

# The Power of AI-Driven Data Storytelling

## Executive Summary

Today, organizations are increasingly recognizing the importance of data storytelling. As organizations amass more data and as advancements in AI transform how data is utilized, leaders and teams are actively reimagining how data storytelling can help drive action and impact.

Whether data driven stories are used to communicate a strategic vision, core values or business results, they help leaders make new connections and transform decision-making. The rise of AI-driven data storytelling is revolutionizing how data is interpreted and actioned. AI-enabled data storytelling is making insights more relevant for broader business audiences. Generative AI (Gen AI) makes storytelling even more powerful by making it much easier to unlock tailored insights, analytics, and dynamic data personalization in more consumable formats<sup>1</sup>.

This white paper delves into the transformative power of AI-driven data storytelling and explores the evolution from traditional Business Intelligence (BI) to AI-driven BI. It outlines a technical framework for implementing AI-driven data storytelling, covering key phases such as strategic planning, data acquisition and preparation, insights generation, visualization, and automated monitoring and evaluation. The paper also addresses common challenges and provides practical strategies for embedding and scaling AI-driven data storytelling across organizations. Through this paper, IT decision-makers will gain insights into cross functional use cases for AI-driven data storytelling and how this can be leveraged to drive faster and more precise decision making.



## Data Storytelling – An Evolution from BI to AI

Traditional Business Intelligence (BI) has been a staple for data-driven decisions, but often falls short of the evolving needs of business stakeholders. BI tools generate static reports and visualizations that are not always actionable or relevant in real-time. They require manual analysis and technical expertise, making them difficult for non-technical teams to adopt. This complexity leaves many overwhelmed and paralyzed with existing data.

Today, businesses are drowning in data. The challenge is not just collecting data, but managing, interpreting, and presenting it in a way that drives action. While 5% of people remember a statistic, 63% recall a story<sup>2</sup>—emphasizing some of the limitations of traditional BI. AI has become a game changer for this challenge, by automating the identification of key metrics, patterns, and anomalies<sup>3</sup>. AI can now transform raw data into tailored narratives, addressing the specific needs of decision-makers. It drives focus on the most relevant insights by reducing data noise. It can also eliminate the need for

manual and time-consuming sorting by leveraging advanced algorithms to automatically rank and filter key metrics, while generating real-time previews of high-impact insights for decision-makers.

AI can also enable real-time, cross-business collaboration by breaking down data silos. This can better align cross functional teams around key insights and accelerate decision-making. Furthermore, personalized data storytelling ensures insights are scalable and relevant to both technical and non-technical users, empowering organizations to make more data-driven decisions.

Now, with Gen AI, organizations are taking storytelling even further. Gen AI introduces more advanced capabilities, such as:

**Automated Data Access:** Gen AI uses Natural Language Processing (NLP)-powered chatbots, allowing non-technical users to interact with data and derive instant insights without manual analysis. *Example: In retail, store managers can use GenAI to query inventory and sales data directly, while in finance, analysts can ask for real-time market trends and receive fully formatted reports.*

**Real-Time Insights:** Gen AI can process live data streams, offering real time insights into performance and trends. *Example: In manufacturing, Gen AI can immediately detect production bottlenecks, while in healthcare, it allows for real-time monitoring of patient data.*

**Predictive Insights:** Gen AI unlocks proactive decision making by more accurately predicting trends and behaviors. It processes vast amounts of data, learns continuously, and reduces biases and errors. *Example: In retail, Gen AI can forecast customer demand to optimize inventory, whereas in banking, it can predict fraud or market movements.*

**Hyper-Personalized Insights:** Gen AI tailors insights to specific users, teams, and customers, enabling more actionable outcomes. *Example: In marketing, Gen AI can deliver targeted campaign performance reports, while in operations, it can provide personalized efficiency metrics to different teams.*

Gartner had previously predicted that by 2025, 75% of data stories<sup>4</sup> would be automatically generated using augmented intelligence and machine learning. With Gen AI, this growth has accelerated, further expanding AI-driven storytelling across organizations. Gen AI empowers businesses to make faster, more precise decisions and has fueled the ‘democratization’ of data across the organization. More teams are empowered to engage in better data storytelling given the easier to use tools and improved capabilities at their disposal. Extending access to a broader audience has in turn democratized decision making across the organization, given more business users now have real time access to data and insights that drive better business outcomes. These developments have helped organizations fuel a more data-first culture that is becoming an important differentiator in today’s fast-paced marketplace<sup>5</sup>.

## Framework for AI-Driven Data Storytelling

AI-driven data storytelling follows five key phases: **strategic planning, data acquisition and preparation, insights generation, visualization and narration, and monitoring and evaluation**. In the strategic planning phase, end users define clear business objectives and establish the necessary infrastructure to meet these goals. This involves aligning with stakeholders on strategic outputs and building the technical framework (including data pipelines, AI model architectures, and scalable analytics platforms) in support of these objectives. The focus of the data acquisition and preparation phase is on evaluating data sources, flow, and readiness for AI-driven insights. This includes the identification of dark data—untapped information with potential value.

