation (BOD agenda, minutes) * Formal approval and associated communications | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data management policies and standards have not been approved. | The process needed to define and implement data management policies and standards is being investigated. | | Policy and standards are in the process of being reviewed with established governance bodies. | | Established governance bodies have reviewed and approved the data management policies and standards. | Data management policy and standards are mandated and compliance is being audited. |  |

## **Maintaining Catalogues and Inventories**

*For data catalogues and inventories to serve their purpose, they must be maintained as part of the development lifecycle. Any changes to these resources of information must be done in accordance to established policy and standards to ensure content changes are of the highest quality and are fully attributed to the owners of the data sets.*

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| **5.3.1 Data Catalogue Maintenance** | | | | | | | |
| *Data catalogues, inventories, and glossaries capture information about the data assets owned and governance by an organization. It acts as a discovery tool for the end user, and as such, must be maintained with formal, policy-driven processes and procedures to ensure the information is maintained*  **Sub-Capability Objectives**   * Data inventory is maintained * Business data glossaries are being reviewed and updated * CDE designations are routinely evaluated and modified | | *Advice* | | Catalogues and inventories inform. Glossaries provide important descriptive information. CDE designations must be maintained to enable proper prioritized data processing and data quality evaluation. When evaluating this capability, make sure the firm has formal processes in place to ensure the information in these repositories remains of high-quality. | | | |
| *Questions* | | * Are there formal procedures (policy-driven) that require routine updates to all inventories and catalogues? * Are these processes built into the SDLC and other operating processes? | | | |
| *Artifacts* | | * Policy and standards are in place that require all catalogues are updated with all new and enhancement development * Communication of these requirements have been sent out to all development teams and businesses * Training | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no formal policies in place requiring catalogue and glossary maintenance. | Inventory and glossary update procedures are being discussed. | | Policy and procedures are being developed to ensure routine updates for all data catalogues and glossaries. | | Policies have been developed. Requirements have been communicated to relevant stakeholders. | Policies are in place and processes are in production to ensure routine maintenance of all data catalogues and glossaries. |  |

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| **5.3.2 Data Model Inventory and Maintenance** | | | | | | | |
| *All new system development, as well as modification to existing systems, generate changes to MDM, application models and metadata. It is imperative that the maintenance of the models and metadata be updated as required and prescribed by policy and standards.*  **Sub-Capability Objectives**   * Maintenance procedures for data models; taxonomies; ontologies; etc., are established and enforced * All metadata is maintained and utilized * Data classifications are kept current * Identification schemas are maintained - usage is mandated | | *Advice* | | Models and metadata are foundational to data architecture and engineering. Many times, once developed, companies fail to maintain this information, making it outdated and of little value. When evaluating this capability, inquire into what procedures are in place to ensure these tools are regularly updated and maintained. Look for policy and standards to support these objectives. | | | |
| *Questions* | | * Are there formal procedures (policy-driven) that require use and routine updates to all models and metadata? * Are these processes for using and maintaining models and metadata built into the SDLC and other operating processes? | | | |
| *Artifacts* | | * Policy and standards are in place that require the use and maintenance of data models and metadata * Communication of these requirements have been sent out to all development teams and businesses * Training | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no formal policies in place requiring use and maintenance of data models and metadata. | Use and maintenance of models and metadata are being discussed. | | Policy and procedures are being developed to require the use and maintenance of data models and metadata. | | Policies have been developed. Requirements have been communicated to relevant stakeholders. | Policies are in place and processes are in production to ensure routine maintenance of all data models and related metadata. |  |

## **Enforcing Metadata Processes**

*Metadata maintenance is critical to the success of a data management program. “Data about data” must be regularly reviewed and maintained to ensure all aspects of the organization’s information assets are fully described and maintained for completeness and accuracy.*

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| **5.4.1 Identifiers and Symbology** | | | | | | | |
| *Data Identification schemes and methodologies are used to ensure precise identification of data factors of input. Customer ID; Legal Entity ID; Product ID are examples of unique identification. Establishing ID methodologies are critical for data aggregation, classification and analysis. Unique identification is a foundational concept and is emerging as a required component for regulatory reporting and risk analysis.*  **Sub-Capability Objectives**   * Identifiers have been defined for critical business entities (e.g. product; customer; account; etc.). * Internal entity IDs have been assigned, published and are being used across business processes. * Internal IDs are aligned (and cross referenced) to industry standard identifiers | | *Advice* | | Identification schemes for instruments, entities, customers and products need to be unique and precise. Standard identifiers need to be mapped to any proprietary identifiers used in consuming applications. Unique identification is a core foundational tenet of data management that is governed by policy and enforced by standards.  When evaluating this capability, look for evidence of internal standards. See if the organization has established requirements regarding the use and maintenance of standard entity identifiers. Question if the firm is using and aligning to industry standards. | | | |
| *Questions* | | * Have unique and precise (officially sanctioned) identified been established for all instruments, entities, customers and products? * Has policy been developed and approved to ensure these identifiers are used in business applications? * Have standard identifiers been published are cross-referenced to any proprietary identifiers? | | | |
| *Artifacts* | | * Policy about standard identifiers * Inventory of identification standards being used * Cross-referencing and transformation documentation | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Disparate or inconsistent identification schemes are being used in silos throughout the organization. | The areas that need unique and precise identifiers are being debated. | | Areas that need unique identifiers have been defined and verified for critical business domains (i.e. product, client, entity, etc.). | | Identifiers have been assigned, published and are being used across business processes. Plans are being debated on the approach for concordance (cross-referencing) of legacy identifiers to the new standard. | Identifiers for specific data domains are declared as "standard" for the firm. Legacy identifiers have been cross-referenced and aligned. New applications are required to use the new standards. | Identifiers are cross-referenced to industry standard identifiers. |

