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Information Technology –

Adequacy of Organizational Data Governance and Management Practices

भारतीय मानक

सूचान प्रौद्योगिकी – संगठन डेटा परिपक्वता ढांचा और मूल्यांकन मॉडल

ICS 35.080

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Foreword

Formal Clauses to be added later.

Key trends across sectors highlight the emergence of data as a critical organizational "asset" and the importance of managing, measuring and monetizing this critical asset to drive businesses effectively. Along with business enterprises, data has taken the center-stage in government and non-governmental organizations as well. Evidence based policy making and strategy formulation is becoming an integral part of governance structures across the world. Major transformational initiatives being progressed at the national and international levels, also have data at their core.

Many organizational strategies already explicitly mention data as a critical enterprise asset and analytics as an essential competency. On the other hand, many organizations are lagging in their ability to leverage data to their advantage.

With this massive proliferation and democratization of data and the emergence of a borderless data ecosystem, it has become extremely important to plan and hedge associated risks and avoid potential damage. Ethics, Trust, Privacy and Security are aspects that need serious considerations in the current context and going forward.

This underscores the need for data governance led organizational data management. After establishing management practices, it is also required to ensure that these data governance led management practices are being performed in a manner that may be considered adequate.

An organization may benefit from performing these data governance led management practices in more sophisticated ways than the basic level which may be considered adequate. For the guidance of such organizations, it is considered valuable to define a concept of maturity for these services.

INTRODUCTION

0.1 Overview

Data is recognized as a very important organizational asset. Concerns over the ability to effectively use data and manage the risks associated with holding data require that all stakeholders have trust in the manner in which data is managed and governed. These concerns have motivated the need for a standard to assess the adequacy of the manner in which an organization manages and governs its data assets.

This standard can be used independently or in conjunction with other relevant standards as applicable.

0.2 Need for the standard

Standardization in this area will be very useful for all organizations.

This document is intended for use primarily by the following actors:

a) Any organization wanting to undergo data governance and management adequacy assessment
b) Any organization wanting to provide Data Governance and Management Assessment Services
c) Conformity Assessment Bodies

0.3 Purpose

The purpose of the standard is to define the core practices and processes which organizations must demonstrate in respect of data governance and management, as well as define the requirements and method of assessment to determine if those practices and processes being performed at a level that is defined to be adequate.

Information Technology – Adequacy of Organizational Data Governance & Management Practices

1 SCOPE

This standard specifies the practices that are needed for an organization to effectively govern and manage the data in digital form under its control. It also specifies the outcomes to be achieved for these practices to be considered adequate and a method of assessment of the practices and processes to be considered adequate.

This standard is generic and is intended to be applicable to all organizations, regardless of type, size or nature.

2 REFERENCES

The Standards listed in Annex A and Annex B contains provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A and Annex B.

3 TERMINOLOGY

For the purpose of this standard the following terms and definitions shall apply.

a) Practice – collection of methods, techniques and conventions that are employed to achieve certain outcomes

b) Performed level - If there is evidence that all the outcomes for a given practice are being achieved, then the practice can be termed as operating at Performed level.

c) Managed level - If there are documented processes that comprise the practice and there is documented evidence to show that these processes are indeed functioning as documented and are being regularly reviewed, then the practice shall be said to be operating at Managed Level.

4 PRACTICE GROUP & PRACTICES

The overall data governance and management framework consists of four practice groups. Each practice group contains certain practices. Each practice is realized through one or more processes.

