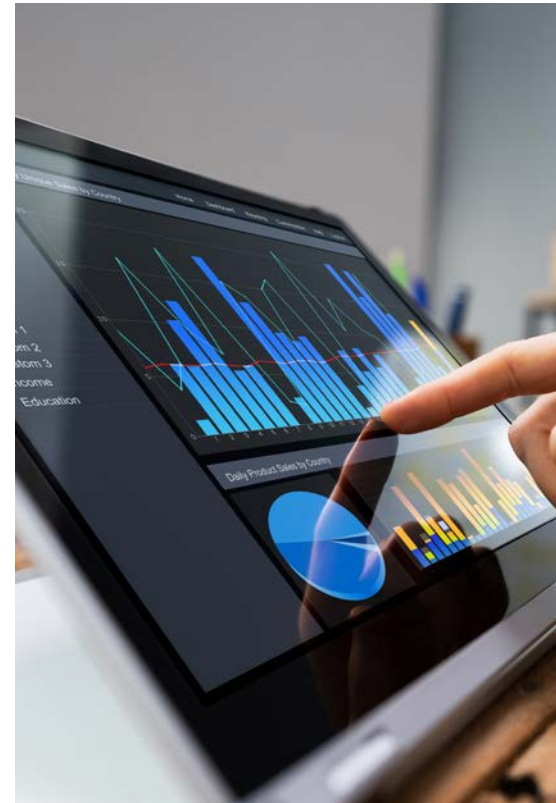# Evolving to a next-gen Data & Analytics Governance

The challenge: a changing world in which transformation is crucial

Seeking transformation means being agile, resilient and ready to reinvent oneself. In a world full of uncertainty and unique challenges, it is more important than ever for companies to embrace transformation and become the best version of themselves. At PwC, we are helping our clients to courageously transform in order to set themselves up for lasting results and long-term success in the midst of tumultuous times. Companies have always had to evolve and adapt to remain competitive. But today a number of disruptive forces are accelerating the pressure to transform: an ongoing pandemic, rapid technological change, new cybersecurity threats and rampant inflation, to name a few.

> The companies that will succeed will be those that are able to manage change and respond with transformation towards becoming data driven.

In this context, Data Governance is also facing a period of radical change. All organizations have to make data-driven decisions every day, regardless of whether they have a formal Data Governance function, but increasing volumes of increasingly complex data, the emergence of new cutting-edge technologies and even more strict regulatory standards risk hindering the transformation process of companies into data-driven businesses. Exercising authority and control over the management of one's data assets opens the door to many benefits and is crucial to generating the right value from data assets, **but what approach is needed to manage change?**

Data Governance benefits

- Reliable and **fit-for-purpose** data

- **Greater trust** in operational and managerial decisions

- **Increased ability to respond to change**

- **Reduced risk** of departmental silos and duplication

- Reduced **regulatory** compliance risk

- Clear definition of **Roles and Responsibilities**

A traditional governance approach to data analytics is proving ineffective in overcoming the challenges posed by recent technology trends. Organizations need data governance programs that are flexible, scalable and highly responsive to changing business dynamics as opposed to top-down approaches that aim to control every aspect of use cases and D&A initiatives, often leading to their failure.

> PwC proposes a diversified approach to Data & Analytics Governance in line with clients' needs, highlighting how to adapt, customize and expand the governance and control framework of data according to different business and technology scenarios.

The Evolution of Data Governance

Compliance

12/2013 – Circolare 285 Publication
Data Governance within the Financial Services context is born
Bank of Italy provides instructions to strengthen the system of internal controls and integrated risk management.

01/2016 – The first Gartner's CDO Survey is released
The need for Chief Data Offices
The topic of data is becoming more and more important, implying the setting up of dedicated data offices with executive figures in charge (CDO).

09/2018 – GDPR comes into force
The importance of data protection
GDPR requires to meet tight standards: compliance and risk mitigation are confirmed as key drivers.

03/2020 – First Lockdown in Italy
Data Governance generates a competitive advantage
Data Analytics becomes an indispensable function to emerge in the new digital marketplace spawned by the pandemic.

10/2021 – The Italian Big Data & Analytics reaches 2 bn €
The digital transformation era
New approaches and tools mature, such as AI and the Cloud, to automate manual tasks and streamline data governance.