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| **5.4.2 Data Modeling Standards – Maintenance and Use** | | | | | | | |
| *Taxonomies define how things relate. Data taxonomies define relationship of elements within a data domain. Taxonomies are critical to establishing common definition and language of data across an enterprise and are required to ensure data's proper use.*  **Sub-Capability Objectives**   * Authorized data domains are verified by business subject matter experts. * Authorized data domain taxonomies are being published and are being used by upstream/downstream systems (existing and new). * Internal taxonomies are aligned with (and cross referenced to) global standards | | *Advice* | | Taxonomies define hierarchical relationships. Ontologies define how financial instruments and processes work in the real world. Once designated, they need to be managed (via policy) to ensure that they are implemented, maintained and used. Adjustment to data domain taxonomies and conceptual/logical models should be formally aligned with the firm’s change management policies (including change approvals, impact analysis, controlled implementation/rollout) | | | |
| *Questions* | | * Have data domain taxonomies (and conceptual/logical models) been verified by business subject experts? * Have data taxonomies and models being published and are being used in existing and new systems? * Have policies and standards for managing taxonomies/models been defined, verified, sanctioned and published? * Has governance over taxonomies been aligned with existing change management policies? | | | |
| *Artifacts* | | * Policy and standards on use and maintenance * Mapping and transformation to ensure implementation by upstream and downstream systems * Bi-directional communication (verification, approvals, agreements) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data domain taxonomy governance does not exist | Data taxonomy governance is being debated by relevant stakeholders | | Policies to ensure the maintenance and use of established data taxonomies and being developed in collaboration with business and IT subject matter experts | | Policies related to the use and maintenance of authorized data taxonomies have been defined, and have been reviewed and approved by relevant stakeholders | Taxonomies are being used by upstream and downstream systems. Data is shared across business processes. Data harmonization is achieved. | Operational taxonomies are aligned with (and cross-referenced to) industry standards |

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| **5.4.3 Data Classifications Schemes** | | | | | | | |
| *Data classifications are critical for control and analysis of data. Data classifications are critical to establishing standard treatment of data across an enterprise and for aggregating data for analytical purposes.*  **Sub-Capability Objectives**   * There is a coordinated process for the assignment and approval of data classifications. * Data classifications have been established, assigned to data domains and verified by stakeholders. * Data classifications are adopted and implemented in systems. * Data classifications dictate how data is to be handled throughout the business process (e.g.: classification of data denotes privacy treatment, info-security treatment, masking, encryption, risk analysis, etc.). | | *Advice* | | There are many forms of data classification. Some identify data according to industry classifications. Some identify data according to its type or sub-type within a market segment. Some are used to identify instrument types. Some are used to determine how data will be managed or controlled (i.e. data sensitivity classification or data privacy classification). Policies, procedures and standards are needed to ensure the appropriate assignment, use and maintenance of classification schemes. The key stakeholders in data classification should include technology, business, legal and compliance. In many cases, compliance policies may already exist, but they may not be integrated into the “appropriate use” or SDLC processes within a firm. | | | |
| *Questions* | | * Have all classification requirements been defined, documented and verified? * Are policies and standards governing the assignment and use of classification schemes been developed and approved? * Are relevant stakeholders (business, technology and operations) involved in the data classification definition and verification process? * Are data classification schemes aligned with other control functions (security, privacy, compliance)? | | | |
| *Artifacts* | | * Documentation on the process for developing, assigning and maintaining classifications * Classification scheme policies and standards * Operational adoption (evidence) * Bi-directional communications (feedback, verification, authorizations) * Storage of classifications as metadata | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no standard data classification schemes in place | The areas that need classification are being debated | | Areas that need data classifications have been defined and verified | | Data classifications are established, assigned to data domains and verified by stakeholders | Classifications are adopted and implemented in systems. Classification schemes/standards are made mandatory by data policy. | Classification schemes are aligned with internal ontology to support flexible (scenario-based) analysis |

## **Access, Distribution and Appropriate Use**

*Metadata maintenance is critical to the success of a data management program. “Data about data” must be regularly reviewed and maintained to ensure all aspects of the organization’s information assets are fully described and maintained for completeness and accuracy.*