The specific practice groups, and the constituent practices are depicted in the diagram below:

Practice Group	Practices
Planning & Governance	Data Governance
	Data Planning
Data value Delivery Enhancements	Decision Management
	Master & Reference Data Management
	Document & Content Management
	Data Integration & Interoperability
	Data Storage & Operations
Risk Management	Data Classification
	Data Privacy
	Data Confidentiality
	Data Integrity
	Data Availability
	Data Regulatory Compliance
Foundational Activities	Metadata Management
	Data Quality Management

Figure 1 : Practice Groups & Practices

5 Practice Group – Planning & Governance

The objective of the practices in the Planning & Governance Practice group is to establish the over-arching data governance structure, governance strategy, policies & processes that are needed for the organization to achieve its objectives of efficient oversight of the usage of organizational data assets and the compliance with applicable regulations. These practices are the interface between top management and their policies with the operational aspects pertaining to collecting, processing and storing data. Practice - Data Governance

5.1 Practice - Data Governance

Data governance is a system for defining who within an organization has authority and control over data assets and how those data assets may be used. The Data Governance function guides all other data management functions.

5.1.1 Outcomes for the Data Governance Practice

Outcomes for the Data Governance Practice

With respect to the requirements of this standard at least the following outcomes are expected:

a) A Data Governance Organization, (may be nimble) with appropriate roles and responsibilities
b) Data Governance Strategy, Policies, Processes at least for the prioritized business needs
c) Data Strategy, Data Principles at least for the prioritized business needs
d) Operating Model and Operations plan
e) Baseline Standards, Guidelines, Standard Operating Procedures, Review Process and Best Practices

5.2 Practice - Data Planning

The objective of the "Data Planning" practice is to forecast, plan and budget organizational data requirements at a strategy level over a longer time horizon. It focuses on an inventory of data assets, establish their valuations and plans for initiatives required to maintain & enhance those for exploitation as per organization's objectives and goals. The planning process initiates identification and onboarding (under data governance) of new data assets, whenever required, in alignment with business needs.

5.2.1 Outcomes for the Data Planning Practice

With respect to the requirements of this standard at least the following outcomes are expected:

a. Established organizational key data assets.

b. Established process to collate and manage data requirements from all business stakeholders (mostly for a rolling window of 1 year)
c. Established process to plan and budget for required initiatives for timely fulfilment of organizational data needs
d. Established process to plan infrastructural/capacity needs for existing and future data assets.
e. Established process to assess Key Data Asset Valuation

6 Practice Group - Data Value Delivery Enablement

Data Value Delivery Enablement Practice Group consists of key practices within the end to end data value chain ensuring on time availability of data and processing capability in regard to that data, spanning capture, storage, integration, transformation, organization and usage of data and information thereby enabling effective utilization and decision making across an organization and its ecosystem.

6.1 Practice - Decision Management

Decision Management encompasses all aspects of an organization's decision-making process and the enabling systems that it uses. This Practice deals with the decision making ecosystem of an organization. It aims to enhance the extent to which an organization's decision management is data driven and leverage available capabilities spanning simple reporting, data discovery, visualization, dimensional analysis, machine learning, natural language processing and cognitive computing, to improve decision effectiveness.

6.1.1 Outcomes of the Decision Management Practice

With respect to the requirements of this standard at least the following outcomes are expected:

a) Understanding of the key decision needs of an organization.
b) Strategy, approach, plans, infrastructure requirements and roadmaps to meet the current and long-term decision needs
c) Established artifacts – data & analytics: business, application and technical architecture, and design patterns.
d) Productionized decision management capabilities.
e) Established process to manage and continuously improve decision management capabilities and foster fact-based decision-making culture within the organization.

6.2 Practice - Data Architecture

Data Architecture encompasses process areas which helps an organization to plan, design, maintain and enhance an optimal data layer and ensure data availability for decision making to meet current and future business needs. It establishes and maintains the data architecture design encompassing a number of architecture viewpoints, required data flows, data value chains, enterprise data model and data architecture implementation roadmaps. It establishes and helps to

enforce architectural standards, architectural patterns. It also supports in terms of selection and implementation of platforms and technologies to meet both functional & non-functional requirements, enable data capture, data integration and effective data analysis & consumption. Further it enables management of historical data and overall information life cycle management.

6.2.1 Outcomes for the Data Architecture Practice

With respect to the requirements of this standard at least the following outcomes are expected:

a) Approach, data architecture master blueprints and roadmaps to meet the current and long-term data requirements of the organization.
b) Data architecture viewpoints, definitions and data models, at least for the key data layers.
c) Data architecture policies, standards, guidelines, and best practices.
d) Deployed organizational data architecture, integrated with overall enterprise architecture.
e) Established process and organization structure to govern and continuously improve organizational data architecture.