While manual and automated processes exist, optimizing these with automated data hygiene and prioritizing high-value data tables is crucial. Enhancing data pipelines ensures seamless integration and prepares data for advanced analytics, reducing manual effort and accelerating insights of AI-driven storytelling. During the insights generation phase, advanced analytics and AI models process data to identify patterns and trends. SME involvement ensures outputs are relevant and aligned with business objectives. Then real-time visualization tools and narrative generation systems convert these insights into actionable formats. Finally, continuous model monitoring, with automated feedback loops and performance evaluation, ensures model accuracy and adaptability to shifting business dynamics.

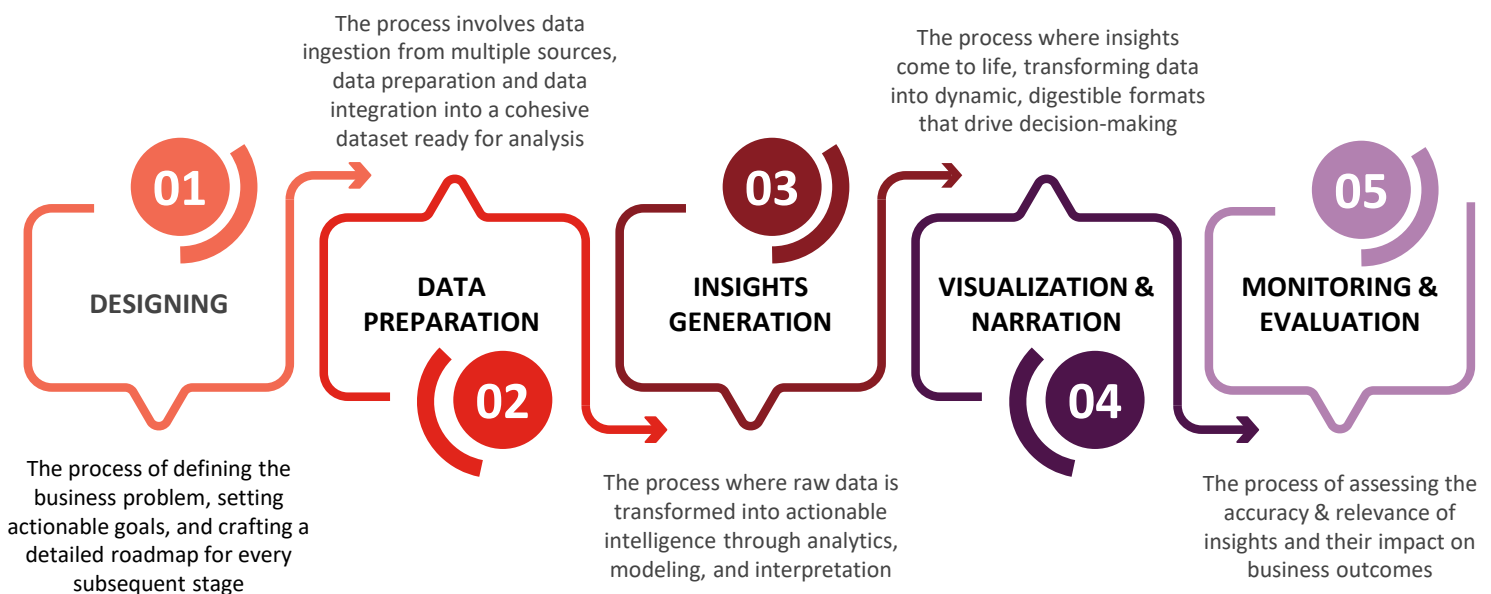


Figure 1: Five Key Phases of Data Storytelling

## Strategic Planning Phase

This phase provides the strategic foundation for AI-driven data storytelling, where end users define clear business objectives and establish the necessary technical infrastructure to meet these goals. This includes aligning stakeholders on strategic outputs and setting up a robust technical framework that will support data flow, insights generation, and scalability. Key components of this phase include designing the data pipelines, AI model architectures, and scalable analytics platforms that will handle the incoming data and ensure seamless integration with business objectives.

At this stage, ITDMs should focus on architecting the systems needed for advanced analytics and ensuring that the infrastructure can support real-time data processing and insights delivery. Technical teams work with business leaders to define the business problem, map out the required data sources, and ensure the infrastructure is scalable to support evolving business needs. Best-in-class teams set clear goals and establish hypotheses linked to business outcomes, ensuring the data storytelling framework is purpose-driven. Building

this framework requires thoughtful planning of how data will flow through the system.

Teams that bypass or rush through this phase often face issues related to both alignment and technical implementation. Common challenges include in the strategic planning phase include:

- 1. Lack of Business and Technical Integration:** Insufficient integration between business leaders and technical teams leads to misaligned technical frameworks (e.g., data pipelines, AI models) that fail to meet business objectives or deliver actionable insights.
- 2. Unclear Solutioning:** Failure to clearly define the business problem and identify the necessary data sources can lead to the development of data pipelines and models that are not optimized for relevant insights, delaying action.

**3. Inconsistent Data Governance:**  
Lack of a unified data governance framework can result in inconsistent data quality, security, and compliance, and lead to fragmented strategies and unreliable insights.