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| **5.5.1 Authorized and Controlled Use of Data** | | | | | | | |
| *An effective data governance program implements sound yet practical controls over access and distribution.*   * *Data domains deemed “official” (aka Authorized Data Domains) are determined* * *Entitlement controls are defined from a business perspective and enabled via technology* * *Data access is controlled via established “data provisioning points”* * *Distribution is determined through established toll gates via policy and standard procedures*   **Sub-Capability Objectives**   * Authorized data domains have been determined. * Screening procedures for access (toll-gates for entitlements) have been established and are operational * Screening procedures for permissible distribution of data have been established and are operational | | *Advice* | | Access and distribution are critical elements of content governance. Controls around how data is accessed, and how data be used and distributed must be governed. Data management must lead in determining these business objectives. Technology must lead in the implementation and enablement of these solutions. When evaluating these capabilities, determine if policies have been established and if data management and technology – along with the business stakeholders are all involved in the design and implementation of this governance feature. | | | |
| *Questions* | | * Have the official sources of data been determined and is their use required via policy? * Are the entitlement criteria (driven by policy) in place? * Are the appropriate toll-gates (procedures) in place to determine if data can be delivered to a given user or entity outside the organization? | | | |
| *Artifacts* | | * Policy and standards are in place that require the determination of access and distribution approvals * Communication of these requirements have been sent out to all development teams and businesses * Training | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Access and distribution of data is not formally governed. | Concept of access and distribution governance is being considered | | Processes to formally govern access and distribution are being developed. | | Processes have been defined to formally govern the access and distribution of data to ensure adherence to existing policy and standards | Processes to govern access and distribution are operational |  |

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| **5.5.2 Organizational Governance Alignment** | | | | | | | |
| *Alignment to business processes include: business process definition; operations procedures; 3rd party contract specifications; etc.*  Sub-Capability Objectives   * Data governance is aligned with business processes to ensure semantic definitions, taxonomies and CDEs are properly assigned, maintained | | *Advice* | | The goal is to ensure that the management of data meaning is aligned with defined business processes. Business terms including their definitions and relationships need to be properly assigned and maintained to capture and align with business reality. Data meaning needs to be aligned with operational procedures and third party data agreements. Collaboration is required to manage vendor and producer relationships and entitlement control needed to maintain the flow of data. | | | |
| *Questions* | | * Have business processes been defined and verified? * Are governance procedures in place to ensure unambiguous shared meaning across the organization? * Have critical data elements (CDEs) been aligned with established business processes? * Are there mechanisms to ensure collaboration between data producers and data consumers? * Are third party requirements and restrictions defined and accessible? | | | |
| *Artifacts* | | * Business process flow diagrams * Bi-directional communication on data definitions and relationships * CDE-business process mapping * Data sharing agreements * Security and privacy classifications | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no governance in place to ensure the correct use of data. | The concepts and requirements to ensure the proper use of data is being discussed. | | Data content governance policy (to ensure semantic definitions, taxonomies and CDEs are properly used) are being defined and shared with involved stakeholders | | Data architecture governance policy are developed and being reviewed for approval by relevant stakeholders. | Data governance processes to ensure semantic definitions, taxonomies and CDEs are properly assigned, maintained and utilized, are operational. |  |

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| **5.5.3 Governance Alignment with IT** | | | | | | | |
| *Alignment to Technology processes include: design reviews, approvals to build approvals, validation of appropriate usage approvals, permit to deliver approvals, etc.*  Sub-Capability Objectives   * All technology development is required by governance policy to follow data architecture standards * All technology development use established data architecture elements | | *Advice* | | This collaboration with IT is designed to ensure alignment to business processes, compliance with restrictions and harmonization with both technical and architectural standards. This will include design reviews to ensure that IT implementation follows data architecture standards and that toll gates are in place to review technical implementation | | | |
| *Questions* | | * Is IT governance aligned with data architecture governance? * Is transformation, cross-referencing and integration procedures defined and documented? * Is there a process for technical design review? * Are toll gates and authorizations to build/permission to use in place? | | | |
| *Artifacts* | | * Transformation and cross-referencing diagrams * Governance procedures for IT implementation? * Bi-directional communication on technical review and authorizations | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no alignment between data architecture governance and IT | The mechanisms for aligning data content and IT are being discussed | | Governance processes to ensure alignment between data content governance and IT are being defined and shared with involved stakeholders | | Governance processes to ensure alignment between data content governance and IT are being reviewed and verified by stakeholders | Technology development adheres to governance policy and uses established data architecture elements |  |

# **Chapter 6: Collaborating with Technology**

## **Data Management IT Infrastructure**

*Technology for data management involves the collaboration of the data management program with the technology organization. Data management must determine the user requirements for the program. Technology is the enabler. Through this relationship, various policy and standards governing the data management technology environment will be established. Is the goal of the data management organization to collaborate with technology to ensure that all stakeholder adhere to established policy and standards.*

