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Developing a Data Governance Maturity Assessment Protocol: behaviorally anchored capabilities and a validation plan based on DMBOK, DMM, and CMMI models

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Abstract

Organizations increasingly depend on data for operational, regulatory, and strategic decisions, yet the existence of policies, technologies, or formal roles does not establish that Data Governance is institutionally mature. This methodological article presents an initial development protocol for a Data Governance maturity assessment instrument. The construct is defined as the degree to which decision rights, accountabilities, policies, controls, and governed data-management capabilities are formally established, consistently enacted, supported by verifiable evidence, monitored through performance information, and continuously improved in alignment with organizational purpose, legal requirements, ethical principles, and stakeholder needs. The proposed measurement model is multidimensional, criterion-referenced, and predominantly formative or composite. Seven preliminary dimensions are specified, and a bank of forty-nine candidate capability statements is introduced. A five-stage behaviorally anchored response rubric replaces agreement-based Likert responses, while “Cannot assess” and “Not applicable” are treated separately. The primary intended output is a noncompensatory capability profile supported by multiple informants and documentary evidence; no validated overall score or cutoff is claimed. The article also specifies a future validation protocol covering content validity, cognitive interviewing, pretesting, pilot studies, model evaluation, interrater agreement, temporal stability, relations with external variables, invariance, and sensitivity to change. The contribution is therefore conceptual and procedural: a transparent protocol to be empirically assessed rather than a validated organizational diagnostic tool.

Keywords: Data Governance; DMBOK; CMMI; DMM; Information Science.

Resumo

As organizações dependem cada vez mais de dados para decisões operacionais, regulatórias e estratégicas, mas a existência de políticas, tecnologias ou papéis formais não demonstra que a Governança de Dados esteja institucionalmente madura. Este artigo metodológico apresenta um

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protocolo inicial de desenvolvimento de um instrumento de avaliação da maturidade em Governança de Dados. O construto é definido como o grau em que direitos decisórios, responsabilidades, políticas, controles e capacidades governadas de gestão de dados estão formalmente estabelecidos, são executados de modo consistente, sustentados por evidências verificáveis, monitorados por informações de desempenho e continuamente aprimorados em alinhamento com a finalidade organizacional, os requisitos legais, os princípios éticos e as necessidades das partes interessadas. O modelo de mensuração proposto é multidimensional, referenciado por critérios e predominantemente formativo ou composto. São especificadas sete dimensões preliminares e um banco de quarenta e nove capacidades candidatas. Uma escala de cinco estágios com âncoras comportamentais substitui respostas de concordância, com tratamento separado para “Não é possível avaliar” e “Não se aplica”. O resultado principal pretendido é um perfil não compensatório de capacidades, sustentado por múltiplos informantes e evidências documentais; não se afirmam a existência de escore global ou pontos de corte validados. O artigo também apresenta protocolo futuro de validação de conteúdo, entrevistas cognitivas, pré-teste, estudo-piloto, avaliação do modelo, concordância entre avaliadores, estabilidade temporal, relações com variáveis externas, invariância e sensibilidade à mudança. A contribuição é conceitual e procedimental: um protocolo transparente a ser testado empiricamente, e não uma ferramenta diagnóstica organizacional já validada.

Palavras-chave: Governança de Dados; DMBOK; CMMI; DMM; Ciência da Informação.

Resumen

Las organizaciones dependen cada vez más de los datos para decisiones operativas, regulatorias y estratégicas; sin embargo, la existencia de políticas, tecnologías o funciones formales no demuestra que la Gobernanza de Datos esté institucionalmente madura. Este artículo metodológico presenta un protocolo inicial para desarrollar un instrumento de evaluación de la madurez de la Gobernanza de Datos. El constructo se define como el grado en que los derechos de decisión, las responsabilidades, las políticas, los controles y las capacidades gobernadas de gestión de datos están formalmente establecidos, se ejecutan consistentemente, se sustentan en evidencia verificable, se monitorean mediante información de desempeño y se mejoran continuamente en consonancia con el propósito organizacional, los requisitos legales, los principios éticos y las necesidades de las partes interesadas. El modelo de medición propuesto es multidimensional, referido a criterios y predominantemente formativo o compuesto. Se especifican siete dimensiones preliminares y un banco de cuarenta y nueve capacidades candidatas. Una rúbrica de cinco etapas con anclajes conductuales sustituye las respuestas de acuerdo, y “No se puede evaluar” y “No aplica” se tratan por separado. El resultado principal previsto es un perfil no compensatorio respaldado por múltiples informantes y evidencia documental; no se afirma que exista una puntuación global o puntos de corte validados. También se presenta un protocolo futuro de validación. La contribución es conceptual y procedimental: un protocolo transparente que deberá probarse empíricamente y no una herramienta diagnóstica ya validada.

Palabras clave: Gobernanza de datos; DMBOK; CMMI; DMM; Ciencia de la información.

1. Introduction

The growing centrality of data in operational, regulatory, and strategic processes has changed how organizations create public or organizational value, manage risk, demonstrate accountability, and support decisions. Data Governance addresses the principles, decision rights, roles, policies, and control mechanisms through which data are directed and overseen. It is therefore broader than a technical architecture problem and must be distinguished from the operational execution of Data Management (DAMA INTERNATIONAL, 2017; BERNARDO et al., 2024).

A recurring methodological difficulty is determining whether governance practices merely exist on paper or are embedded in routine organizational behavior.

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Policies, committees, catalogs, architectures, and executive titles may coexist with fragmented accountability, unmonitored data quality, weak risk controls, or inconsistent decisions. A maturity assessment must consequently distinguish formal presence from enactment, measurement, evidence, and improvement.

The literature includes maturity assessments in corporate data-management functions, archives, government, cloud environments, mobility services, and small and medium-sized enterprises (PERMANA; SUROSO, 2018; WULANDARI, 2020; HARWANTO; HIDAYANTO, 2022; AL-RUITHE; BENKHELIFA, 2017; CHENG et al., 2017; OLAITAN; HERSELMAN; WAYI, 2019; CHU, 2025; KAMARODDIN; SALLEH; SYED ARIS, 2025). These studies demonstrate practical interest but also show that constructs, units of analysis, item formats, scoring rules, and validation evidence vary substantially.

The literature examined by the authors suggests a limited availability of proposals that transparently integrate: (a) the substantive scope of the Data Management Body of Knowledge (DMBOK); (b) assessable organizational capabilities informed by the Data Management Maturity Model (DMM); and (c) an explicit logic of institutionalization conceptually adapted from CMMI. This statement is deliberately moderate because the present article is not a systematic review.

The original manuscript proposed fifteen questions, combined agreement responses with maturity stages, and used arithmetic means and provisional score bands. The present revision does not defend those elements as established measures. Instead, it repositions the work as an initial methodological study and a protocol for future development and validation. This distinction follows established guidance that construct specification, item generation, response-process evaluation, and empirical validation should precede substantive use of a new instrument (LAMBERT; NEWMAN, 2022; BOATENG et al., 2018; ARTINO JR. et al., 2014; TSANG et al., 2017).

The objective is to define the intended construct, specify a criterion-referenced composite measurement model, present a broader candidate capability bank with behaviorally anchored maturity stages, and describe a future validation protocol. No claims are made that the proposed instrument is currently valid, dependable, scalable, or ready to classify organizations.

2. Conceptual background

2.1 Data Governance and Data Management

Data Governance is treated here as the system by which authority over data is directed, controlled, and held accountable. Data Management comprises the operational capabilities through which data are acquired, modeled, integrated, secured, described, improved, retained, and used. Governance sets decision rights, policies, priorities, accountabilities, and assurance expectations; management executes and operates within that framework. The two are analytically distinct but organizationally interdependent.