**4. Scalability and Infrastructure Gaps:** Poorly planned technical architecture, such as data pipelines that can't scale or AI models that can't handle increasing data loads, may cause bottlenecks, reduce system performance, or prevent real-time insights generation.

The figure below outlines key technical strategies to address these four challenges and highlights the unique advantages of each solution. Implementing these strategies requires careful prioritization to determine which areas to tackle first and which processes should be automated for maximum efficiency.

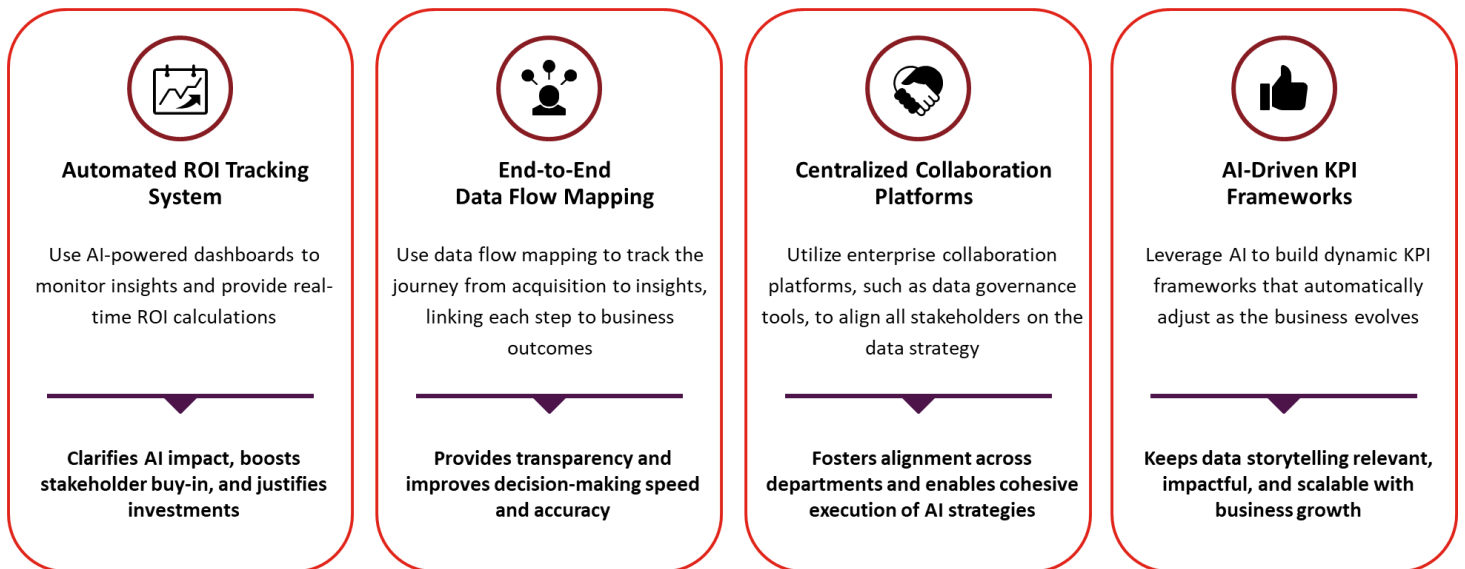
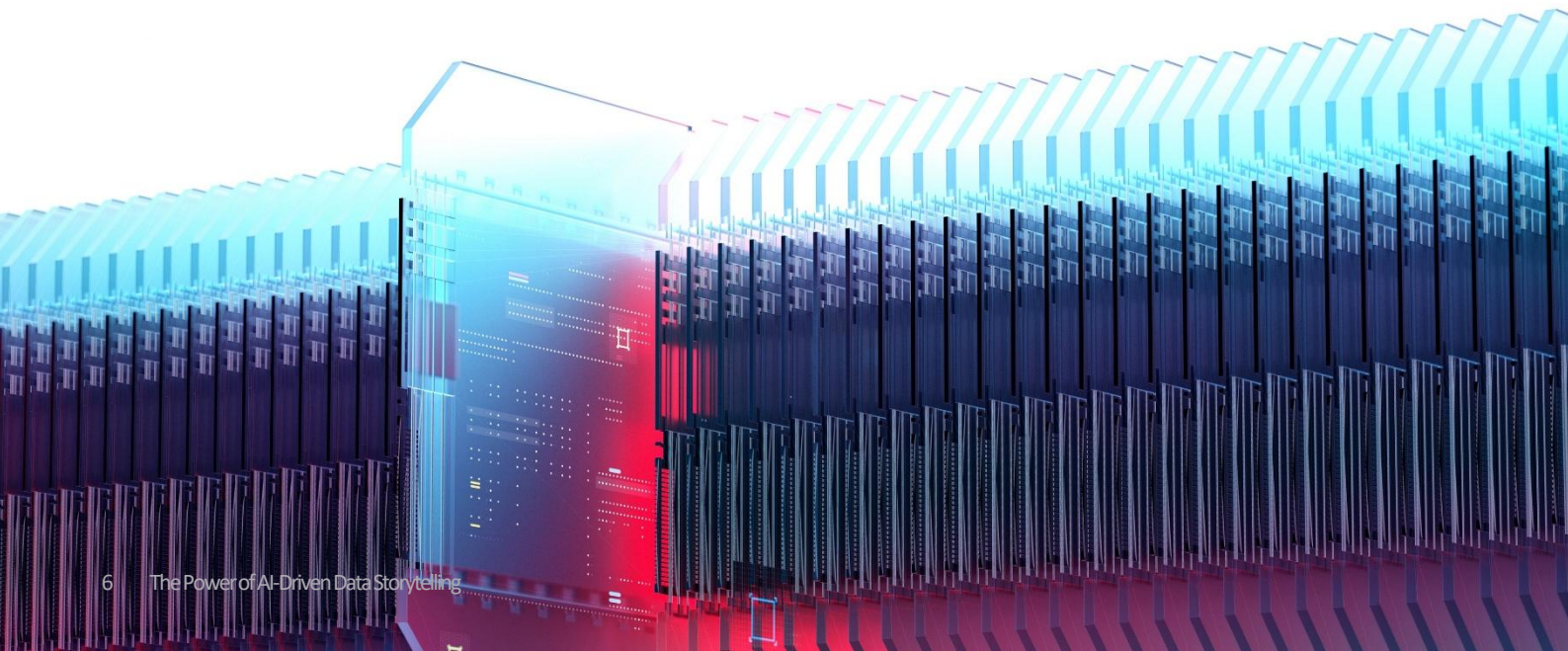