Data Driven Business

06/2022 – The data Governance in Gartner's Data Analytics Trends
A new paradigm: Data Mesh and Data Product Governance
Data Governance consolidates key driver of reliability and availability of fit-for-purpose data, accelerating growth and competitiveness.

The new Challenges

The need to guarantee accessibility and transparency to an **ever-increasing amount of data**	The advent of **emerging** and disruptive **technologies** on the market
The increasing **complexity of data**	New **regulations** to which companies must adhere

To cope with the imminent change brought about by these factors, PwC has developed innovative Data Governance services, whose multidisciplinary focus on Data Analytics functions has enabled us to adapt to emerging market trends and address the new challenges they pose.
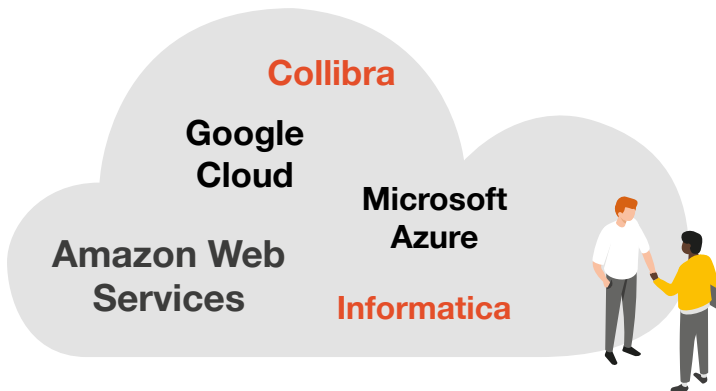
Cloud Data Governance

AI Governance

Smart Data Governance

Cloud Data Governance

Collibra

Google Cloud

Microsoft Azure

Amazon Web Services

Informatica

We collaborate with leading Cloud services technology vendors to offer our customers scalable, flexible and secure integrated or modular Cloud Data Governance solutions.

What we offer

Cloud Data Governance concerns the application of best practices necessary to manage and control data in cloud environments. Our goal is to build confidence and trust in the adoption of cloud technologies, enabling further value extraction from one's information assets through the implementation of advanced technology services, with benefits in terms of cost savings, process automation, mobility and enhanced information security.

Data Cataloging

- Creation of a unified data catalogue for on-premise and multi-cloud data management.
- Automatic discovery and cataloguing of data and metadata from multiple data stores, both cloud and on-premise.
- Reduction of duplicate and redundant data for greater data model consistency and cost savings.

Data Archiving

- Application of automatic data retention rules based on data classification across cloud environments.
- Automatic movement of less-used data to low-cost cloud storage layers for balancing resources.
- Compliance with legal requirements to maintain data history for audit purposes.

Data Lineage

- Extension of lineage to dislocated data sources across hybrid and multi-cloud environments.
- Implementation of data and metadata lineage auto-discovery and change detection capabilities.
- Lineage historicization to track changes and data movement between systems.

Data Lifecycle

- Setting up of a comprehensive framework across cloud architectures to enable intelligent data integration in distributed systems.
- Dynamic and flexible allocation of processing capacity according to usage and data lifecycle stages.
- Definition of automated procedures to ensure data integrity and usability and improve process efficiency.

Data Quality

- Implementation of automated data quality control processes in heterogeneous and multi-cloud environments.
- Facilitated definition and implementation of data quality rules by linking with Data Catalog metadata.
- Centralization of data quality measurements from multiple cloud sources via API for comprehensive reporting of data quality metrics.
- Use of advanced data quality features for standardization, verification, parsing, deduplication and data cleaning.