DMBOK positions Data Governance as a coordinating function across architecture, modeling, storage, security, integration, documents and content,

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reference and master data, warehousing, metadata, and quality (DAMA INTERNATIONAL, 2017). Applied studies have used DMBOK to design governance structures, roles, processes, and architectures in different organizations (AISYAH; RULDEVIYANI, 2018; MAULINA; RULDEVIYANI, 2019; HENDRAWAN; KUSUMASARI; FAUZI, 2022; ISMAIL; SUROSO; HERMADI, 2024; NAZAR; HIDAYANTO, 2024). These works support thematic coverage but do not, by themselves, establish a validated measurement model.

Data curation and integration technologies can support governed data environments, but technical capability should not be equated with governance maturity. For example, large-scale curation systems address integration and quality problems, yet governance maturity additionally requires accountable decisions, evidence, control, and institutional learning (STONEBRAKER et al., 2013).

2.2. Organizational maturity and institutionalization

Organizational maturity refers to the progressive institutionalization of practices, not merely their adoption. In the proposed rubric, progression is expressed through observable criteria: absence or ad hoc activity; localized management; defined and standardized practice; measured and controlled performance; and evidence-based continuous improvement. The labels are inspired by maturity-model logic but are not presented as official CMMI maturity levels.

Cretu and Cretu (2025) emphasize maturity as a way to prepare public institutions for future demands, while Marchildon et al. (2018) use a design-science approach to develop a Data Governance maturity assessment tool. Gökalp et al. (2021) also show the importance of process capabilities in transitions toward data-driven organizations. Together, these sources support a capability-oriented perspective while leaving open the specific measurement and aggregation rules that must be validated.

2.3. DMBOK as the domain foundation

DMBOK provides the primary domain map used to prevent the construct from being reduced to a single concern such as compliance, technology, or data quality. Its knowledge areas guide coverage of strategy, accountability, quality, metadata, architecture, integration, master and reference data, security, privacy, and lifecycle controls (DAMA INTERNATIONAL, 2017). The proposed specification matrix records inclusions and boundaries so that future experts can judge relevance, comprehensiveness, and comprehensibility rather than assuming that broad framework names guarantee content validity.

2.4. DMM as the capability foundation

The DMM translates broad Data Management concerns into capabilities and practices that can be assessed organizationally (CMMI INSTITUTE, 2014). Pörtner et al. (2025) further organize maturity around process dimensions and capabilities for data-driven organizations. In the present protocol, DMM is used to identify assessable capabilities, not to claim direct reproduction of proprietary model content.

2.5. CMMI as a conceptual source for progression

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CMMI V2.0 contributes a general logic of institutionalization, performance management, governance, and improvement (CMMI INSTITUTE, 2018). Its logic has been conceptually transferred to adjacent governance domains, including Green IT (PATÓN-ROMERO et al., 2019). Practitioner-oriented explanations of CMMI practice areas are retained for contextual purposes but are not used as the sole basis for measurement decisions (SPYROSOFT, 2023).

The present stages are therefore described as informed by, conceptually adapted from, or inspired by CMMI. The article does not reproduce an official CMMI appraisal method, does not equate capability levels with organizational maturity levels, and does not claim that the proposed seven-dimensional profile is endorsed by the CMMI Institute.

2.6. Literature gap and scope

Sector-specific assessments illustrate both the value and the limits of existing approaches. Cloud-focused models emphasize architecture and service environments (AL-RUITHE; BENKHELIFA, 2017; CHENG et al., 2017); public-sector applications emphasize institutional and regulatory conditions (WULANDARI, 2020; OLAITAN; HERSELMAN; WAYI, 2019; HARWANTO; HIDAYANTO, 2022); and SME or mobility contexts require proportional and sector-sensitive language (CHU, 2025; KAMARODDIN; SALLEH; SYED ARIS, 2025).

The present scope is a cross-sector development protocol. It uses sector-neutral concepts such as institutional objectives, organizational value, accountable leadership, and stakeholder outcomes. Sector adaptations may later be necessary, but they should be evaluated rather than embedded as unexamined corporate terminology.

3. Construct definition and measurement model

3.1. Construct definition and boundaries

Data Governance maturity is defined as the degree to which organizational decision rights, accountabilities, policies, controls, and governed data-management capabilities are formally established, consistently enacted, supported by verifiable evidence, monitored through performance information, and continuously improved in alignment with organizational purpose, legal requirements, ethical principles, and stakeholder needs.

This definition includes the governance of operational Data Management capabilities because their institutionalization provides observable evidence that governance decisions are enacted. It does not imply that all technical sophistication is mature governance. Artificial intelligence, predictive models, cloud services, or advanced platforms are not universal maturity requirements; when present, they are evaluated through purpose, accountability, risk, ethical controls, monitoring, and learning.

3.2. Proposed dimensions

The seven dimensions are preliminary and may be merged, split, or refined after content-validation and empirical studies. Their breadth reflects the reviewers' concern that security, privacy, risk, ethics, compliance, master, and reference data,

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third parties, and change management were underrepresented in the original five-dimension structure.

Table 1: Preliminary dimensional architecture

Code	Dimension	Operational definition
D1	Strategic Alignment and Organizational Value	The extent to which data-governance priorities are explicitly connected to institutional purpose, stakeholder value, resource decisions, and accountable executive oversight.
D2	Decision Rights, Accountability, and Governance Operating Model	The extent to which decision rights, roles, forums, policies, standards, escalation routes, and assurance responsibilities are defined and enacted.
D3	Data Quality, Metadata, and Master/Reference Data	The extent to which critical data are defined, quality-controlled, described, cataloged, stewarded, and reconciled across authoritative sources.
D4	Data Architecture, Integration, Interoperability, and Lifecycle	The extent to which architecture, interfaces, semantic standards, lineage, retention, and disposal are governed across the data lifecycle.
D5	Security, Privacy, Risk, Ethics, Compliance, and Third-Party Governance	The extent to which legal, ethical, security, privacy, risk, audit, and third-party obligations are translated into controlled data practices.
D6	Data Culture, Literacy, Evidence-Informed Decision-Making, and Responsible Data Use	The extent to which people can understand, challenge, share, and use data responsibly in decisions without treating technology adoption as a proxy for maturity.
D7	Performance Monitoring, Change Management, and Continuous Improvement	The extent to which governance performance is monitored, changes are managed, lessons are institutionalized, and improvement priorities are evidence-based.

Source: authors

3.3. Criterion-referenced composite model

The proposed instrument is multidimensional and criterion-referenced. Candidate statements represent organizational capabilities and conditions that contribute to maturity. The dimensions are predominantly formative or composite: governance maturity is constituted by the presence and institutionalization of heterogeneous capabilities, and the indicators need not be interchangeable or highly correlated. This position consists of the distinction between reflective scales and formative indices (DIAMANTOPOULOS; WINKLHOFER, 2001).

A higher-order global maturity construct remains a hypothesis rather than an established score. Internal consistency coefficients are not central quality criteria for formative components. Cronbach's alpha may be reported only for a theoretically defensible reflective subset and should not be interpreted as proof of unidimensionality or validity (TAVAKOL; DENNICK, 2011; MCNEISH, 2018).