Figure 2: Technical tips to streamline the Strategic Planning Phase



## Data Acquisition and Preparation

Data acquisition and preparation are essential steps in transforming raw data into actionable insights for AI-driven storytelling. This process focuses on evaluating the readiness of data sources, optimizing data flow, and identifying untapped "dark data" with potential value. It includes data acquisition, data preparation, and data integration.

The process starts with ingesting data from multiple sources—structured, semi-structured, and unstructured—while assessing data quality and identifying high-value data tables for prioritization. Data is then cleansed, transformed, and normalized to ensure consistency and accuracy. Automated data hygiene processes play a crucial role in reducing manual effort and improving data quality. Finally, data integration consolidates information from various systems into a cohesive, unified dataset ready for advanced analytics.

Distributed Extract, Transform, Load (ETL) frameworks facilitate high-volume data ingestion, transformation, and loading across cloud environments, ensuring data is ready for real-time analytics.

These frameworks are essential for handling large-scale, heterogeneous data sources while maintaining data consistency and integrity across distributed systems. Cloud-native data lakes provide scalable storage and processing capabilities, while AI-powered tools such as those for automated data quality checks and anomaly detection, streamline data validation. Streaming platforms like Kafka or Apache Flink enable real-time data ingestion and processing, ensuring the timely delivery of insights. However, even with a robust infrastructure in place, several technical challenges can emerge.

**Data Quality Issues:** Poor data quality leads to flawed insights. Inconsistent, incomplete, or inaccurate data requires extensive cleansing and normalization, delaying analysis and producing unreliable results. Metadata tagging, where data attributes are labeled or categorized differently across systems, make it difficult to maintain uniformity, which complicates data organization and retrieval. Without data lineage tracking, it becomes challenging to ensure accuracy over time and makes error correction difficult. Many organizations also lack standardized data definitions, dictionaries, or schemas, which further degrades data quality.

- 1. Data Pre-Processing Challenges:** Pre-processing diverse data formats—structured, semi-structured, and unstructured—is resource-intensive. Large datasets often contain noise or errors driven by inconsistent data entry, incomplete records, or system integration issues. Converting between formats, especially when legacy systems are involved, adds complexity, making the preparation process prone to inefficiencies and delays in generating insights.
- 2. Data Curation and Integration Challenges:** Merging data from various sources, such as databases, APIs, and external services, requires precise metadata management for consistency. Achieving real-time

data integration with low-latency processing is difficult at scale. Managing diverse data sources and ensuring schema consistency across systems complicates unifying data for AI-driven analytics.

- 3. PII Exclusion and Data Privacy:** Ensuring PII is excluded or anonymized during data preparation is critical for compliance with privacy regulations. Failure to do so can result in breaches and penalties, making automated masking and anonymization essential.

The figure below outlines key technical strategies to address these four challenges and highlights the unique advantages of each solution.

