



THE CAPCO INSTITUTE
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OF FINANCIAL TRANSFORMATION

GOVERNANCE OF TECHNOLOGY

Revolutionizing data governance
for AI large language models

XAVIER LABRECQUE ST-VINCENT
VARENIA PRASAD

BALANCING
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DEAR READER,

In my new role as CEO of Capco, I am very pleased to welcome you to the latest edition of the Capco Journal, titled **Balancing Innovation and Control**.

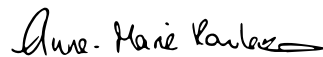
The financial services and energy sectors are poised for another transformative year. At Capco, we recognize that this is a new era where innovation, expertise, adaptability, and speed of execution will be valued as never before.

Success will be determined based on exceptional strategic thinking, and the ability to leverage innovative new technology, including GenAI, while balancing a laser focus on risk and resilience. Leaders across the financial services and energy industries recognize the transformative benefits of strong governance while needing to find the optimal balance between innovation and control.

This edition of the Capco Journal thus examines the critical role of balancing innovation and control in technology, with a particular focus on data, AI, and sustainability, with wider corporate governance considerations. As always, our authors include leading academics, senior financial services executives, and Capco's own subject matter experts.

I hope that you will find the articles in this edition truly thought provoking, and that our contributors' insights prove valuable, as you consider your institution's future approach to managing innovation in a controlled environment.

My thanks and appreciation to our contributors and our readers.

A handwritten signature in black ink that reads "Annie Rowland". The signature is fluid and cursive, with a long horizontal stroke at the end.

Annie Rowland, **Capco CEO**

REVOLUTIONIZING DATA GOVERNANCE FOR AI LARGE LANGUAGE MODELS

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ABSTRACT

In an artificial intelligence (AI) enabled organization, traditional data governance practices face challenges due to the complexity of AI algorithms, utilization of unstructured data, dynamic data transformations, integration with external data sources, and the lack of interpretability in AI models. To overcome these challenges, financial institutions can deploy strategies to increase transparency, refine metadata for unstructured data, and foster collaboration. Furthermore, data ownership and stewardship roles demand evolution in the AI-driven landscape. Ownership now encompasses AI models, algorithms, and insights. To address the needs of stakeholders and ensure responsible AI usage, collaboration, technical expertise, and a focus on governance and compliance become crucial. By adapting their data governance frameworks to accommodate the unique challenges presented by AI, financial institutions can maximize the value of AI technologies while maintaining data quality and trustworthiness. This transformation in data governance is essential for financial institutions to capitalize on the benefits of AI and maintain a competitive edge in the industry.

1. INTRODUCTION

Traditional data governance practices and risk maturity models are rendered obsolete or inadequate in the era of artificial intelligence (AI) adoption, particularly with the emergence of advanced technologies such as large language models (LLMs) like ChatGPT. Financial institutions are aggressively pursuing AI implementation to gain competitive advantage, aiming to optimize both employee and customer experiences. However, the rapid evolution of AI introduces significant challenges related to data privacy and transparency, necessitating a fundamental reboot of data governance within organizations. In response, we have developed a comprehensive framework tailored to address these concerns, enabling financial institutions to not only navigate the complexities of AI integration but also to capitalize on opportunities presented by “generative pre-trained transformers” (GPT) AI in specific use cases.

2. THE EARLY PROMISE: MAXIMIZING VALUE WITH AI

Generative AI's appeal has captivated many and we are now faced with a new paradigm in which traditional data governance practices and risk maturity frameworks have become obsolete or inadequate. The GenAI use cases underscore the empowerment of employees by facilitating rapid access to information, a task that traditionally consumed hours. This holds particular significance for business functions striving for efficiency gains and superior customer experiences. Moreover, AI offers the tantalizing prospect of driving innovation through dynamic machine learning algorithms.

Embracing comprehensive transformations is essential for ensuring readiness and to avoid being left behind in this fiercely competitive industry. However, it is imperative for organizations to recognize that outdated governance practices

and risk frameworks no longer suffice in this era of AI. Vigilant oversight remains crucial, yet advancements in AI-driven automation can streamline processes, reducing reliance on manual reviews. Organizations must prioritize adapting governance principles and frameworks to seamlessly integrate AI technologies.