6.3 Practice - Data Integration and Interoperability

Data Integration and Interoperability primarily focuses on ensuring efficient movement of data between systems, applications, data stores and organizations. Integration enables consolidation of data into consistent forms which may be physical or virtual. Interoperability enables communication between multiple systems.

6.3.1 Outcomes for the Data Integration & Interoperability Practice

With respect to the requirements of this standard at least the following outcomes are expected:

a) DII approach, solution master blueprints and roadmaps for efficient data movements in a timely manner within and between systems, applications and organizations.
b) Deployed DII solutions to move data securely, fulfilling the information needs of the organization in a timely manner.
c) Established DII standards and best practices
d) Established process and organization structure to govern and continuously improve DII capabilities.

6.4 Practice - Master & Reference Data Management

Master Data is that subset of data that represents core business entities in an organization and is required across business areas, processes and systems. Reference Data is data used to classify, categorize and/or characterize other data in an organization. It can relate data within the organization to information beyond the organizational boundaries as well.

Master data management aims at establishing control over key master data in an organization and enablement of consistent, accurate and timely use. It also focuses on standardizing the processes

for collection, aggregation, matching, consolidation, quality-assurance, persistence and distribution of master data throughout an organization. Reference Data Management aims to establish control and enable effective usage of the established domain values and their definitions, across the organization.

6.4.1 Outcomes for the Master & Reference Data Management

With respect to the requirements of this standard at least the following outcomes are expected:

a) Availability of at least the key Master & Reference Data Assets and related capabilities
b) Approach, architecture blueprints and roadmaps to meet the current and long-term master & reference data requirements of the organization
c) Master & reference data artifacts - data models, architecture & design patterns, standards & guidelines, standard operating procedures.
d) Utilization of master data assets through effective sharing.
e) Established process and organization structures to govern and continuously improve master & reference data capabilities/services.

6.5 Practice - Document & Content Management

Document management entails capture, storage, retention and management of documents and include functions such as intake, drafting, versioning, collaboration. internal and external sharing, security, metadata, access rights, workflows, search, repository organization, archiving and retention policy management, along with reporting and auditing on these functions. It manages data in structured formats such as Word, PDF, PowerPoint, Excel, etc.

Content management on the other hand deals with storage, management, contextualization, distribution and publishing of content in digital formats (both structured and unstructured) such as in websites and other digital media. It offers control over storage, access and distribution of key content asset pieces like logos, webpages, videos, audio file and documents.

6.5.1 Outcomes of the Document & Content Management Practice

With respect to the requirements of this standard at least the following outcomes are expected:

a) Compliance with regulatory requirements, primarily records management obligations and customer expectations
b) Deployed Document & Content Management Capability: Timely availability of consistent and current Document & Content type resources across the organization.
c) Approach, plans, architecture blueprints and roadmaps to meet the current and long-term Document & Content type requirements of the organization.
d) Policies, procedures and standards
e) Established process and organization structures to govern and continuously improve master & reference data capabilities/services.

6.6 Practice - Data Storage & Operations

Data Storage practice enables an organization to plan, design, implement and support an optimal data storage to maximize the value of stored data and improve utilization and performance of data storage resources. Essentially this practice enables organizations to understand storage requirements, plan and store a wide variety and volume of data efficiently in alignment with the established data architecture, speed up data retrieval, prevent data loss, implement data security strategies, implement data life cycle management strategies related to data storage and optimize IT expenses towards data storage.

6.6.1 Outcomes of the Data Storage & Operations Practice

With respect to the requirements of this standard at least the following outcomes are expected:

a) Established process to identify and manage data storage requirements
b) Data storage strategy, approach, plans, high level design and roadmap to meet the current and long-term data storage requirements of the organization.
c) Established process and organization structure to govern and continuously improve organizational data assets throughout their lifecycle in terms of data integrity, availability and performance while optimizing storage cost
d) Established best practices, standards and guidelines and standard operating procedures.