Figure 1: Conceptual measurement model

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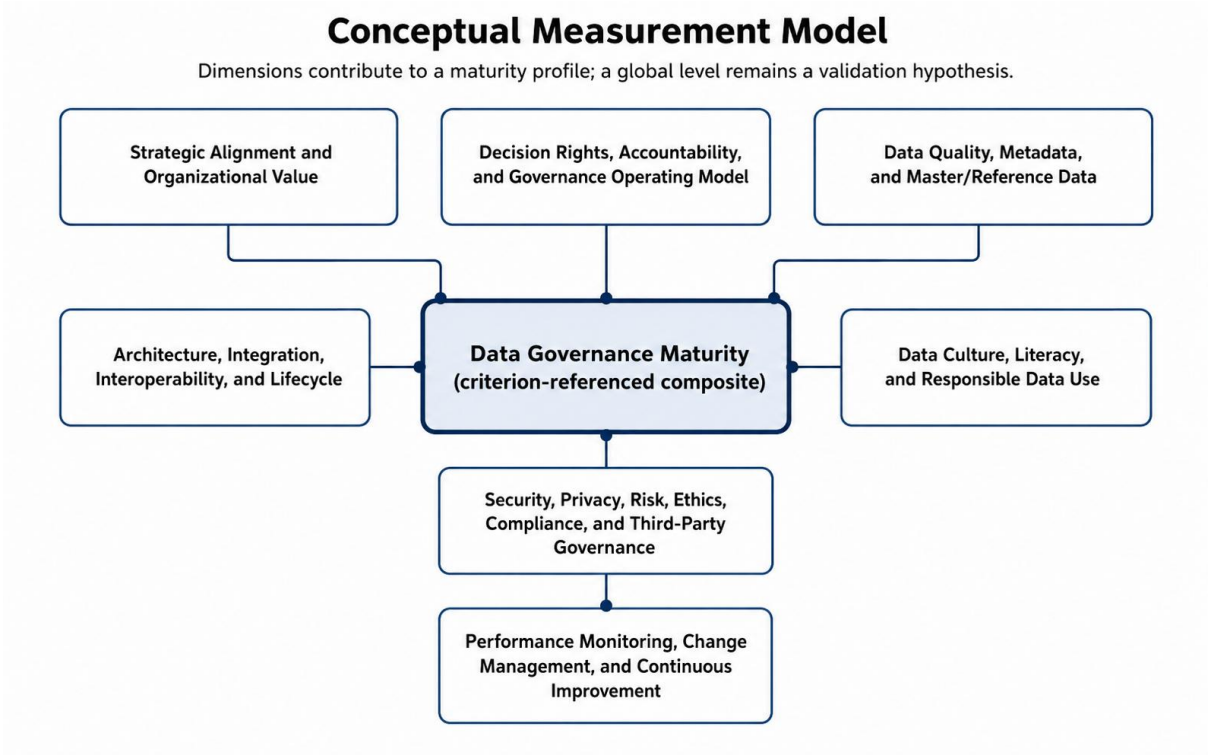

Note: The model is a development hypothesis. Arrows indicate contribution to a composite profile rather than reflective causation.

The principal intended output is a profile of capability stages and evidence gaps. Future research will compare noncompensatory, cumulative, pattern-based, and composite aggregation rules. Until those rules are evaluated against external criteria, the protocol does not assign a validated overall maturity level.

3.4. Unit of analysis

The unit of analysis is an organization or a clearly delimited organizational unit. Individual responses are treated as observations from informants, not as direct organizational scores. The design therefore requires multiple informed respondents and documentary evidence. Aggregation is conditional on adequate agreement and reliability at the group level, using statistics such as rWG, ICC(1), and ICC(2) where assumptions are met (LEBRETON; SENTER, 2008). Disagreement is itself diagnostically relevant and should not be concealed by averaging.

4. Initial instrument development

4.1. Study design and current stage

This is an initial methodological development study. Activities completed in the present revision are construct respecification, dimensional expansion, deductive generation of a candidate capability bank, definition of a behaviorally anchored rubric, and formulation of a validation protocol. Expert validation, cognitive interviews, pretesting, pilot administration, internal-structure analysis, reliability studies, criterion validation, invariance testing, and sensitivity-to-change studies remain future procedures.

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4.2. Specification and candidate-item generation

Candidate capabilities were generated deductively from the submitted manuscript, the DMBOK, the DMM, CMMI-inspired institutionalization principles, and the domains raised by the reviewers. The revision team decomposed the original compound questions into atomic statements, replaced binary interrogatives with organizational descriptors, removed evaluative adjectives, and used sector-neutral wording. This process follows established recommendations for construct development and questionnaire design (LAMBERT; NEWMAN, 2022; ARTINO JR. et al., 2014; BOYNTON; GREENHALGH, 2004; TSANG et al., 2017).

The current bank contains forty-nine candidate statements, seven per dimension. The number is intentionally larger than the original 15-item version because content validity should begin with adequate representation and allow later reduction. No item has yet been retained or eliminated on empirical grounds. Appendix A presents the bank; Appendix C records theoretical and evidentiary traceability.

4.3. Behaviorally anchored maturity scale

The agreement-based Likert format has been removed. For each capability, respondents select the stage that best matches observable organizational practice. The five stages are fully verbalized to support interpretive consistency, but the protocol does not assume equal psychological or mathematical intervals between categories (ARTINO JR. et al., 2014).

Table 2: Generic behaviorally anchored maturity rubric

Stage	Label	Generic criterion
1	Absent or Ad Hoc	The practice is absent, informal, reactive, or dependent on isolated individual effort. Formal evidence is generally unavailable.
2	Localized and Managed	The practice is implemented in selected units, projects, or teams. Evidence is local or partial, and organization-wide standardization is not established.
3	Defined and Standardized	The practice is formally documented, assigned to defined roles, and consistently implemented across its intended organizational scope.
4	Measured and Controlled	The practice is monitored using indicators, audits, quality controls, service levels, or other documented performance evidence.
5	Continuously Improved and Adaptive	The practice is systematically reviewed and improved using evidence, lessons learned, risk information, stakeholder feedback, and changes in the operating environment.

Source: authors

Capability-specific guidance and evidence examples will be refined through expert review and cognitive interviews. “Cannot assess” indicates insufficient knowledge or access to evidence. “Not applicable” requires a contextual justification and is not interpreted automatically as low maturity. Both are analytically distinct from missing data.

4.4. Respondents and multi-informant design

The target respondents are professionals with role-relevant knowledge of the assessed capabilities. Whenever feasible, four to seven informants should represent senior leadership; a Data Governance or Data Office function; information technology or architecture; quality or metadata; information security, privacy, risk, or compliance; a business or operational unit; internal audit or assurance; and representative data users. Eligibility criteria should address tenure, relevant experience, committee participation, access to strategic information, and familiarity with the assessed domain.

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Table 3: Minimum respondent-profile variables

Variable	Purpose
Role	Formal function and responsibility
Functional area	Leadership, governance, technology, quality, security/privacy/risk, business, audit, or user
Hierarchical level	Operational, managerial, executive, or oversight
Organizational tenure	Time in the organization or assessed unit
Governance experience	Time working with Data Governance or related capabilities
Committee participation	Current or prior participation in governance forums
Information access	Access to strategic, operational, risk, and performance evidence
Domain familiarity	Self-rated and role-based familiarity with the assigned dimensions

Source: authors

4.5. Documentary evidence

A hybrid assessment combines informed judgments with documentary and operational evidence. Perception-only measurement can be affected by social desirability, incomplete knowledge, and halo effects. Higher stages therefore require progressively stronger evidence, such as approved policies, assigned roles, committee records, indicators, audit findings, catalogs, incident records, risk assessments, training records, and improvement plans. Appendix D summarizes expected evidence by dimension.

5. Provisional interpretation framework

5.1 Capability-level interpretation

A capability is provisionally assigned the highest stage for which the stage criterion is met, prerequisites from lower stages are satisfied, minimum evidence is available, and the available informants do not show unresolved material disagreement. This cumulative rule prevents a nominally advanced practice from being classified at a high stage when foundational accountability or documentation is absent.