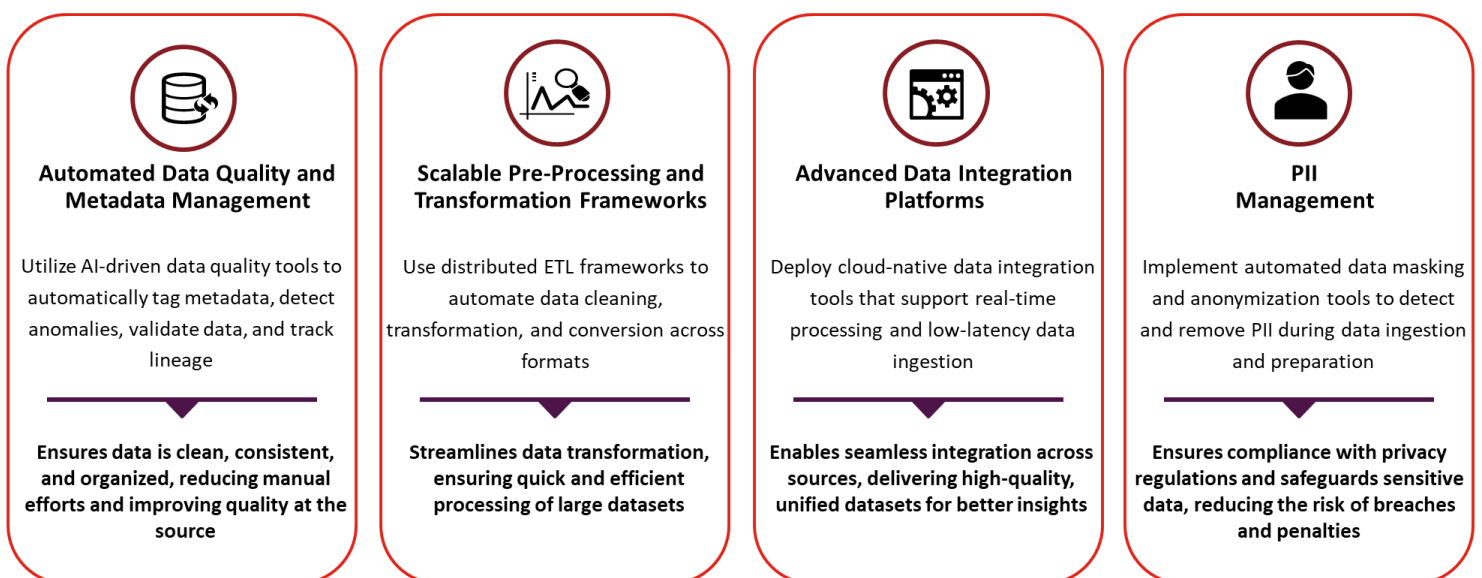


Figure 3: Technical tips to streamline the Data Acquisition and Preparation Phase



## Insights Generation

Insights generation remains central to data storytelling, where raw data is transformed into actionable insights with advanced analytics, machine learning models, and statistical techniques. Historically, this process has relied heavily on data scientists for tasks like feature engineering, hyperparameter tuning, and model iteration to ensure alignment with business goals. However, with the advent of more sophisticated AI and automation tools, such as AutoML platforms and no-code AI tools, this process is becoming increasingly accessible to non-technical users.

For example, AutoML platforms can automate model selection and hyperparameter optimization, while no-code tools like visual AI builders enable business teams to create and train models through intuitive interfaces without deep technical expertise. This shift allows AI systems to autonomously detect trends, patterns, and anomalies, and translate these into insights without the traditional bottlenecks of manual fine-tuning and oversight.

Operational challenges can limit an organization's ability to generate accurate, timely, and actionable insights:

- 1. Model Development and Fine-Tuning:** Building and refining machine learning models, including feature engineering and parameter tuning, remains a manual and resource-intensive task. Despite advances in AI-driven automation, these adjustments still slow down insights generation, creating bottlenecks in the process.
- 2. Scalability Bottlenecks:** As data volumes increase, scaling insights generation becomes a challenge, causing performance bottlenecks and delayed decision-making.
- 3. Trustworthy Insights:** Non-technical users may struggle to trust AI-generated insights if the underlying data and models are not transparent or well-understood.
- 4. Delayed Insights:** Many organizations face latency in delivering insights due to inefficient data pipelines or processing bottlenecks, limiting their ability to respond quickly as the market moves.



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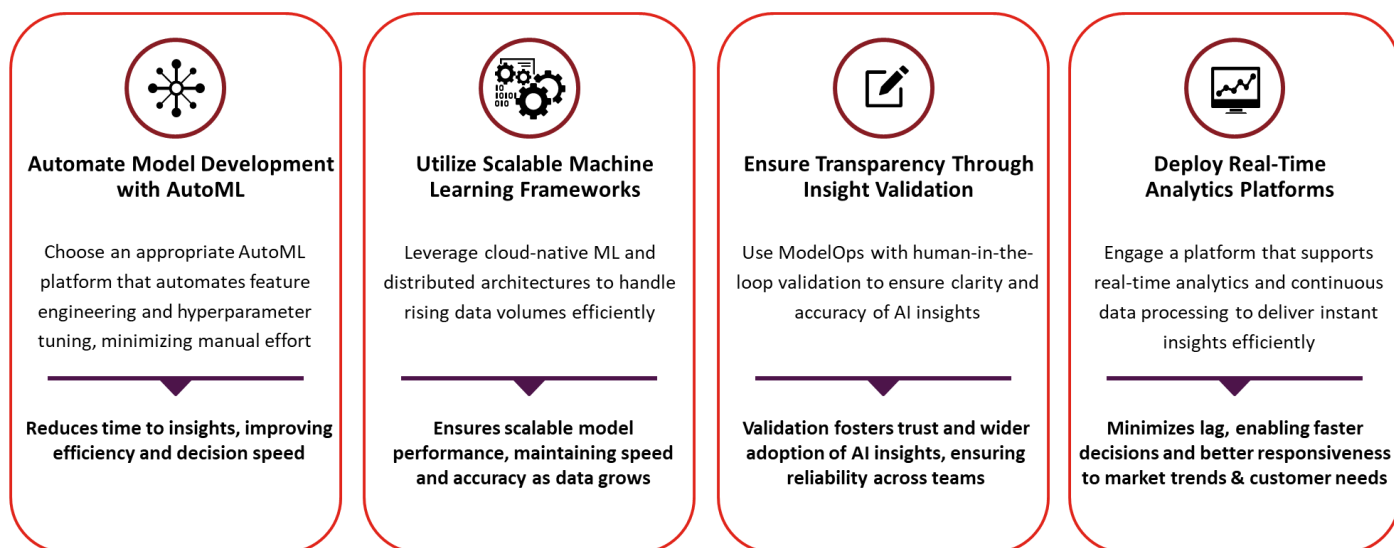