7 Practice Group - Data Protection & Risk Management

Data Protection and Risk Management programs must be comprehensive enough to address all requirements established by authoritative sources (e.g., laws, regulations, guidance), and must be supported by written policies, appropriate training, ongoing practices, and appropriate assessment. This practice group provides methods and processes to identify, assess, prioritize, and manage risk related to Data (Security, Privacy & Compliance) in an organization

7.1 Practice – Data Classification

The organization should have a defined method to classify data with respect to its importance and must have policies that describe how any data should be classified and labeled to indicate its classification level. This classification will be used as the primary method to decide to what level this data is to be protected and can be shared.

7.1.1 Outcomes of Data Classification Practice

a) Availability of a documented data classification policy.
b) Availability of methods to label data in accordance with the classification policy.

7.2 Practice – Data Privacy

The organization must have a defined privacy policy that defines all data that is to be considered as personal data. It must describe how each type of personal data will be collected, processed and stored. In particular the framework for obtaining consent for collecting, processing and storage of personal data and the acceptable methods for protecting such data throughout its lifecycle should be clearly described.

7.2.1 Outcomes of Data Privacy Practice

a) Availability of a documented privacy policy and consent management framework
b) Standardized process to assess whether information is PII and categorize PII based on associated privacy risks.
c) Limits the collection of PII to the minimum elements identified for the purposes described in the notice
d) Retention of PII for which the individual has provided consent
e) Compliance with privacy requirements
f) Management of privacy risks as part of managing the enterprise risk management function

7.3 Practice – Data Confidentiality

The objective of this practice is to protect data against unintentional, unlawful, or unauthorized access, disclosure, or theft. There must be clearly defined and standardized methods to encrypt data based on its classification, and a well-defined and clearly documented key management process.

7.3.1 Outcomes of Data Confidentiality Practice

a) Availability of a documented encryption policy
b) Encryption Solutions deployment as per the document policy.
c) Enterprise-wide Key Management process in place including periodic rotation of keys.

7.4 Practice – Data Integrity

The objective of this practice is to make sure that data has not been changed in an unauthorized manner. The issue of ensuring that there is consistent semantics associated with data may also be viewed as an integrity problem. For example if a quantity denotes the age of a person, then it cannot be negative. These aspects of integrity must be managed as data quality requirements. Here the issue to be dealt with is assurances that data cannot and has not been modified in an unauthorized way.

7.4.1 Outcomes of Data Integrity Practice

a) Documented policy describing the granularity for integrity protection and the periodicity for integrity verification
b) Standards for integrity protection such as checksums or digital signature
c) Documented process to be followed in case of actual or potential loss of data integrity

7.5 Practice – Data Availability

The data availability practice objectives are to ensure that any organizational data is available for use whenever it is required. This practice calls for data to be replicated to ensure that accidental or malicious damage to any copy of data is mitigated by replicating data such that it can be restored. This practice does not cover the computing infrastructure and processes to ensure that data can be restored within specified timeframes. It does cover the managing of inventory and testing of copies of data to make sure they can be restored when needed.

7.5.1 Outcomes of Data Availability Practice

a) Availability of a documented data backup policy
b) Backup done in accordance with the policy.
c) Data backup process is automated,
d) Backup is protected at the same level as the live data
e) Backups periodically tested by being restored.
f) Availability of documented data retention and disposal policy

7.6 Practice – Data Regulatory Compliance

This objective of this practice is to consolidate and define all the regulatory obligations for compliance that relate to the data collected, processed and stored by the organization. These obligations are to be translated into metrics and operating procedures to ensure and verify compliance. Outcomes of Data Regulatory Compliance Practice

7.6.1 Outcomes of Data Regulatory Practice

a) Reporting metrics as required for compliance are documented.
b) Instrumented processes for compliance metrics to be measured
c) Existence of formal incident response process which covers planning, communications, readiness, analysis, mitigation, and improvements
d) Periodic training for awareness of Data loss
e) Availability of established list of contact information for parties that need to be informed of any such incidents

8 Practice Group - Foundational Activities

This practice group is intended to create a unified and organization wide basis to interpret data so that there is an organizational view of the data in its entirety, and that the right level of quality can

be maintained for the data. The Foundational Practice group can be considered as a pre-requisite group.