5.2. Dimensional profiles

The principal output is a dimensional profile showing the stage distribution of capabilities, unmet essential conditions, evidence coverage, informant disagreement, associated risks, and priorities for further investigation. Tables and confidence or uncertainty information should be primary communication devices. Radar charts, if used, are supplementary and do not constitute validity evidence.

5.3. Noncompensatory logic

Arithmetic means and the original ranges 1.00-1.49, 1.50-2.49, and so forth have been withdrawn. A high architecture stage must not compensate automatically for absent accountability, security, privacy, quality, or risk controls. Future studies should compare minimum-requirement rules, cumulative stage rules, expert-derived patterns, and empirically estimated composite models against independent judgments and relevant outcomes.

5.4. Missing information and disagreement

Missing responses, “Cannot assess,” and “Not applicable” will be analyzed separately. Exclusion thresholds and imputation rules will be prespecified after pilot evidence is available. Zero within-person variance will not be treated alone as proof of disengagement; response time, logical inconsistencies, attention indicators, evidence discrepancies, and case review should be combined.

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5.5. Future development of recommendations

A roadmap does not follow automatically from a stage label. A future decision matrix should connect each capability gap to missing evidence, risk, prerequisites, recommended action, responsible role, progress indicator, dependency, priority, and qualitative effort. Recommendations must be traceable and separately validated for usefulness.

Table 4: Proposed structure for a future gap-to-action matrix

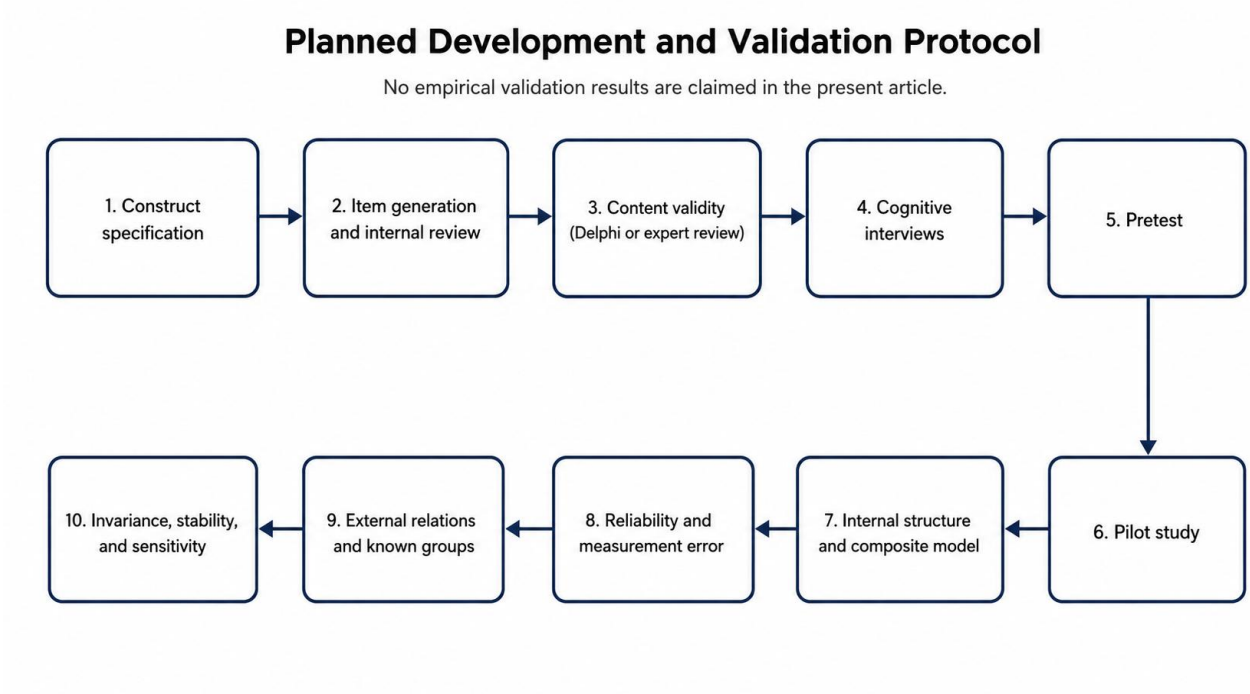
Capability	Observed stage	Missing evidence	Risk	Next-stage practice	Action	Progress indicator
Example capability	To be determined after validated assessment	Document or record not available	Context-specific risk	Criterion for the next stage	Action selected after review	Defined, observable indicator

Source: authors.

6. Validation protocol

The validation strategy is presented as planned work, not as completed evidence. Its sequence follows the general logic of construct specification, item generation, content assessment, response-process evaluation, pilot testing, structural evaluation, and external validation (LAMBERT; NEWMAN, 2022; BOATENG et al., 2018).

Figure 2: Planned development and validation protocol



6.1. Construct specification

Confirm the construct definition, boundaries between governance and management, dimensional coverage, essential capabilities, unit of analysis, and hypotheses about formative, composite, and any reflective components.

6.2. Item generation and internal review

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Maintain a transparent item history recording source domain, wording changes, redundancy decisions, and expert responsibilities. Item quality criteria include atomicity, observable wording, sector neutrality, and evidentiary feasibility.

6.3. Content validity

Use either a clearly defined one-time expert review or a formal Delphi. A Delphi would specify panel eligibility, anonymity, controlled feedback, two or three planned rounds, consensus rules, stopping criteria, and attrition management. CVR evaluates essentiality and must use a critical value appropriate to the achieved panel size (LAWSHE, 1975; AYRE; SCALLY, 2014). I-CVI and S-CVI/Ave evaluate relevance, comprehensiveness, and clarity; their decision rules must be prespecified (YUSOFF, 2019). GENAREO (2023) is retained as a practitioner-oriented calculation aid, supplemented by peer-reviewed methodological sources.

6.4. Cognitive interviews

Conduct purposive cognitive interviews with representatives of the intended respondent groups to examine comprehension, information retrieval, judgment, response selection, ambiguity, terminology, cognitive burden, and sectoral applicability. Think-aloud and probing techniques should be documented (TOURANGEAU; RIPS; RASINSKI, 2000; WILLIS, 2005).

6.5. Pretest

Assess instructions, navigation, completion time, evidence requests, response-category use, “Cannot assess,” “Not applicable,” and operational feasibility. Revise before the pilot study.

6.6. Pilot study and sample planning

Determine sample size from the final number of capabilities, number of organizations and informants, model complexity, distribution of stages, planned comparisons, and simulation or power analysis. A single generic respondent-per-item rule is insufficient.

6.8. Reliability and measurement error

Estimate interrater agreement and reliability before organization-level aggregation (LEBRETON; SENTER, 2008), test-retest stability, classification stability, and measurement error where meaningful. Coefficient omega and alpha may be examined for reflective subsets, with alpha interpreted cautiously (TAVAKOL; DENNICK, 2011; MCNEISH, 2018).

6.9. Relations with external variables

Evaluate convergent, discriminant, criterion-related, known-groups, and nomological evidence using independent expert appraisals, audit results, data incidents, regulatory findings, performance indicators, or other justified criteria. A single criterion will not establish all forms of validity.

6.10. Invariance, generalizability, and sensitivity

Examine sector, size, public/private, role, language, and cultural differences. Measurement invariance or comparable model tests should precede substantive comparisons when applicable

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(PUTNICK; BORNSTEIN, 2016). Longitudinal studies should evaluate stability and responsiveness after governance improvement initiatives.