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| **6.1.1 Technology Infrastructure Strategy** | | | | | | | | |
| *It is the role and obligation of technology to define and design the architecture needed to accommodate data requirements in collaboration with business.*  *Technology works in collaboration with the data management organization to define the database strategies, analytics platform approaches, middleware solutions, storage and retention technologies, information security considerations, and all other elements of the holistic technology infrastructure needed to support the data management goals and objectives of the organization.*  Sub-Capability Objectives   * An integrated technology architecture strategy is designed, socialized and agreed by relevant technology, business and senior executive stakeholders. * The integrated architecture strategy is supported and enforced by corporate audit policy. | | *Advice* | | The goal is to ensure that the data management program can be implemented by IT. Technology runs the IT mechanisms – they do not define data functionality or requirements. The opportunity is to evaluate the IT architecture strategy in light of data management objectives | | | | |
| *Questions* | | * What are the mechanisms to ensure a formal partnership between the ODM and IT? | | | | |
| *Artifacts* | | * IT strategy alignment with data management strategy * Evidence of communication, socialization and approvals | | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no integrated technology architecture strategy | The concepts and components of an integrated technology architecture strategy are being discussed | | An integrated technology architecture strategy is in the process of being defined | | An integrated technology architecture strategy is designed, socialized and agreed by involved stakeholders | An integrated architecture strategy is supported and enforced by corporate oversight policy (i.e. audit) |  |

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| **6.1.2 Roadmaps for IT Implementation** | | | | | | | |
| *For an IT implementation roadmap to be sustainable, it must have a budget commitment over the life of the designed roadmap.*  Sub-Capability Objectives   * A multi-year technology architecture roadmap has been developed. * The roadmap adheres to the approved technology architecture strategy. * Budgets have been developed and approved as well as built into the firm’s budget cycle processes. | | *Advice* | | The IT roadmap must be practical and aligned to business priorities | | | |
| *Questions* | | * Is the IT roadmap aligned to approved budgets? * Is the IT roadmap aligned with the target state objectives? | | | |
| *Artifacts* | | * Architecture target state * Architecture road maps | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no technology architecture roadmap | The components of the technology architecture roadmap are being debated | | A multi-year technology architecture roadmap is in the process of being defined | | The technology architecture roadmap has been shared with and verified by involved stakeholders. Budgets are developed and aligned with budget cycles | The technology architecture roadmap has been approved. The roadmap adheres to IT architecture strategy. Budgets are approved |  |

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| **6.1.3 Technology Infrastructure Governance** | | | | | | | |
| Sub-Capability Objectives   * Integrated governance structure and policies are in place, operational and in alignment with the data management strategy. * Governance routines are established to ensure adherence to the defined technology architecture * All enhancements and new development are subject to architectural platform design review and approval. | | *Advice* | | Technology infrastructure governance guarantees adherence to declared platform and tool standards. The objective is to ensure that existing governance policies reflect the goals of the data management program. | | | |
| *Questions* | | * What is the practice associated with identification and selection of infrastructure components that are not contained within the standard architectural framework of the organization? * What are the mechanisms to ensure collaboration with IT in defining platform policy and standards? | | | |
| *Artifacts* | | * Is technology policy in place * Evidence of governance collaboration (stakeholder meeting agendas and results, escalation procedures, etc.) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no platform governance | The components of IT and platform governance processes are being discussed | | IT and platform governance processes are in the process of being defined, aligned with data management strategy and shared with involved stakeholders | | IT and platform governance processes have been aligned with the data management strategy. IT and platform governance processes have been shared with and verified by relevant stakeholders. | Integrated governance structure and policies are operational. Enhancements and new development follow architectural platform review and approval processes |  |

## **Data Management Tool Strategy**

*The selection of technology tools required by the data management program must be determined based first on overall functionality, then, how well they integrate into a firm’s technology ecosystem. Data management plays a major role in this effort in ensuring the capabilities of the tool stack are consistent with and support the overall data strategy.*

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| **6.2.1 Tool Strategy Verification** | | | | | | | |
| **Sub-Capability Objectives**   * Integrated technology tool strategy has been defined and selected * Tool strategy decisions are approved and align with data management and vendor management strategies**.** | | *Advice* | | The goal of this capability is to ensure that there is a defined data management tool selection strategy and that it is aligned with the data management program. This requires coordination between data, technology and business. Data management tools include modeling tools; ETL; metadata; data glossaries; data quality, and data governance tools. | | | |
| *Questions* | | * What are the mechanisms for coordination between the tool selection process and data management? * Are the policies, procedures and processes that govern this relationship defined and verified? | | | |
| *Artifacts* | | * Documented tool selection strategy * Evidence of communication, alignment and sign-off | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no technology tool selection strategy. | The concepts and components of an integrated technology tool strategy are being discussed. | | An integrated technology tool strategy is in the process of being defined. | | An integrated technology tool strategy is designed, socialized and agreed by involved stakeholders. | An integrated technology tool strategy is supported and enforced by corporate oversight policy (i.e. audit). |  |