AI Governance

Artificial intelligence offers virtually **unlimited potential** to benefit society as a whole. Companies in every sector are eager to claim their share of the potential benefits of AI. In addition to these benefits, the rise of AI brings with it a number of **challenges** related to **trust and accountability**. To address them effectively, organizations must understand which are the **risks** associated with AI and take them into account in the **design and implementation phases**.
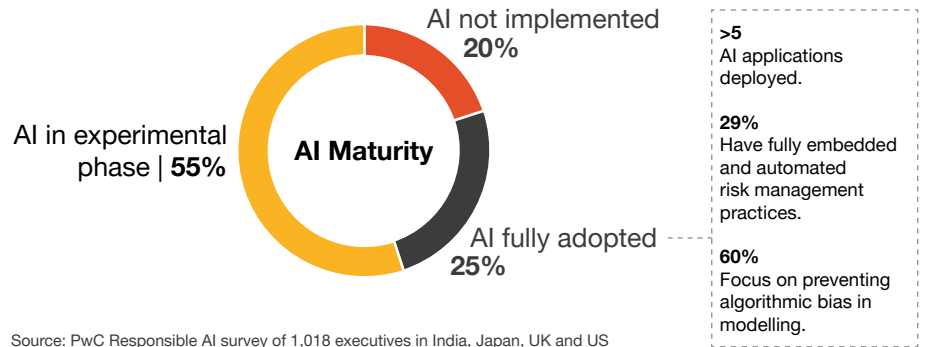
$15,7 trl
Potential contribution of AI to the global economy by 2030
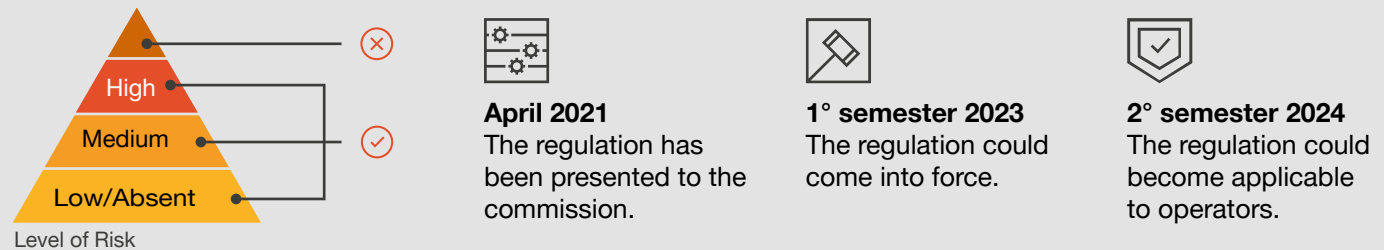
14%
Potential increase in GDP by 2030 thanks to Artificial Intelligence

Source: Sizing the prize: what's the real value of AI for your business and how can you capitalise?, PwC Report

% of respondents reporting on implementation of AI in their companies

AI not implemented **20%**

AI in experimental phase | **55%**

AI Maturity

AI fully adopted **25%**

>5
AI applications deployed.

29%
Have fully embedded and automated risk management practices.

60%
Focus on preventing algorithmic bias in modelling.

Source: PwC Responsible AI survey of 1,018 executives in India, Japan, UK and US

In April 2021, the **European Commission** published a **proposal of regulation on AI** that imposes a **risk-based approach** and will put much more focus on the AI process itself.

High
Medium
Low/Absent

Level of Risk

April 2021
The regulation has been presented to the commission.

1° semester 2023
The regulation could come into force.

2° semester 2024
The regulation could become applicable to operators.

Given the introduction of the regulation that could soon be enforced, **it is crucial to be prepared and to plan the proper framework interventions** to be developed during the **transition period** before the final milestone.

What we offer

PwC has developed a comprehensive AI Governance **framework** and **toolkit** to help companies focus on and address key dimensions in the design and implementation of AI applications. The services aim to **define, plan, implement and monitor** the processes and tools to **govern and control** AI programs at all levels of the company, in line with the AI regulatory requirements.

AI Policy
- GAP analysis of internal regulations.
- Definition of roles and responsibilities.
- Communication plans to promote AI.

AI Data Model
- Integration of AI-specific entities.
- Definition of the AI Algorithms Catalog.
- Extension of the Data Privacy framework.

AI Quality Checklist
- Assessment of bias in AI systems.
- Monitoring of Sensitive Outputs.

AI Model Governance
- Monitoring of performances and robustness.
- Retaining of technical documentation.
- Log file management and monitoring.

AI Lineage
- Visualization of data flows and transformations in AI processes.
- Representation of roles within the AI lifecycle.

Data Protection
- Data Obfuscation and Data Masking.
- Governance and control of AI outputs.
- Transparency of AI applications.

Augmented DG
- AI Data Profiling.
- Augmented Data Lineage.
- Automatic identification of business rules.
- Self-service DQ and Data preparation.

Smart Data Governance

In an ever-changing environment, where business needs to change rapidly, a significant gap still exists between companies that are mature in their exploitation of data and those at the beginning of their digital transformation journey. There is an urgent need to adopt **processes** and **technologies** for data **integration and governance**, even and especially in companies **without regulatory requirements, SMEs or with low investment capacity**. To these, PwC makes key data governance skills accessible through its **'Smart' solutions offering**.