Figure 4: Technical tips to streamline the Insights Phase

## Visualization and Narration

The Visualization and Narration phase brings insights to life, as data is transformed into dynamic and digestible formats that better engage audiences and drive decision-making. This phase involves creating visualizations—from basic charts to interactive

dashboards—and using Natural Language Generation (NLG) to contextualize insights with relevant storytelling. This helps both technical and non-technical audiences interpret insights more quickly.

Building a strong technical foundation is crucial for scaling these capabilities. Organizations

need to determine whether to build custom solutions in-house, buy off-the-shelf tools, or adopt a hybrid approach. Building provides full control and customization but requires substantial time and resources. Buying offers rapid deployment and ready-made features but may limit flexibility. A hybrid approach, combining custom-built components with pre-built platforms, can offer the best of both worlds—providing tailored solutions while maintaining efficiency and scalability. The right approach depends on an organization's goals, technical expertise, and available resources.

Many organizations still face challenges in scaling and adopting these technologies. Common barriers include:

**1. Adoption Resistance:** Teams may resist new tools due to unfamiliarity, lack of confidence in their capabilities, or a preference for traditional reporting methods

**2. Customization Constraints:** Some platforms offer limited customization, making it difficult to tailor dashboards to specific business needs. This leads to static, or generic outputs.

**3. Data Privacy and Governance:** As visualizations become more interactive and data rich, maintaining compliance with privacy regulations and governance standards becomes more challenging.

**4. Performance Bottlenecks:** Larger datasets and complex visualizations can strain real-time rendering, especially with high-resolution, GPU-heavy tasks.

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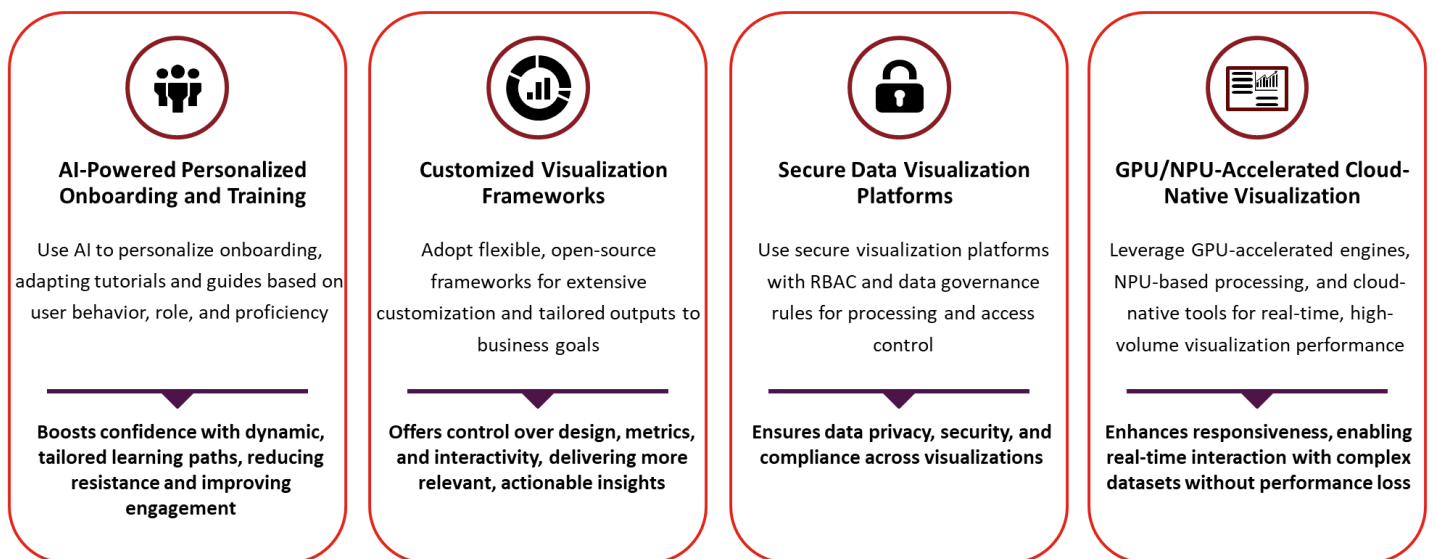


Figure 5: Technical tips to streamline the Visualization and Narration Phase

## Monitoring and Evaluation

Monitoring and Evaluation is the final stage in the AI-driven data storytelling framework. After generating and visualizing insights, organizations must continuously assess their accuracy, relevance, and impact. This phase tracks data sources and model performance to ensure generated insights align with evolving business goals. Real-time monitoring and feedback loops help gauge insight effectiveness. Ongoing insight evaluation ensures data-driven decisions are driving measurable business impact.