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| **6.2.2 Roadmaps for Data Management Tools** | | | | | | | |
| **Sub-Capability Objectives**   * Tool selection roadmaps have been developed * The roadmaps are developed and adhere to data management implementation plans * Budgets have been developed and approved and built into the firm's multi-year budget cycle | | *Advice* | | Once the tool selection strategy is defined, it needs to be converted into an actionable implementation roadmap. Make sure the technology roadmap is practical, aligned to business priorities and harmonized with internal procurement processes. | | | |
| *Questions* | | * Is the tool selection in alignment with the data management strategy and promised deliverables? * Is the implementation roadmap aligned with internal procurement processes? * Are plans in place for decommissioning of legacy tools? | | | |
| *Artifacts* | | * Tool roadmap * Evidence of alignment with the data management strategy (approvals) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no technology tool roadmap. | The components of the technology tool roadmap are being debated. | | The technology tool roadmap is in the process of being defined. | | The technology tool roadmap has been shared with and verified by involved stakeholders. Budgets are being developed and aligned with budget cycles. | The technology tool roadmap has been approved. The roadmap adheres to IT architecture strategy. Budgets are approved. |  |

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| **6.2.3 Governance Alignment** | | | | | | | |
| *Technology, in partnership with the data management organization, defines and governs the data management related technology stack. Data tools include but are not limited to data discovery tools, data quality tools, data profiling tools, metadata tools, lineage tools, BI tools, data governance tools, etc.)*  **Sub-Capability Objectives**   * Technology defines the permissible technology stack for related data tools. * Tool governance is implemented and operational across all technology development teams | | *Advice* | | Different tools that perform the same functions can produce disparate data. The data management group doesn’t have control over the tools used to support business – but the ODM does want to prevent misuse based on differences in various tools. Beyond this core objective, the proliferation of tools can increase complexity, add cost and inhibit systems integration. Business needs flexibility to acquire the best tools for their objectives. The ODM needs to understand (and accommodate to) the differences in the way these tools manipulate data. | | | |
| *Questions* | | * Is there a mechanism for collaboration between data management and data tool selection? * Is there agreement between IT and business regarding the scope and controls associated with IT tools? | | | |
| *Advice* | | * Policy and standards for tool governance (documented and verified) * List of authorized tools * Bi-directional communication between IT, business and data on tool selection and criteria for approval | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no alignment between the permissible technology tool stack and data governance. | The intersections between data management and permissible tools are being debated. | | Data tools are aligned with data governance processes. | | Data tool governance is documented and verified by relevant stakeholders. | BI, ETL and data tool governance is implemented and operational across all technology development teams. |  |

## **Data Management Storage Strategy**

*Data storage is an operational and security concern for organizations. The amount of data produced are increasing exponentially. Over-retention of data poses operational and legal challenges. Over replication can result in data quality and information security issues. A sound data management strategy is key to an effective data management strategy.*

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| **6.3.1 Storage Strategy Verification** | | | | | | | |
| **Sub-Capability Objectives**   * Integrated storage strategy approach (on-premise; cloud; archive & retention) has been determined * Storage strategy decisions are approved and align with data management; legal and compliance strategies | | *Advice* | | An integrated storage strategy should be developed, with consideration for on-premise storage, use of cloud, archiving, retention and defensible destruction. Business, legal and compliance are critical stakeholders in these plans, in addition to the businesses who create and require access to these data. It is important that the data management function, in collaboration with technology, legal, compliance and business drive the creation of a comprehensive storage strategy for the organization. | | | |
| *Questions* | | * What are the mechanisms to ensure coordination among IT, data and business? (at the proper levels). Is legal and compliance involved in these decisions? * Are plans for retention/archiving and defensible destruction of data being considered as part of the SDLC process? * Are additional legal requirements (i.e. masking and anonymization) required? * What is the firm’s appetite for cloud services? * How will the firm manage “data reconstruction” from archive? | | | |
| *Artifacts* | | * Storage criteria, strategy and roadmap * Evidence of alignment with the data management strategy (approvals) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no storage management strategy. | The concepts and components of an integrated storage management strategy are being discussed. | | An integrated storage management strategy is in the process of being defined. | | An integrated storage management strategy has been defined, socialized and agreed to by involved stakeholders. | An integrated storage management strategy is established and is supported and enforced by corporate oversight policy (i.e. audit). |  |

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| **6.3.2 Roadmaps for Data Storage** | | | | | | | |
| **Sub-Capability Objectives**   * Data storage strategy roadmap has been developed.      * The roadmaps are developed and adhere to data management implementation plans * Budgets have been developed and approved and built into the firm's multi-year budget cycle | | *Advice* | | Data storage, archive and retrieval plans must be coordinate across the various stakeholders (technology, business, data, legal and compliance). Prioritization is critical. | | | |
| *Questions* | | * What are the mechanisms for coordination and prioritization? | | | |
| *Artifacts* | | * Evidence of socialization and alignment | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no data storage roadmap. | The components of the storage roadmap are being discussed. | | The data storage roadmap is in the process of being defined. | | The data storage roadmap has been developed, socialized and verified by involved stakeholders. Budgets are in the process of being developed and aligned with budget cycles. | Integrated data storage roadmap has been approved. Budgets are approved. |  |