3. THE CHALLENGE: REDEFINING DATA

In this AI-enabled world, the very essence of data has undergone a profound transformation, where “language is data” emerges as a cornerstone principle. Language, encompassing human speech, text, emotions, and sentiments, emerges as a primary source of input data, marking a departure from the conventional use of structured data. This shift is particularly pronounced in AI applications, notably those leveraging natural language processing, which thrive on the amalgamation of structured and unstructured data. Table 1 underscores the pivotal role of unstructured data in capturing nuanced and diverse information often overlooked by traditional structured datasets.

As datasets evolve into a blend of structured and unstructured data, ensuring data quality becomes paramount to its suitability for AI consumption. The suitability of data for AI ingestion critically depends on its quality, as it directly shapes the resulting outputs. Language analysis and sentiment classification necessitate the nuanced interpretation of human language, demanding governance frameworks to adapt accordingly. These frameworks must vigilantly monitor for corrupt tainted data, extract pertinent insights, and flag potential issues, underscoring the necessity for agile and robust governance structures in this AI-driven landscape.

“*In this AI-enabled world, the very essence of data has undergone a profound transformation, where “language is data” emerges as a cornerstone principle.*”

To tackle these challenges, our methodology helps ensure that risks are well understood and mitigated through the clear definition of use cases and establishment of guardrails for regulatory and audit purposes. For financial institutions to reap the benefits of GenAI, they need to focus on the most fundamental challenge of governing their data in an AI-enabled world.

3.1 Traditional data governance is no longer sufficient

With the rapid advancement of AI technology, we are witnessing a surge in new models and the creation of fresh data for various purposes. Though their inner workings may seem complex, their potential to revolutionize large institutions is undeniable. By addressing issues of data lineage, biases, and unintended consequences head-on, we enable a future where AI empowers us all.

The effectiveness of governing AI hinges on the data it uses and how transparent its uses/algorithms are. There are numerous challenges that are now present for financial institutions to overcome (Figure 1).

Table 1: Unstructured data eases the capture of rich and diverse information that traditional structured data might miss

	STRUCTURED DATA	UNSTRUCTURED DATA
Definition	<ul style="list-style-type: none"> • Data with a high degree of organization; follows a predefined model or schema. • Explicitly defined in columns and rows. 	<ul style="list-style-type: none"> • Data lacking a predefined data model; lacks a consistent structure. • Often required to convert raw data into a usable format.
Data sources	<ul style="list-style-type: none"> • Tabular data • Databases • Spreadsheets such as Excel, Google Sheets • Online forms 	<ul style="list-style-type: none"> • Word documents, PDF, emails, blogs, news articles, research journals, etc. • Images • Audios • Videos • Social media posts and commentary

Figure 1: Challenges to risk management and governance in an AI-enabled environment

1. COMPLEXITY OF AI DATA	2. TRANSPARENCY AND EXPLAINABILITY	3. DYNAMIC NATURE OF AI	4. REGULATORY COMPLIANCE	5. DATA QUALITY AND TRUST	6. DYNAMIC DATA ECOSYSTEM
Traditional governance frameworks struggle with the complexity and variety of AI data sources, which include unstructured and semi-structured data.	AI algorithms lack transparency and explainability compared to traditional statistical methods, raising concerns about bias and ethical implications of AI decisions.	Rapid advancements in AI technologies outpace the capabilities of traditional governance frameworks, leading to gaps and leaving organizations vulnerable to risks.	Evolving regulatory landscapes, especially concerning data privacy and ethical AI use, require governance frameworks to adapt accordingly.	Ensuring data quality and trustworthiness in AI-driven processes demands more sophisticated governance mechanisms to tackle AI data characteristics such as bias and data drift.	Data is constantly evolving, with new sources, formats, and volumes emerging rapidly. Traditional governance frameworks may struggle to keep pace leading to gaps in data governance coverage and effectiveness.