7. Planned analysis and interpretation

Data will be organized in a reproducible data dictionary that distinguishes respondent-level records, organization identifiers, capability stages, evidence ratings, “Cannot assess,” “Not applicable,” and missing responses. Spreadsheet tools may support initial checking, while statistical software should be selected according to the final model. The original manuscript’s use of Microsoft Excel and SPSS is retained as an operational option, not as evidence of methodological adequacy.

Data screening will use prespecified rules. Missingness will be described by item, dimension, respondent role, and organization. Straight-lining will be reviewed with response time, logical consistency, evidence congruence, and other indicators rather than automatic deletion. All exclusions and sensitivity analyses will be reported.

Organization-level profiles will be produced only after examining agreement, role-specific discrepancies, evidence coverage, and uncertainty. Results will distinguish observed stage, evidence strength, and confidence in the assessment. Hypothetical charts will not be reported as empirical results.

The original manuscript cited CIO (2018) when proposing arithmetic score bands. The submitted files do not provide a complete bibliographic record for that source. The citation is preserved for auditability, but it is not used to justify the revised scoring logic (CIO, 2018). Author confirmation of the complete reference is required.

8. Ethical, licensing, and practical considerations

Organizational assessments may expose weaknesses in accountability, security, privacy, compliance, and data quality. Study protocols should therefore address informed participation, confidentiality, secure handling of documents, role-based access, reporting thresholds, and procedures for sensitive findings.

Use of DMBOK, DMM, and CMMI terminology must respect applicable copyright, trademark, reproduction, and licensing conditions. The present article uses high-level conceptual mappings and original candidate statements. It does not reproduce an official appraisal instrument or claim certification equivalence. Practitioner sources such as Spyrosoft (2023) and Zorrilla and Yebenes (2022) are retained for contextual visibility and are supplemented by official or peer-reviewed references.

Sector adaptation should preserve the construct while allowing contextual evidence. Public organizations may emphasize public value, transparency, continuity, and legal mandate; private organizations may emphasize organizational value, performance, and risk; nonprofit and educational settings may use mission-related outcomes.

9. Limitations

The proposed instrument has not undergone content validation, cognitive interviewing, pretesting, pilot administration, structural analysis, reliability assessment, criterion validation, invariance testing, or responsiveness evaluation. The forty-nine candidate capabilities and seven dimensions are therefore provisional.

The composite interpretation is theoretically motivated but not empirically established. Essential capabilities, evidence thresholds, stage prerequisites, aggregation rules, and any global classification require validation. Multi-informant

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designs may be difficult in small organizations, and documentary evidence may be unavailable, sensitive, or uneven in quality.

The literature review was targeted rather than systematic, so claims about scarcity are limited to the literature examined. Cross-cultural and cross-sector adaptation may change terminology, evidence availability, and the practical meaning of stages. Finally, the bibliographic record for CIO (2018) requires author confirmation.

10. Conclusion

This revision reframes the study as an initial methodological protocol for developing and validating a Data Governance maturity assessment. The contribution is a construct definition, a multidimensional criterion-referenced composite model, seven preliminary dimensions, forty-nine candidate capabilities, a behaviorally anchored stage rubric, a hybrid multi-informant and documentary-evidence design, and a staged validation plan.

The article does not demonstrate validity, reliability, organizational applicability, score cutoffs, or a definitive overall maturity level. Those properties must be examined through content evaluation, response-process studies, pilot data, model testing, interrater analysis, temporal stability, external criteria, invariance, and sensitivity to change. After such evidence is available, the protocol may support interpretable organizational profiles and traceable improvement decisions.

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Appendix A - Preliminary candidate capability bank

Instructions: For each capability, select the stage that best matches the organization's current, evidenced practice. Use "Cannot assess" when you lack sufficient information and "Not applicable" only with a contextual justification. The statements are candidates and must not be treated as a validated instrument.

Table 5: D1 - Strategic alignment and organizational value

Code	Candidate capability statement	Typical evidence
D1.1	A formally approved data strategy identifies the organizational outcomes that data-governance activities are expected to support.	Approved strategy and governance charter
D1.2	The scope of data governance is explicitly linked to institutional priorities, public value, service quality, risk reduction, or other relevant value outcomes.	Strategy map or benefits framework
D1.3	Senior leadership has assigned accountable sponsorship for the data-governance program.	Appointment record or role description
D1.4	Resource decisions for data initiatives use documented criteria that include expected value, risk, dependencies, and ongoing operating costs.	Portfolio criteria and decision records
D1.5	The organization periodically reviews whether governance priorities remain aligned with changes in strategy, regulation, and stakeholder needs.	Review calendar and minutes
D1.6	Critical data domains and governance priorities are selected through a documented, risk-informed process.	Domain prioritization record
D1.7	Expected benefits and obligations of major data initiatives are tracked after approval.	Benefits register and follow-up reports

Source: authors

Table 6: D2 - Decision rights, accountability, and governance operating model

Code	Candidate capability statement	Typical evidence
D2.1	Decision rights for critical data are formally defined.	Decision-rights matrix
D2.2	Accountable data owners are designated for the in-scope critical data domains.	Owner register
D2.3	Data stewards have documented responsibilities and sufficient authority to perform them.	Stewardship role descriptions
D2.4	A governance forum meets at defined intervals and records the decisions it makes.	Committee charter and minutes
D2.5	Escalation routes are used to resolve cross-functional data conflicts.	Issue and escalation log
D2.6	Policies and standards are communicated to the organizational units expected to apply them.	Communication and acknowledgment records
D2.7	Compliance with governance decisions is periodically reviewed by an appropriate assurance function.	Assurance or audit reports

Source: authors

Table 7: D3 - Data quality, metadata, and master/reference data

Code	Candidate capability statement	Typical evidence
D3.1	Critical data elements are identified and assigned to accountable roles.	Critical-data-element register
D3.2	Quality rules are defined in relation to the intended use of critical data.	Quality rule catalog
D3.3	Data-quality thresholds and indicators are monitored for the in-scope data domains.	Quality dashboard
D3.4	Data-quality incidents are recorded and assigned for resolution.	Incident register
D3.5	Recurring quality problems are investigated for root causes.	Root-cause analysis records
D3.6	A maintained glossary or catalog provides approved definitions and ownership information.	Business glossary or data catalog
D3.7	Master and reference data have identified authoritative sources and reconciliation procedures.	Master-data model and reconciliation logs

Source: authors

Table 8: D4 - Data architecture, integration, interoperability, and lifecycle

Code	Candidate capability statement	Typical evidence
D4.1	Data-architecture principles and standards are formally approved.	Architecture principles
D4.2	Interfaces that exchange critical data are inventoried and assigned to responsible parties.	Interface inventory
D4.3	Technical and semantic interoperability requirements are documented for in-scope data exchanges.	Canonical models or interoperability specifications
D4.4	Lineage is documented for critical data from source through material transformations and use.	Lineage repository
D4.5	Changes to schemas, interfaces, and data models follow a controlled process.	Change-control records
D4.6	Retention and disposal requirements are documented by data category.	Retention schedule

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D4.7	Archiving and disposal activities produce verifiable records.	Archival and disposal evidence

Source: authors

Table 9: D5 - Security, privacy, risk, ethics, compliance, and third-party governance

Code	Candidate capability statement	Typical evidence
D5.1	Security requirements for critical data are defined according to risk and classification.	Classification and control standard
D5.2	Privacy obligations are translated into documented data-handling controls.	Privacy control mapping
D5.3	Data-related risks are maintained in an accountable risk register.	Risk register
D5.4	Ethical and responsible-use criteria are applied to high-impact data uses.	Ethics assessment or review record
D5.5	Algorithmic or automated decision risks are assessed when such systems are used.	Algorithmic impact assessment
D5.6	Third-party agreements specify applicable data-governance, security, privacy, retention, and audit requirements.	Contractual clauses and vendor assessments
D5.7	Compliance and control effectiveness are periodically assessed and corrective actions are tracked.	Audit findings and action plans