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| **6.3.3 Governance Alignment** | | | | | | | |
| *Technology, in partnership with the data management organization, defines and governs how data is persisted, archived, restored and defensively destroyed, in alignment with business objectives, the Data Management Strategy, and Legal and Compliance considerations. Storage includes online, archive, cloud and other 3rd party storage medium.*  **Sub-Capability Objectives**   * Data storage strategy and governance is defined * Data storage strategy and governance is aligned with business, data management and legal and compliance objectives. * Data storage strategy and governance is communicated to, has been reviewed by and is approved by relevant stakeholders. * Data storage governance (people, process, technology) has been implemented and is operational | | *Advice* | | Data storage policy and standards must be part of the SDLC (or equivalent). The engagement should be about how data will be stored, archived and destroyed at the initiation of an applications development process. | | | |
| *Questions* | | * Does the data storage policy exist? * Does it cover the full data lifecycle? * What are the mechanisms to ensure adherence? * Are legal and compliance involved in this effort? | | | |
| *Artifacts* | | * Policy and standards for data storage governance (documented and verified) * Evidence of implementation of the storage standards (i.e. established business processes, checkpoints, document reviews and approvals) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| A formal data storage strategy and governance (for data persistence, archive and defensible destruction) does not exist. | The intersections between data management and storage activities are under discussion. | | Data storage strategy and governance are aligned with business, data management, legal and compliance objectives. | | The data storage strategy is verified by relevant stakeholders. | Data storage governance is operational. |  |

## **Data Distribution Strategy**

*How data will be technologically accessed is a critical component of any data management implementation. A distribution infrastructure must take into consideration the types of services that will be provided and the speed and efficiency of these services, especially when it pertains to moving large amounts of data across and throughout a network. The data management function needs to identify these requirements so technology can enable the ‘right-fit’ infrastructure solution.*

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| **6.4.1 Data Distribution Strategy Verification** | | | | | | | |
| *The data distribution strategy will define the technology infrastructure required to deliver data to the end user. The strategy should consider the types of services that will be provided (ex: DaaS – data as a service), how it will be protected (entitlement control), and how it will affect the internal communication infrastructure (movement of large amounts of data across the network).*  **Sub-Capability Objectives**   * A data distribution strategy is defined by IT. * The data distribution strategy is aligned with the objectives of the Data Management Strategy. | | *Advice* | | The data distribution strategy must be based on the objectives of the data management strategy. Will data be delivered to analytic platforms? Will data be displayed across public access points (internet)? Will data be pushed to hand-held devices and PDF’s? These business objectives need to be determined in order to direct technology to build the correct, ‘fit-for-purpose’ distribution infrastructure. | | | |
| *Questions* | | * Have the requirements for data access been defined? * Have the services required by the business been defined? * Have these requirements been factored into the proposed data distribution infrastructure strategy? * Will data be pushed outside the fire-wall of the organization? Have they considered the security impact of these requirements to the proposed strategy? | | | |
| *Artifacts* | | * A defined distribution strategy | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data distribution strategy is not defined. | Data distribution strategy is being considered | | Data distribution strategy is being developed | | Data distribution strategy is defined and is being reviewed by relevant stakeholders | An approved data distribution strategy has been defined and approved. |  |

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| **6.4.2 Roadmaps for Data distribution** | | | | | | | |
| **Sub-Capability Objectives**   * Data distribution strategy roadmap has been developed.      * The roadmaps are developed and adhere to data management implementation plans * Budgets have been developed and approved | | *Advice* | | Distribution infrastructure roadmaps will involve multiple stakeholder input. When evaluating this capability, make sure the right stakeholders are participating. | | | |
| *Questions* | | * What are the mechanisms for coordination and prioritization? | | | |
| *Artifacts* | | * Evidence of socialization and alignment | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no data distribution roadmap. | The components of the distribution roadmap are being discussed. | | The data distribution roadmap is in the process of being defined. | | The data distribution roadmap has been developed, socialized and verified by involved stakeholders. Budgets are in the process of being developed and aligned with budget cycles. | Integrated data distribution roadmap has been approved. Budgets are approved. |  |