Market Drivers	New needs	New solutions
• Lower regulatory compliance requirements. • Limited budget on data initiatives.	• Search for an operational Data Governance that is more pervasive in business processes. • Definition of digital evolution strategies from a data-driven perspective.	**Packaged Smart Solutions** • Stand-alone and complementary service modules. • Accelerators of technological evolution.

Greater diversification of sectors outside Financial Services

+24% Manufacturing Sector   **+15%** Telco & Media Sector   Analytics market growth in Italy to 2021

Source: Osservatorio PoliMi
Big Data & Business Analytics

What we offer

In order to enable even low-complexity companies to develop new data management capabilities and improve their competitiveness in the digital marketplace, PwC has devised the following Smart solutions:

Technological Accelerators

Thanks to previous experience in the field, PwC has tried and tested accelerators and standards:
- **Ready-to-go templates**
- **Customisable semi-finished products**

Open Source Tools

Adoption of **open source technology solutions** enabling proper data governance.

truedat   WinPure*   Vertabelo*   SmallID*
Amundsen   DataHub   Apache Atlas

Short Timeframes

Implementation of the entire set of services **in 8 to 12 months**, achieving in the short term the definition of a data governance framework, competencies and business processes.

Maturity Model	Organisational and operational model
Data Dictionary and Business Glossary	Data Lineage

Modules that can also be implemented individually with complementary capabilities, which in synergy amplify the benefits.

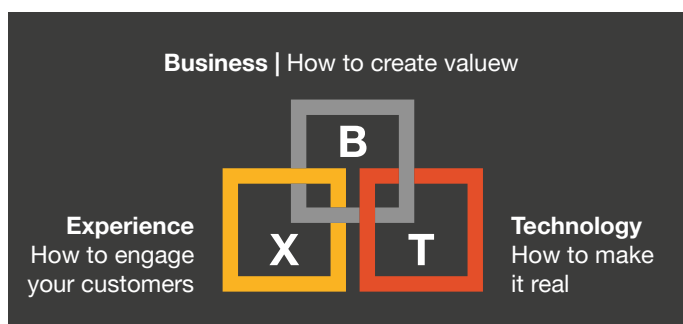|	
Data Cleansing & Data Matching	Data Model Definition
Control Catalogue	Data Culture

*: Tools that require smart license

PwC's Data & Analytics approach

The ingredients for a successful Data Driven Company

The Data Governance Competence Center is part of PwC's Data & Analytics Practice, an ecosystem created to support our customers in their Data Driven transformation journey with a 360° view across data initiatives. Data Governance is an integrated piece in an organic and multidisciplinary approach, in which the most critical and most important aspect is being able to maintain the right balance between these elements.

PwC's Data & Analytics

Consultancy Layer

Data Strategy & Product Design
Create a Data Driven Transformation leveraging **Data & Intelligence to empower our Clients Business Strategy** including Operating Model, Use Case prioritization and Functional Data Product Design.

Data Governance & Quality
Ensure governance of the data, its quality and consistency with a Business Driven approach prioritizing acceleration of Business Results while ensuring Compliance, from methodology to design and implementation of Data Governance solutions.

Analytical Layer

Data Experience & Visualization
Accelerate a Data Driven Business with a **comprehensive approach for large scale Analytics adoption**, including Data Literacy, Up-Skilling, Citizen Led Innovation programs, powered by best in class Data Visualization and Self Service consumption, transformation and advanced analytics solutions.

Data Science & AI
Develop best in class algorithms, models and engines in order to provide insights, increase process automation, simulate human behavior and actions and solve problems with more appropriate methods and techniques.

Engineering Layer

ML & AI Ops
Enable large scale ML & AI adoption by design and implementation of Enterprise grade AI & ML full life-cycle frameworks, including DevOps approach and full **AI-powered automation**.

Cloud Data Platforms
Design and implement Enterprise grade Data Platforms, including Big and Fast Data, Data virtualization, Cloud Native native solutions and shift to cloud. Enable scale-up, solve bottlenecks and accelerate the transformation.

Integration Platforms
Design & implement Enterprise Integration Platforms with state of the art integration technologies, including real time integration, streaming, APIs, IOT and other advanced integration scenarios.