As AI becomes more prevalent, governance practices must adapt accordingly. We need to ensure the same level of oversight for AI data and models as we do for traditional data. This is essential to maintain high quality and trustworthiness, especially when it comes to the impact on clients. To meet this demand, data governance teams must step up and play a crucial role in navigating this new era of AI. Let us examine a couple examples to illustrate.

3.1.1 EXAMPLE 1: DATA LINEAGE IN AN AI-ENABLED ORGANIZATION

Data lineage, a fundamental aspect of traditional data governance, refers to the ability to track the origin, movement, and transformations of data throughout its lifecycle. In a traditional data environment, where data flows are relatively straightforward and well-defined, establishing data lineage is often feasible through manual documentation and tracking mechanisms.

However, when AI is introduced into the enterprise, traditional data lineage practices face significant challenges due to several reasons:

- **Complexity of AI algorithms:** AI algorithms, particularly deep learning models, constantly evolve, making it difficult to trace how data inputs are processed and transformed to produce outputs. Unlike traditional systems where data transformations are explicitly defined, AI algorithms learn and adapt based on complex patterns within the data, rendering manual lineage tracking impractical.

- **Unstructured data:** AI thrives on unstructured data such as text, images, and audio, which often lack clear lineage metadata. Traditional data lineage tools and techniques are designed for structured data, making them ill-equipped now.
- **Dynamic data transformations:** AI models continuously evolve and adapt as they ingest new data and learn from feedback. This dynamic nature of AI introduces a challenge as any previously captured lineage and data transformations will require at least constant updates, if not near real-time. Traditional lineage tools may struggle to keep pace with the rapid changes in AI models and data.
- **Integration with external data sources:** AI applications often rely on external data sources, such as third-party datasets and APIs, which may not provide comprehensive lineage information. Integrating external data sources into the enterprise data ecosystem introduces third-party governance, which further complicates the task of establishing end-to-end lineage.
- **Interpretability and explainability:** AI models are often characterized by their lack of interpretability and explainability, making it challenging to understand the rationale behind their decisions. Without clear visibility into how AI models utilize and transform data, establishing meaningful data lineage becomes elusive.

Table 2: AI considerations for data governance have a key role in defining the future operating model

FOCUS AREA	DESCRIPTION	AI CONSIDERATIONS FOR FINANCIAL INSTITUTIONS
Data governance team	A dedicated team responsible for overseeing the implementation and management of data governance initiatives. This team typically includes data stewards, data architects, and compliance officers.	Does your team have the right skillset to support the governance of GenAI models?
Data governance policy	A set of guidelines and rules that outline the principles, objectives, and responsibilities of data governance within the organization. This policy provides a framework for the implementation and enforcement of data governance practices.	How does the data governance policy address the specific considerations and challenges associated with AI, such as transparency, explainability, and bias mitigation?
Data stewardship	Data stewards are assigned to specific data domains or business areas and are responsible for ensuring the quality, integrity, and security of the data within their domain. They act as the custodians of the data and enforce data governance policies and standards.	How will data stewards work with AI teams to ensure that AI models are trained on quality data and that the outputs are accurate and reliable? Are stewards able to determine if the data is fit-for-purpose?
Data classification	The process of categorizing data is based on its sensitivity, criticality, and regulatory requirements. This classification helps determine the appropriate level of protection and access controls for different types of data.	How will data classification consider AI-specific requirements, such as identifying sensitive data used for training AI models or identifying data subject to regulatory compliance?
Data quality management	A set of processes and practices aimed at ensuring the accuracy, completeness, and consistency of data. This includes data profiling, data cleansing, and data validation activities to improve data quality.	How will data quality management address the unique challenges posed by AI, such as evolving data models and the need for ongoing monitoring and validation of AI model inputs and outputs? How will considerations of ethics and bias impact data quality measurements?
Metadata management	The management of metadata, which provides information about the data, including its structure, definitions, relationships, and lineage. Metadata management helps to improve data understanding and facilitates effective data governance.	How will metadata management capture and document the specific characteristics of AI models, including the algorithms, training data, and validation processes used? How will unstructured data be catalogued?
Data security and privacy	Policies, procedures, and controls to protect data from unauthorized access, breaches, and ensure compliance with privacy regulations. This includes access controls, encryption, data masking, and monitoring of data usage.	How will data security and privacy measures address the unique risks associated with AI, such as protecting sensitive training data and ensuring privacy in AI-driven decision-making processes?
Data governance tools	Software tools and technologies used to support and automate data governance activities. This includes data cataloguing tools, metadata management tools, data quality tools, and data lineage tools.	How will data governance tools integrate with AI platforms and technologies to enable effective management and oversight of AI models and their associated data?
Training and education	Ongoing training and education programs to raise awareness about data governance, promote best practices, and ensure that employees understand their roles and responsibilities in data governance.	How will training and education programs address the specific knowledge and skills required to understand and effectively govern AI technologies, including AI ethics, bias mitigation, and explainable AI?
Compliance and audit	Regular monitoring and audits to assess compliance with data governance policies and regulatory requirements. This includes internal and external audits to identify any gaps or non-compliance and taking any corrective actions.	How will compliance and audit processes assess the adherence to AI-specific regulatory requirements and ethical standards? Will audits include reviewing AI model development and decision-making processes?