Source: authors

Table 10: D6 - Data culture, literacy, evidence-informed decision-making, and responsible data use

Code	Candidate capability statement	Typical evidence
D6.1	Role-appropriate data-literacy needs are identified.	Competency framework
D6.2	Data-literacy development activities are provided to the identified target groups.	Training records
D6.3	Decision processes identify the data and evidence used for material judgments.	Decision templates or records
D6.4	Users can challenge data quality, definitions, assumptions, and analytical outputs through defined channels.	Challenge or issue-management mechanism
D6.5	Teams share governed data through approved mechanisms rather than relying on unmanaged copies.	Approved access and sharing records
D6.6	Responsibilities for the ethical use of data are communicated to personnel and contractors.	Code, policy, and acknowledgment records
D6.7	Learning from data incidents and contested decisions is incorporated into guidance and training.	Lessons-learned updates

Source: authors

Table 11: D7 - Performance monitoring, change management, and continuous improvement

Code	Candidate capability statement	Typical evidence
D7.1	Governance objectives have defined performance indicators or evidence criteria.	Governance scorecard
D7.2	Governance forums periodically review performance and unresolved risks.	Performance review minutes
D7.3	Corrective actions have owners, due dates, dependencies, and closure evidence.	Action register
D7.4	Material changes to policy, architecture, process, or regulation trigger a documented change-management response.	Change-impact assessments
D7.5	Stakeholder feedback is used to identify governance barriers and improvement opportunities.	Feedback records
D7.6	Improvement priorities are selected using evidence about risk, value, feasibility, and organizational readiness.	Improvement backlog
D7.7	Completed improvements are evaluated to determine whether intended outcomes were achieved.	Post-implementation review

Source: authors

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Appendix B - Dimension-specific stage guidance

The descriptors below operationalize the generic progression at the dimension level. Capability-specific anchors will be refined through expert and cognitive evaluation.

Table 12: D1 - Strategic alignment and organizational value

Stage	Label	Dimension-specific guidance
1	Absent or Ad Hoc	Strategic Alignment and Organizational Value practices are absent, reactive, or dependent on individual effort; formal evidence is generally unavailable.
2	Localized and Managed	Strategic Alignment and Organizational Value practices exist in selected units or projects, with partial evidence and inconsistent organizational coverage.
3	Defined and Standardized	Strategic Alignment and Organizational Value practices are documented, assigned to roles, and consistently applied across the intended scope.
4	Measured and Controlled	Strategic Alignment and Organizational Value practices are monitored through indicators, audits, controls, or other documented performance evidence.
5	Continuously Improved and Adaptive	Strategic Alignment and Organizational Value practices are systematically reviewed and improved using performance evidence, risk information, lessons learned, and stakeholder feedback.

Source: authors

Table 13: D2 - Decision rights, accountability, and governance operating model

Stage	Label	Dimension-specific guidance
1	Absent or Ad Hoc	Decision Rights, Accountability, and Governance Operating Model practices are absent, reactive, or dependent on individual effort; formal evidence is generally unavailable.
2	Localized and Managed	Decision Rights, Accountability, and Governance Operating Model practices exist in selected units or projects, with partial evidence and inconsistent organizational coverage.
3	Defined and Standardized	Decision Rights, Accountability, and Governance Operating Model practices are documented, assigned to roles, and consistently applied across the intended scope.
4	Measured and Controlled	Decision Rights, Accountability, and Governance Operating Model practices are monitored through indicators, audits, controls, or other documented performance evidence.
5	Continuously Improved and Adaptive	Decision Rights, Accountability, and Governance Operating Model practices are systematically reviewed and improved using performance evidence, risk information, lessons learned, and stakeholder feedback.

Source: authors

Table 14: D3 - Data quality, metadata, and master/reference data

Stage	Label	Dimension-specific guidance
1	Absent or Ad Hoc	Data Quality, Metadata, and Master/Reference Data practices are absent, reactive, or dependent on individual effort; formal evidence is generally unavailable.
2	Localized and Managed	Data Quality, Metadata, and Master/Reference Data practices exist in selected units or projects, with partial evidence and inconsistent organizational coverage.
3	Defined and Standardized	Data Quality, Metadata, and Master/Reference Data practices are documented, assigned to roles, and consistently applied across the intended scope.
4	Measured and Controlled	Data Quality, Metadata, and Master/Reference Data practices are monitored through indicators, audits, controls, or other documented performance evidence.
5	Continuously Improved and Adaptive	Data Quality, Metadata, and Master/Reference Data practices are systematically reviewed and improved using performance evidence, risk information, lessons learned, and stakeholder feedback.

Source: authors

Table 15: D4 - Data architecture, integration, interoperability, and lifecycle

Stage	Label	Dimension-specific guidance
1	Absent or Ad Hoc	Data Architecture, Integration, Interoperability, and Lifecycle practices are absent, reactive, or dependent on individual effort; formal evidence is generally unavailable.
2	Localized and Managed	Data Architecture, Integration, Interoperability, and Lifecycle practices exist in selected units or projects, with partial evidence and inconsistent organizational coverage.
3	Defined and Standardized	Data Architecture, Integration, Interoperability, and Lifecycle practices are documented, assigned to roles, and consistently applied across the intended scope.
4	Measured and Controlled	Data Architecture, Integration, Interoperability, and Lifecycle practices are monitored through indicators, audits, controls, or other documented performance evidence.
5	Continuously Improved and Adaptive	Data Architecture, Integration, Interoperability, and Lifecycle practices are systematically reviewed and improved using performance evidence, risk information, lessons learned, and stakeholder feedback.

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Table 16: D5 - Security, privacy, risk, ethics, compliance, and third-party governance

Stage	Label	Dimension-specific guidance
1	Absent or Ad Hoc	Security, Privacy, Risk, Ethics, Compliance, and Third-Party Governance practices are absent, reactive, or dependent on individual effort; formal evidence is generally unavailable.
2	Localized and Managed	Security, Privacy, Risk, Ethics, Compliance, and Third-Party Governance practices exist in selected units or projects, with partial evidence and inconsistent organizational coverage.
3	Defined and Standardized	Security, Privacy, Risk, Ethics, Compliance, and Third-Party Governance practices are documented, assigned to roles, and consistently applied across the intended scope.
4	Measured and Controlled	Security, Privacy, Risk, Ethics, Compliance, and Third-Party Governance practices are monitored through indicators, audits, controls, or other documented performance evidence.
5	Continuously Improved and Adaptive	Security, Privacy, Risk, Ethics, Compliance, and Third-Party Governance practices are systematically reviewed and improved using performance evidence, risk information, lessons learned, and stakeholder feedback.

Source: authors

Table 17: D6 - Data culture, literacy, evidence-informed decision-making, and responsible data use

Stage	Label	Dimension-specific guidance
1	Absent or Ad Hoc	Data Culture, Literacy, Evidence-Informed Decision-Making, and Responsible Data Use practices are absent, reactive, or dependent on individual effort; formal evidence is generally unavailable.
2	Localized and Managed	Data Culture, Literacy, Evidence-Informed Decision-Making, and Responsible Data Use practices exist in selected units or projects, with partial evidence and inconsistent organizational coverage.
3	Defined and Standardized	Data Culture, Literacy, Evidence-Informed Decision-Making, and Responsible Data Use practices are documented, assigned to roles, and consistently applied across the intended scope.
4	Measured and Controlled	Data Culture, Literacy, Evidence-Informed Decision-Making, and Responsible Data Use practices are monitored through indicators, audits, controls, or other documented performance evidence.
5	Continuously Improved and Adaptive	Data Culture, Literacy, Evidence-Informed Decision-Making, and Responsible Data Use practices are systematically reviewed and improved using performance evidence, risk information, lessons learned, and stakeholder feedback.