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| **6.4.3 Governance Alignment** | | | | | | | |
| *Technology defines and governs how data is distributed across the network.*  **Sub-Capability Objectives**   * A data distribution strategy and governance is defined by IT. * The data distribution strategy is aligned with the objectives of the Data Management Strategy. * Data distribution governance is implemented and operational | | *Advice* | | Data distribution policy and standards define how the organization will gain access to official stores of data. This is an essential component associated with the implementation of a control environment. Data distribution governance is contingent on the identification of the authorized data domains and the associated provisioning points. If these elements of data access have not been clearly identified - the policies associated with access (and adherence) will be cumbersome. | | | |
| *Questions* | | * Have authorized data domains been developed and adopted? * Does the distribution strategy include a provision layer (i.e. how is distribution authorized)? * What are the mechanisms to ensure stakeholders know how to access data? | | | |
| *Artifacts* | | * Policy and standards for data distribution (documented and verified) * List of authorized data domains * List of official (authorized) data provision points | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data distribution strategy is not defined. | The intersections between data management and data distribution are being debated | | Procedures for data distribution governance are in the process of being defined and shared with involved stakeholders | | Data distribution is aligned with and data management strategy and verified by involved stakeholders | Data distribution governance is implemented and operational |  |

## **Operational Risk**

*Operational risk (disaster recovery; failover procedures; etc.) have traditionally been the function of technology. Technology still plays a critical role, however, data management must participate and contribute to the business specifications that determine the levels of DR and Op Risk support. It is important that the data assets are protected, secured and recovery strategies are in place, commiserate with the business requirements.*

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| **6.5.1 Data Infrastructure Contingency Planning** | | | | | | | |
| **Sub-Capability Objectives**   * Op risk management strategy has been developed, socialized and agreed to by relevant technology, business and senior executive stakeholders. * Comprehensive operational risk evaluation is performed across legacy applications to determine risks and vulnerabilities * Op risk considerations for all new development are built into the software development lifecycle (SDLC) processes | | *Advice* | | A comprehensive disaster recovery (op risk) strategy must be developed and deployed across all of the firm’s information assets. Guidelines regarding prioritization, level of recovery and cost must all be considered.  If a firm is to have a robust op-risk practice, then the recovery criteria must be applied to legacy environments as well as all new development. Firms should have Op Risk evaluation as part of their contingency planning and should incorporate recovery criteria as part of the organization’s SDLC processes – op risk requirements will dictate system and data design architecture/recovery strategies.  When evaluating the recovery criteria of large repositories and data warehouse, keep in mind they are often “multi-tenant” (i.e. the requirements of the most stringent recovery might dictate the overall strategy).  And, keep in mind, operational risk is often driven by regulation – ensure the recovery procedures are aligned with compliance in preparation for any regulatory examination. | | | |
| *Questions* | | * What are the mechanisms to ensure collaboration between data management and operational risk contingency planning? * Are all data dependencies defined and understood for recovery? * Has DR been implemented into the firm’s SDLC processes? * Has the firm preformed an op risk evaluation of legacy systems? | | | |
| *Artifacts* | | * Disaster recovery plan * Disaster recovery testing plans and results * Evidence of a sustainable Op risk/DR program going forward | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no DR or contingency planning in place. | The elements of a DR strategy are being discussed. | | Operational risk plans are in development. | | Op risk strategy and plans have been completed and are being verified by stakeholders. | Op risk management is operational and auditable. Routine testing is being performed. |  |

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| **6.5.2 Operational Risk Governance** | | | | | | | |
| Sub-Capability Objectives   * Integrated operational risk governance structure and policies are in place and in operation. * All enhancements and new development are subject to a review and approval of their operational risk plans. * Operational risk planning is subject to Corporate Audit. | | *Advice* | | Operational risk routines (i.e. disaster recovery/BCP, cyber-threats, degrees of interconnectedness, testing, dependencies) must be formalized for all data systems. Changes to existing systems and/or new development must be evaluated against the operational risk guidelines. Operational risk will also be driven by regulation – ensure the governance processes are aligned with compliance in preparation for any regulatory examinations. | | | |
| *Questions* | | * Is operational risk governance formalized and aligned with the firm’s risk and escalation plans? * Is it aligned with the data management governance mechanisms? | | | |
| *Artifacts* | | * Disaster recovery governance mechanisms * Evidence of disaster recovery planning collaboration with compliance | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no operational risk governance processes | The components of operational risk governance are being discussed | | Operational risk governance structure and policies are defined and shared with involved stakeholders | | Operational risk management governance structure and policies are documented and verified by stakeholders | An integrated operational risk governance structure and policies are supported and enforced by corporate oversight policy (i.e. audit) |  |

# **Chapter 7: Control Function Collaboration**

## **Control Function Governance Processes**

*Data management must operate in collaboration with many of the existing control functions with an organization. In most cases, policy and standards for these areas already exist and are functional. It is imperative to the success of the data management program for the data policy and standards to be in alignment and work collaboratively with the other control functions.*