To address these challenges, organizations can implement strategies to increase algorithmic transparency, enriching metadata for unstructured data, fostering cross-disciplinary collaboration, and continuously improving lineage practices. These approaches aim to enhance the understanding and tracking of data origin, movement, and transformations in AI environments.

3.1.2 EXAMPLE 2: DATA OWNERS AND STEWARDS ARE NOW CONSTRAINED TO GOVERN AI DATA

Traditionally, data ownership and stewardship roles are often assigned to specific departments or individuals responsible for managing and maintaining data assets within their respective domains. However, with AI, the scope of data ownership expands beyond traditional boundaries. Ownership now extends to encompass not only the raw data but also the AI models, algorithms, and derived insights generated from that data.

With the integration of AI into enterprise workflows, the roles and responsibilities associated with data ownership and stewardship must evolve to address the unique challenges and opportunities presented by AI technologies. In this AI-driven landscape, where language itself becomes a form of data, there emerges a wider range of stakeholders. This expansion of stakeholders necessitates not only retraining

but also broader engagement across the organization. This demands a holistic approach that emphasizes cross-functional collaboration, technical expertise, and a heightened focus on governance and compliance. The data governance team, therefore, needs to be retrained and upskilled to develop a deeper understanding of AI principles, algorithms, and techniques. The team will need to work closely with legal and compliance, data scientists, machine learning engineers, researchers, etc., to establish guidelines for responsible AI usage, monitor adherence to these guidelines, and address any ethical or legal concerns that may arise.

3.2 The solution: To embrace AI effectively, revolutionize your data governance

Data governance must boldly evolve across all its core functions alongside the rise of GenAI. As these tools and technologies advance, the expertise of subject matter specialists becomes essential in assessing data quality, enhancing their quality, and confirming their viability for algorithmic modeling.

To begin, financial institutions should assess current governance practices to identify strengths and weaknesses to understand how to align with strategic objectives. In this evolving landscape, the outlined considerations presented in Table 2 will need to be addressed by data leaders as they are key differentiators to enable organizations to perform their role to the best of their ability.



4. CONCLUSION

Traditional data governance frameworks face significant challenges when integrating AI technologies due to the complexities introduced by unstructured data, opaque algorithms, and dynamic data flows and transformations. As AI is embraced, strategies can be implemented to evolve data governance practices to ensure transparency, accountability, and ethical use of data.

Data ownership and stewardship roles also need to evolve in the AI-driven landscape. Ownership expands to include AI models, algorithms, and insights. Collaboration, technical

expertise, and a focus on governance and compliance are important to address the needs of stakeholders and ensure responsible and ethical AI usage.

To effectively embrace AI, financial institutions must revolutionize their data governance and start leveraging advanced tools and techniques for managing AI data. They should assess current practices, align them with objectives, and address key considerations like data quality, lineage, ownership, and compliance. This will help them navigate AI complexities and seize opportunities in specific use cases.

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