Source: authors

Table 18: D7 - Performance monitoring, change management, and continuous improvement

Stage	Label	Dimension-specific guidance
1	Absent or Ad Hoc	Data Culture, Literacy, Evidence-Informed Decision-Making, and Responsible Data Use practices are absent, reactive, or dependent on individual effort; formal evidence is generally unavailable.
2	Localized and Managed	Data Culture, Literacy, Evidence-Informed Decision-Making, and Responsible Data Use practices exist in selected units or projects, with partial evidence and inconsistent organizational coverage.
3	Defined and Standardized	Data Culture, Literacy, Evidence-Informed Decision-Making, and Responsible Data Use practices are documented, assigned to roles, and consistently applied across the intended scope.
4	Measured and Controlled	Data Culture, Literacy, Evidence-Informed Decision-Making, and Responsible Data Use practices are monitored through indicators, audits, controls, or other documented performance evidence.
5	Continuously Improved and Adaptive	Data Culture, Literacy, Evidence-Informed Decision-Making, and Responsible Data Use practices are systematically reviewed and improved using performance evidence, risk information, lessons learned, and stakeholder feedback.

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Appendix C - Theoretical traceability matrix

This matrix is a preliminary specification. DMBOK and DMM mappings are high-level conceptual mappings and do not reproduce proprietary model text.

Item	Dimension	Observable capability	DMBOK domain	DMM capability area	CMMI-inspired institutionalization	Expected evidence
D1.1	D1	A formally approved data strategy identifies the organizational outcomes that data-governance activities are expected to support.	Data Governance; Data Strategy	Strategy; Business Case; Funding	alignment, sponsorship, prioritization, review	Approved strategy and governance charter
D1.2	D1	The scope of data governance is explicitly linked to institutional priorities, public value, service quality, risk reduction, or other relevant value outcomes.	Data Governance; Data Strategy	Strategy; Business Case; Funding	alignment, sponsorship, prioritization, review	Strategy map or benefits framework
D1.3	D1	Senior leadership has assigned accountable sponsorship for the data-governance program.	Data Governance; Data Strategy	Strategy; Business Case; Funding	alignment, sponsorship, prioritization, review	Appointment record or role description
D1.4	D1	Resource decisions for data initiatives use documented criteria that include expected value, risk, dependencies, and ongoing operating costs.	Data Governance; Data Strategy	Strategy; Business Case; Funding	alignment, sponsorship, prioritization, review	Portfolio criteria and decision records
D1.5	D1	The organization periodically reviews whether governance priorities remain aligned with changes in strategy, regulation, and stakeholder needs.	Data Governance; Data Strategy	Strategy; Business Case; Funding	alignment, sponsorship, prioritization, review	Review calendar and minutes
D1.6	D1	Critical data domains and governance priorities are selected through a documented, risk-informed process.	Data Governance; Data Strategy	Strategy; Business Case; Funding	alignment, sponsorship, prioritization, review	Domain prioritization record
D1.7	D1	Expected benefits and obligations of major data initiatives are tracked after approval.	Data Governance; Data Strategy	Strategy; Business Case; Funding	alignment, sponsorship, prioritization, review	Benefits register and follow-up reports
D2.1	D2	Decision rights for critical data are formally defined.	Data Governance	Governance Management; Roles and Responsibilities	defined authority, standardized enactment, assurance	Decision-rights matrix
D2.2	D2	Accountable data owners are designated for the in-scope critical data domains.	Data Governance	Governance Management; Roles and Responsibilities	defined authority, standardized enactment, assurance	Owner register
D2.3	D2	Data stewards have documented responsibilities and sufficient authority to perform them.	Data Governance	Governance Management; Roles and Responsibilities	defined authority, standardized enactment, assurance	Stewardship role descriptions
D2.4	D2	A governance forum meets at defined intervals and records the decisions it makes.	Data Governance	Governance Management; Roles and Responsibilities	defined authority, standardized enactment, assurance	Committee charter and minutes
D2.5	D2	Escalation routes are used to resolve cross-functional data conflicts.	Data Governance	Governance Management; Roles and Responsibilities	defined authority, standardized enactment, assurance	Issue and escalation log
D2.6	D2	Policies and standards are communicated to the organizational units expected to apply them.	Data Governance	Governance Management; Roles and Responsibilities	defined authority, standardized enactment, assurance	Communication and acknowledgment records
D2.7	D2	Compliance with governance decisions is periodically reviewed by an appropriate assurance function.	Data Governance	Governance Management; Roles and Responsibilities	defined authority, standardized enactment, assurance	Assurance or audit reports

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D3.1	D3	Critical data elements are identified and assigned to accountable roles.	Data Quality; Metadata; Reference and Master Data	Data Quality; Metadata; Reference Data	defined standards, monitoring, corrective action	Critical-data-element register
D3.2	D3	Quality rules are defined in relation to the intended use of critical data.	Data Quality; Metadata; Reference and Master Data	Data Quality; Metadata; Reference Data	defined standards, monitoring, corrective action	Quality rule catalog
D3.3	D3	Data-quality thresholds and indicators are monitored for the in-scope data domains.	Data Quality; Metadata; Reference and Master Data	Data Quality; Metadata; Reference Data	defined standards, monitoring, corrective action	Quality dashboard
D3.4	D3	Data-quality incidents are recorded and assigned for resolution.	Data Quality; Metadata; Reference and Master Data	Data Quality; Metadata; Reference Data	defined standards, monitoring, corrective action	Incident register
D3.5	D3	Recurring quality problems are investigated for root causes.	Data Quality; Metadata; Reference and Master Data	Data Quality; Metadata; Reference Data	defined standards, monitoring, corrective action	Root-cause analysis records
D3.6	D3	A maintained glossary or catalog provides approved definitions and ownership information.	Data Quality; Metadata; Reference and Master Data	Data Quality; Metadata; Reference Data	defined standards, monitoring, corrective action	Business glossary or data catalog
D3.7	D3	Master and reference data have identified authoritative sources and reconciliation procedures.	Data Quality; Metadata; Reference and Master Data	Data Quality; Metadata; Reference Data	defined standards, monitoring, corrective action	Master-data model and reconciliation logs
D4.1	D4	Data-architecture principles and standards are formally approved.	Data Architecture; Integration; Data Storage and Operations; Documents and Content	Architecture; Data Lifecycle; Integration	standardization, control, traceability, lifecycle evidence	Architecture principles
D4.2	D4	Interfaces that exchange critical data are inventoried and assigned to responsible parties.	Data Architecture; Integration; Data Storage and Operations; Documents and Content	Architecture; Data Lifecycle; Integration	standardization, control, traceability, lifecycle evidence	Interface inventory
D4.3	D4	Technical and semantic interoperability requirements are documented for in-scope data exchanges.	Data Architecture; Integration; Data Storage and Operations; Documents and Content	Architecture; Data Lifecycle; Integration	standardization, control, traceability, lifecycle evidence	Canonical models or interoperability specifications
D4.4	D4	Lineage is documented for critical data from source through material transformations and use.	Data Architecture; Integration; Data Storage and Operations; Documents and Content	Architecture; Data Lifecycle; Integration	standardization, control, traceability, lifecycle evidence	Lineage repository
D4.5	D4	Changes to schemas, interfaces, and data models follow a controlled process.	Data Architecture; Integration; Data Storage and Operations; Documents and Content	Architecture; Data Lifecycle; Integration	standardization, control, traceability, lifecycle evidence	Change-control records
D4.6	D4	Retention and disposal requirements are documented by data category.	Data Architecture; Integration; Data Storage and Operations; Documents and Content	Architecture; Data Lifecycle; Integration	standardization, control, traceability, lifecycle evidence	Retention schedule
D4.7	D4	Archiving and disposal activities produce verifiable records.	Data Architecture;	Architecture; Data	standardization, control,	Archival and disposal