8.1 Practice - Metadata Management

Metadata is data that provides information about other data. There are three commonly identified types of metadata:

a) Descriptive metadata describes a resource for purposes such as discovery and identification. It can include elements such as title, abstract, author, and keywords.
b) Structural metadata indicates how compound objects are put together, for example, how pages are ordered to form chapters.
c) Administrative metadata provides information to help manage a resource, such as when and how it was created, file type and other technical information, and who can access it. There are several subsets of administrative data; two that are sometimes listed as separate metadata types are:
    i. Rights management metadata, which deals with intellectual property rights, and
    ii. Preservation metadata, which contains information needed to archive and preserve a resource.

8.1.1 Outcomes of Metadata Management Practice

With respect to the requirements of this standard at least the following outcomes are expected:

a) Organizational capability in terms of Business Glossary / Data Dictionary / Data Catalogue providing understanding on data attributes, business terms and usage.
b) Approach, technology enablement plans and roadmaps to meet the current and long-term metadata requirements of the organization.
c) Metadata artifacts - data models, design patterns, standards & guidelines, standard operating procedures.
d) Established process and organization structure to govern metadata quality, security, and usage.

8.2 Practice - Data Quality Management

Data Quality Management encompasses planning, implementation and control of activities that apply Quality management Techniques to data in order to assure it is fit for consumption and meets the needs of data consumers.

The following are the dimensions of data quality

a) Accuracy
b) Completeness
c) Reliability
d) Relevance

e) Timeliness
f) Consistency
g) Availability
h) Validity
i) Integrity

8.2.1 Outcomes of Data Quality Management Practice

With respect to the requirements of this standard at least the following outcomes are expected:

a) Established approach to make data fit for purpose based on business requirements.
b) Approach, technology enablement plans and roadmaps to meet the current and long-term data quality requirements of the organization.
c) Established standards, guidelines, best practices and specifications for data quality controls as part of the data lifecycle.
d) Established process and organization structure to govern (measure, monitor, report) on data quality levels and improve the quality of data, through process and system improvements.

9 Adequacy Assessment

9.1 Practice Level Assessment

The following requirements are placed on the level to which the practice should be assessed in order to be considered adequate.

Practice Group	Practice	Level
Governance and Planning	Data Governance Practice	Performed
	Data Planning Practice	Performed
Data Value Delivery Enablement	Decision Management Practice	Performed
	Data Architecture Practice	Performed
	Data Integration and Interoperability Practice	Managed
	Master and Reference Data Management Practice	Managed
	Document and Content Management Practice	Managed
	Data Storage & Operations Practice	Managed
Data Protection and Risk Management	Data Classification Practice	Managed
	Data Privacy Practice	Managed
	Data Confidentiality Practice	Managed
	Data Integrity Practice	Managed
	Data Availability Practice	Managed

	Data Regulatory Compliance Practice	Managed
Data Foundation	Metadata Management Practice	Managed
	Data Quality Practice	Managed

ANNEX A

(*Clause 2*)

LIST OF REFFERED INDIAN STANDARDS

Sl No.	*IS No.*	*Title*
		To be added later

ANNEX B

(*Clause 2*)

LIST OF REFFERED INTERNATIONAL STANDARDS/PUBLICATIONS

International Standards/Publication	***Title***
ISO/IEC/IEEE 24765 : 2017	Systems and software engineering — Vocabulary
ISO/IEC/IEEE 42020 : 2019	Software, Systems and Enterprises – Architecture Processes
ISO/IEC 33020	Information technology — Process assessment — Requirements for process reference, process assessment and maturity models