Business | How to create valuew

B
X **T**

Experience
How to engage your customers

Technology
How to make it real

The BXT approach
PwC supports multinational companies in a wide variety of sectors in the adoption of Data Governance. Our consulting services provide integrated solutions, from strategy to execution through the innovative BXT approach, drawing on both technological and functional specialist skills to address the most complex business challenges of our clients.

PwC's Data Governance Competence Center

PwC has closely followed the evolution of Data Governance from the very beginning, and since 2015 has a Competence Centre focused on the respective topics and constantly evolving with new market trends, which aims to support clients in their journey to become a Data-Driven Company.

40+	resources	with expertise in Data Governance and related tools
75	certifications	obtained from the main data governance authorities
25+	clients	served with projects in Data Governance

Strategic Alliances
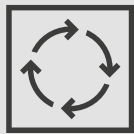
with authorities in the Data & Analytics world:

**DAMA International
EDM Council**

Our Data Governance Framework

The framework developed by PwC, which has been highly proven for several years, is aimed at steering companies towards all-round data governance solutions:

| Data Governance | Data Lifecycle | Data Quality | Data Modelling | Data Technology | Data Protection & Privacy |

Data Governance
The definition of Policies and Guidelines with roles, responsibilities and workflows for data governance and control activities ensure a comprehensive view of data assets through a Maturity Model aligned with business objectives.

Data Lifecycle
Master Data Management and Data Lineage definition, through a data model e2e consistent with their life cycle, provide the tools to trace data flows and transformations highlighting the users involved in the different process steps.

Data Quality
The combination of tools and processes, together with a framework of dimensions, controls and KQI, allows the evaluation and monitoring of the quality of large volumes of data, ensuring usability and effectiveness for end users.

Data Modelling
The representation of data flows, the identification of classification rules through the Business Glossary, the Data Dictionary, conceptual, logical and physical models enable a clear view of information assets.

Data Technology
The support of data governance through management and control tools and platforms enables the addressing of business technology requirements and market analysis in response to business needs.

Data Protection & Privacy
Information security monitoring and the protection of personal and sensitive data ensure compliance with standards of integrity, availability and confidentiality required in the corporate data environment.

Data Governance Innovation Lab

The Data Governance Competence Centre not only provides traditional consulting services in major local and international realities, but also ensures that companies evolve according to a digital transformation plan in line with the major innovations the market offers.

We monitor major trends in the technology landscape to provide our customers with a competitive advantage

Most of the companies we work with are starting to experiment and invest in innovative solutions that introduce Artificial Intelligence and Machine Learning paradigms for the efficiency of Data Governance processes. With our support, we match business needs with the latest technological innovations, acting as a bridge between companies and software vendors.
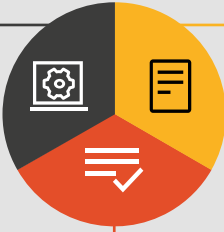
Innovation Lab
Our most recent experiences

| Testing and prototipation labs | Workshops with vendors and digital partners |

AI Assisted Data Classification

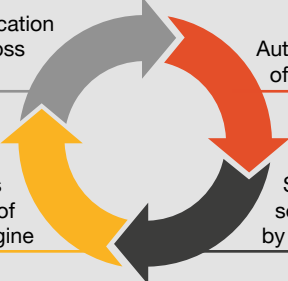Reduction of manual activities in the meta-datation for the creation of glossaries

The model interacts with the DG competence center for the suggestion on labeling and semantics

Industry standard market vocabularies are used to power the AI model for indexing terms

The model analyzes the metadata already available in the system (field name, tables, comments), in addition to the information content for cross references

Augmented Data Quality

Machine Learning technologies leverage "active metadata" to automate manual and repetitive tasks, ensuring optimization of time and resources

Automatic identification of associations across datasets

Automatic Suggestion of Business Rules

Continuous self-learning of the engine

Selection of semantically valid rules by the Business Analyst

Data Observability

Data Pipeline health monitoring technologies and frameworks

- Understanding of the origin of the issues of a Data Object and related Data Flow.
- Acquisition and analysis of technical metadata on ETL processes along the entire pipeline.
- Efficiency analysis through the use of ad-hoc indicators.
- Use of ML algorithms for active (real time) monitoring of the entire data pipeline.
- Issue auto recovery functions through dedicated ML algorithms.

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