However, organizations can encounter several challenges in this phase:

### 1. Model Drift and Performance

**Degradation:** Over time, models can lose predictive power and generate inaccurate insights due to changing data. While oversight is necessary, many monitoring mechanisms can be automated to maintain model effectiveness.

- 2. ROI Measurement:** Quantifying the ROI of AI-driven insights is challenging, especially when considering the downstream impacts of predictive ROI, such as resource allocation and business decisions. Without clear metrics and ROI, ongoing investment in AI data storytelling capabilities can be hindered.
- 3. Scaled Model Monitoring:** As AI efforts scale, monitoring multiple models across teams and business functions becomes complex and resource intensive.
- 4. Limited Automation:** Manual evaluation of insights is slow and inefficient, particularly in dynamic environments where data and other inputs change frequently. Limited automation in these processes can further delay decision-making.



The following figure outlines key technical strategies to address these four challenges and highlights the unique advantages of each solution.

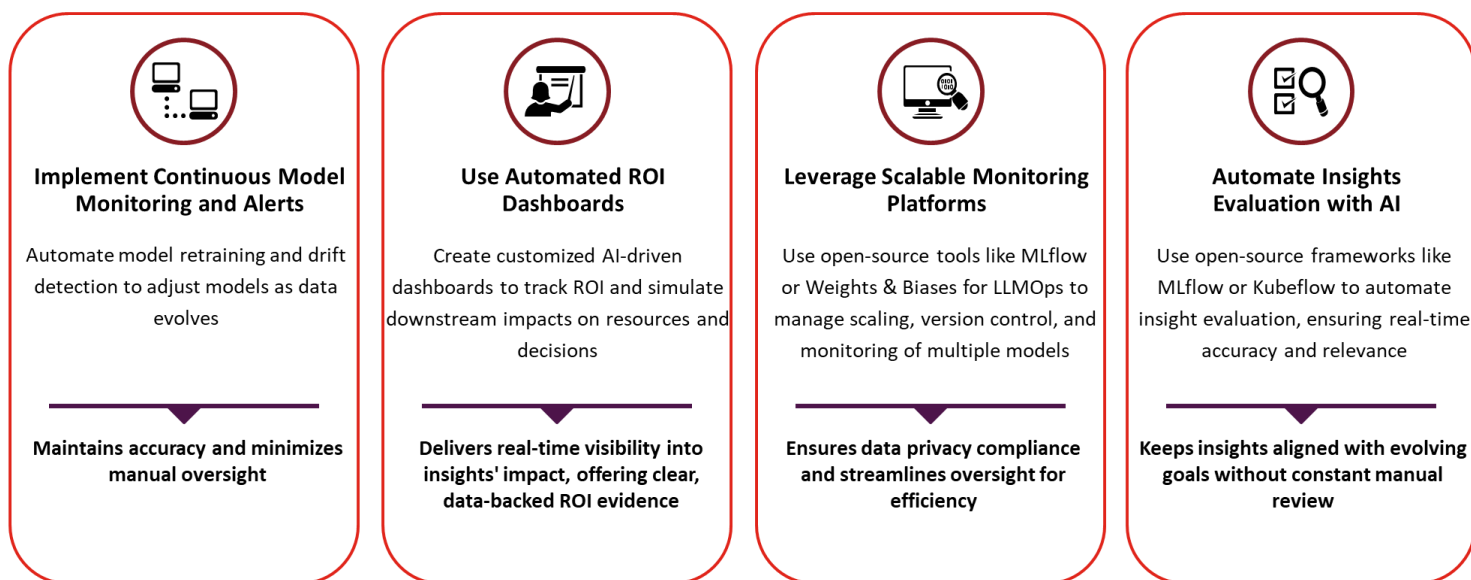


Figure 6: Technical tips to streamline the Monitoring & Evaluation Phase

*“The five phases of the AI-driven data storytelling framework provide an end-to-end structure to more effectively unlock data driven insights. By tackling this end-to-end process holistically, ITDMs will be better positioned to scale the deployment and democratization of AI driven storytelling across their organizations.”*

## Considerations for Embedding and Scaling AI-Driven Data Storytelling Across the Organization

To better scale AI-driven data storytelling, ITDMs should prioritize strong technical foundations and scalable architectures aligned with business objectives. This requires building with transparency and ensuring systems can adapt to growing data demands. Some key considerations include:

- 1. Foster Trust:** Building trust in AI storytelling fuels adoption. By making AI-generated insights transparent (i.e., explaining inputs and processes, clearly indicating what is and is not AI generated, etc.), stakeholders can better understand how insights are derived and their resulting impact on business decisions. Ensuring human oversight also reinforces trust and helps mitigate common AI misconceptions, making stakeholders more comfortable with AI outputs.
- 2. Scale Securely with Hybrid:** As AI models, especially Gen AI, require vast datasets to generate value-add insights, Hybrid AI can better manage these volumes by distributing processing between cloud and edge environments.