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			Integration; Data Storage and Operations; Documents and Content	Lifecycle; Integration	traceability, lifecycle evidence	evidence
D5.1	D5	Security requirements for critical data are defined according to risk and classification.	Data Security; Data Governance; Documents and Content	Risk; Compliance; Security; Supplier Management	risk-based controls, auditability, corrective action	Classification and control standard
D5.2	D5	Privacy obligations are translated into documented data-handling controls.	Data Security; Data Governance; Documents and Content	Risk; Compliance; Security; Supplier Management	risk-based controls, auditability, corrective action	Privacy control mapping
D5.3	D5	Data-related risks are maintained in an accountable risk register.	Data Security; Data Governance; Documents and Content	Risk; Compliance; Security; Supplier Management	risk-based controls, auditability, corrective action	Risk register
D5.4	D5	Ethical and responsible-use criteria are applied to high-impact data uses.	Data Security; Data Governance; Documents and Content	Risk; Compliance; Security; Supplier Management	risk-based controls, auditability, corrective action	Ethics assessment or review record
D5.5	D5	Algorithmic or automated decision risks are assessed when such systems are used.	Data Security; Data Governance; Documents and Content	Risk; Compliance; Security; Supplier Management	risk-based controls, auditability, corrective action	Algorithmic impact assessment
D5.6	D5	Third-party agreements specify applicable data-governance, security, privacy, retention, and audit requirements.	Data Security; Data Governance; Documents and Content	Risk; Compliance; Security; Supplier Management	risk-based controls, auditability, corrective action	Contractual clauses and vendor assessments
D5.7	D5	Compliance and control effectiveness are periodically assessed and corrective actions are tracked.	Data Security; Data Governance; Documents and Content	Risk; Compliance; Security; Supplier Management	risk-based controls, auditability, corrective action	Audit findings and action plans
D6.1	D6	Role-appropriate data-literacy needs are identified.	Data Governance; Business Intelligence and Analytics	Organizational Enablement; Communications	role capability, responsible use, learning	Competency framework
D6.2	D6	Data-literacy development activities are provided to the identified target groups.	Data Governance; Business Intelligence and Analytics	Organizational Enablement; Communications	role capability, responsible use, learning	Training records
D6.3	D6	Decision processes identify the data and evidence used for material judgments.	Data Governance; Business Intelligence and Analytics	Organizational Enablement; Communications	role capability, responsible use, learning	Decision templates or records
D6.4	D6	Users can challenge data quality, definitions, assumptions, and analytical outputs through defined channels.	Data Governance; Business Intelligence and Analytics	Organizational Enablement; Communications	role capability, responsible use, learning	Challenge or issue-management mechanism
D6.5	D6	Teams share governed data through approved mechanisms rather than relying on unmanaged copies.	Data Governance; Business Intelligence and Analytics	Organizational Enablement; Communications	role capability, responsible use, learning	Approved access and sharing records
D6.6	D6	Responsibilities for the ethical use of data are communicated to personnel and contractors.	Data Governance; Business Intelligence and Analytics	Organizational Enablement; Communications	role capability, responsible use, learning	Code, policy, and acknowledgment records
D6.7	D6	Learning from data incidents and contested decisions is incorporated into guidance and training.	Data Governance; Business Intelligence and Analytics	Organizational Enablement; Communications	role capability, responsible use, learning	Lessons-learned updates
D7.1	D7	Governance objectives have defined performance indicators or	Data Governance; Data	Performance	measurement, change	Governance scorecard

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		evidence criteria.	Quality	Management; Process Improvement	control, continuous improvement	
D7.2	D7	Governance forums periodically review performance and unresolved risks.	Data Governance; Data Quality	Performance Management; Process Improvement	measurement, change control, continuous improvement	Performance review minutes
D7.3	D7	Corrective actions have owners, due dates, dependencies, and closure evidence.	Data Governance; Data Quality	Performance Management; Process Improvement	measurement, change control, continuous improvement	Action register
D7.4	D7	Material changes to policy, architecture, process, or regulation trigger a documented change-management response.	Data Governance; Data Quality	Performance Management; Process Improvement	measurement, change control, continuous improvement	Change-impact assessments
D7.5	D7	Stakeholder feedback is used to identify governance barriers and improvement opportunities.	Data Governance; Data Quality	Performance Management; Process Improvement	measurement, change control, continuous improvement	Feedback records
D7.6	D7	Improvement priorities are selected using evidence about risk, value, feasibility, and organizational readiness.	Data Governance; Data Quality	Performance Management; Process Improvement	measurement, change control, continuous improvement	Improvement backlog
D7.7	D7	Completed improvements are evaluated to determine whether intended outcomes were achieved.	Data Governance; Data Quality	Performance Management; Process Improvement	measurement, change control, continuous improvement	Post-implementation review

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Appendix D - Documentary evidence matrix

Code	Dimension	Illustrative evidence	Most qualified informants	Evidence progression
D1	Strategic Alignment and Organizational Value	Approved strategy and governance charter; Strategy map or benefits framework; Appointment record or role description; Portfolio criteria and decision records	Senior leadership; Data Office; portfolio management; audit	Stage 3: formal documentation; Stage 4: monitoring/audit evidence; Stage 5: documented learning and improvement
D2	Decision Rights, Accountability, and Governance Operating Model	Decision-rights matrix; Owner register; Stewardship role descriptions; Committee charter and minutes	Data owners; stewards; governance office; legal/compliance; audit	Stage 3: formal documentation; Stage 4: monitoring/audit evidence; Stage 5: documented learning and improvement
D3	Data Quality, Metadata, and Master/Reference Data	Critical-data-element register; Quality rule catalog; Quality dashboard; Incident register	Data quality; metadata; business owners; technology	Stage 3: formal documentation; Stage 4: monitoring/audit evidence; Stage 5: documented learning and improvement
D4	Data Architecture, Integration, Interoperability, and Lifecycle	Architecture principles; Interface inventory; Canonical models or interoperability specifications; Lineage repository	Enterprise/data architecture; integration; records management; technology	Stage 3: formal documentation; Stage 4: monitoring/audit evidence; Stage 5: documented learning and improvement
D5	Security, Privacy, Risk, Ethics, Compliance, and Third-Party Governance	Classification and control standard; Privacy control mapping; Risk register; Ethics assessment or review record	Security; privacy; risk; compliance; legal; procurement; audit	Stage 3: formal documentation; Stage 4: monitoring/audit evidence; Stage 5: documented learning and improvement
D6	Data Culture, Literacy, Evidence-Informed Decision-Making, and Responsible Data Use	Competency framework; Training records; Decision templates or records; Challenge or issue-management mechanism	Business units; HR/learning; analytics; ethics; data users	Stage 3: formal documentation; Stage 4: monitoring/audit evidence; Stage 5: documented learning and improvement
D7	Performance Monitoring, Change Management, and Continuous Improvement	Governance scorecard; Performance review minutes; Action register; Change-impact assessments	Governance office; performance management; change management; audit	Stage 3: formal documentation; Stage 4: monitoring/audit evidence; Stage 5: documented learning and improvement