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| **7.1.1 Alignment with Information Security** | | | | | | | |
| **Sub-Capability Objectives**   * Data management policy and standards are aligned with Info-security policy and standards. * Cross-organizational dependencies are formally recognized and reflected in each groups’ policy and standards | | *Advice* | | Data management is not responsible for information security, privacy, legal and compliance but there are key elements of the data management program (i.e. identification, classification, access) that are critical to ensuring their success. Data management should be working with all control functions across the organization, identifying the touch points that impact the other control functions objectives. | | | |
| *Questions* | | * What are the mechanism to ensure collaboration with information security? | | | |
| *Artifacts* | | * Evidence that data management policies and standards align with policies of the other control functions * Evidence of collaboration (communication, joint meetings, minutes, agendas, etc.) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no alignment between data governance and information security. | The alignment between data management and information security is under discussion. | | Cross organizational information security dependencies are being defined. | | Cross-organizational dependencies are verified. | Cross-organizational information security dependencies are incorporated into policy and standards. |  |

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| **7.1.2 Alignment with Privacy and Cross-Border** | | | | | | | |
| **Sub-Capability Objectives**   * Data management policy and standards are aligned with privacy and cross-border policy and standards. * Cross-organizational dependencies are formally recognized and reflected in each groups’ policy and standards | | *Advice* | | Consistent with the advice provided in 4.7.1 | | | |
| *Questions* | | * What are the mechanism to ensure collaboration with privacy and cross-border policies? | | | |
| *Artifacts* | | * Evidence that data management policies and standards align with policies of the other control functions * Evidence of collaboration (communication, joint meetings, minutes, agendas, etc.) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no alignment between data governance and privacy policy. | The alignment between data management and privacy policy is under discussion. | | Alignment of privacy and cross-border policy with data management policy are in process. | | The alignment between data management and privacy policy is verified by relevant stakeholders. | Cross-organizational dependencies are formally recognized and reflected in each groups’ policy and standards. |  |

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| **7.1.3 Alignment with External Data Usage Requirements** | | | | | | | |
| *Firms routinely share their data with external party entities (vendors, service providers, reporting agencies, etc.). Policies and standards are required to govern what data can (and cannot) be shared, what approvals are required to permit external use of data and how data delivered to external parties will be protected (in alignment with corporate information security standards).*  **Sub-Capability Objectives**   * Data management policies and procedures for 3rd party data usage have been developed and aligned with business objectives, data management strategy, privacy policies, information security policies, and permissible data usage policies. * 3rd Party data governance policies and standards are implemented and operational. * Cross-organizational dependencies are formally recognized and are reflected in relevant groups’ policies and standards | | *Advice* | | Consistent with the advice provided in 4.7.1 | | | |
| *Questions* | | * What are the mechanism to ensure collaboration with external data usage requirements? | | | |
| *Artifacts* | | * Evidence that data management policies and standards align with policies of the other control functions * Evidence of collaboration (communication, joint meetings, minutes, agendas, etc.) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| Data management policies for third party data usage are not in place. | Policies and procedures for third party data usage are in development. | | Policies and procedures for third party data usage are being defined and shared with involved stakeholders. | | Policies and procedures for 3rd party usage is verified. | Policies and procedures for 3rd party usage is implemented and operational. |  |

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| **7.1.4 Alignment with Legal and Compliance** | | | | | | | |
| *Data Management strategy and governance must be aligned with legal and compliance data policies not already discussed.*  **Sub-Capability Objectives**   * Data Management policies and standards are aligned with legal and compliance data policy and standards. * Cross-organizational dependencies are formally recognized and reflected in relevant groups’ policy and standards | | *Advice* | | Ensure that the data management executives are interacting with the executives from legal and compliance for matters such as cross-border issues, archive, retention and defensible destruction of data | | | |
| *Questions* | | * What are the mechanism to ensure collaboration with external data usage requirements? | | | |
| *Artifacts* | | * Evidence that data management policies and standards align with policies of the other control functions * Evidence of collaboration (communication, joint meetings, minutes, agendas, etc.) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There is no alignment between data governance and legal/compliance policy. | The alignment between data management and legal/compliance policy is under discussion. | | Alignment of privacy and compliance policy with data management policy are in process. | | The alignment between data management and legal/compliance policy is verified. | Cross-organizational information security dependencies are incorporated into policy and standards. |  |

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| **7.1.5 Cross-Organizational Governance Processes** | | | | | | | |
| *Cross-organizational teams meet regularly to keep abreast of evolving issues related to data and data operations.*  Sub-Capability Objectives   * Enterprise control functions formally coordinates with enterprise data management via regular engagements, meetings and routines. | | *Advice* | | Here is where the CDO becomes the “Chief Diplomacy Officer.” There needs to be an engagement strategy and plan to meet and collaborate with the other control functions. | | | |
| *Questions* | | * Are the mechanisms to support regulator coordination defined and operational? * Are formal meetings across control functions taking place? | | | |
| *Artifacts* | | * Engagement plan * Lists of key stakeholders * Evidence of meetings (minutes, follow-up actions) | | | |
| **Not Initiated** | **Conceptual** | | **Developmental** | | **Defined** | **Capability Achieved** | **Capability Enhanced** |
| There are no cross-functional routines taking place | The concept of cross-functional operating routines is being debated | | Cross-functional routines are being defined | | Cross-functional routines have been defined and are being reviewed by relevant stakeholders | Cross-functional routines are defined and operational |  |