As data privacy is critical—ITDMs must integrate security controls like encryption and tokenization to ensure compliance with regulations (GDPR, HIPAA) while maintaining a robust data governance framework.

- 3. Manage Continuous Learning:** AI-driven insights require ongoing refinement. MLOps pipelines automate model updates and retraining, ensuring AI adapts to changing data environments. This continuous learning enhances insights and scalability, reducing the need for manual intervention. In dynamic industries like finance and healthcare, MLOps ensures models stay relevant and deliver long-term value.
- 4. Deploy AI Agents for Task Automation:** Introducing smaller, task-specific agents can streamline one-off processes within the AI-driven data storytelling framework. These agents automate specific tasks, reducing the need for human intervention and lowering operational costs. By offloading smaller, repetitive tasks to agents, organizations can optimize performance without adding unnecessary complexity.

**5. Democratize Engagement:** AI-driven insights need to be tailored for different business functions and teams. ITDMS should explore how to engage stakeholders in both the process of creating AI-driven insights and in the consumption of outputs. Low-code/no-code platforms democratize data storytelling, allowing users to create custom dashboards without technical expertise. GPU-accelerated rendering can support real-time visualizations that more effectively draw in stakeholders. AR/VR offers immersive data experiences, transforming how teams can interact with insights.

**6. Monitor Relevance with Human in the Loop:** To ensure AI-driven insights remain valuable, continuous monitoring is enhanced with Human-in-the-Loop (HITL) frameworks. Maintaining a human in the loop ensures insights align with strategic goals, mitigates biases, and facilitates real time pivots.

Embedding these six tactics into the AI-driven data storytelling process can help organizations overcome common barriers and fuel business outcomes.



Figure 7: Scaling value with AI-driven data storytelling

## Accelerating Path to Value with AI-driven Data Storytelling – Illustrative Use Cases

AI-driven data storytelling has direct applicability across functions. The illustrative examples below bring to life how AI-driven data storytelling can accelerate value realization beyond traditional BI.

Function	AI-Driven Storytelling Advantage
<p><b><u>Marketing - Personalized Campaign Optimization for E-commerce</u></b></p> <p>An e-commerce company uses traditional BI dashboards to monitor campaign performance metrics like click-through rates and conversions. These dashboards provide historical data but lack real-time insights into customer behavior, leaving the marketing team unable to make quick adjustments.</p>	<p>Using Gen AI, the marketing team receives real-time updates on campaign performance with personalized insights into customer preferences and purchasing behaviors. For example, the AI model identifies that a specific customer segment responds better to ads featuring product bundles. The system automatically recommends shifting ad spend to target this segment and explains how this adjustment could boost conversions. As a result, the team optimizes ad targeting in real time, improving campaign ROI within a week.</p>
<p><b><u>Operations - Proactive Supply Chain Optimization for a Global Manufacturer</u></b></p> <p>A global manufacturer relies on traditional BI dashboards to track supply chain metrics like inventory levels, supplier performance, and shipping delays. These reports are generated weekly, making it hard for the operations team to react quickly to unexpected disruptions.</p>	<p>With Gen AI, the manufacturer’s operations team can access real-time insights into supply chain risks. For instance, the AI model detects early warning signs of delays from a key supplier and recommends switching to an alternative supplier while recalculating the potential cost and impact on delivery timelines. It then explains the cost-benefit analysis, allowing the team to act faster. By implementing this change, the company avoids production delays and recovers potential lost revenue.</p>



Function	AI-Driven Storytelling Advantage
<p><b><u>Finance - Predictive Financial Planning for a Retail Chain</u></b></p> <p>A retail chain uses BI dashboards to monitor monthly revenue and expenses. The finance team gets a static view of past performance but lacks forward-looking insights to prepare for future financial risks or opportunities.</p>	<p>By integrating Gen AI into financial planning, the finance team receives predictive insights that flag potential cash flow issues for the next quarter. For example, the AI model identifies a downward trend in customer foot traffic and correlates this insight with external factors like rising inflation. The AI suggests revising budgets and recommends reallocating resources to online channels, where traffic is expected to grow. As a result, the company proactively adjusts its financial strategy, avoiding a projected decline in revenue and positioning itself to capitalize on e-commerce growth.</p>
<p><b><u>IT Contact Center Support - Optimizing Ticket Resolution for a Global Enterprise</u></b></p> <p>An IT contact center handles thousands of support tickets each day. Traditional BI dashboards track resolution times and the number of open tickets but offer limited insights into patterns and recurring issues. As a result, agents often struggle to prioritize tickets effectively, leading to a growing backlog.</p>	<p>With Gen AI, the IT support team receives real-time insights on ticket trends. The AI model analyzes call logs and chat transcripts, identifying recurring issues and clustering them for faster resolution. Predictive models anticipate which problems will recur, allowing agents to proactively address these issues before they pile up. Real-time dashboards monitor critical KPIs such as agent performance and average resolution time, while Natural Language Generation (NLG) automates performance summaries for stakeholders. This enables quicker issue escalation and better resource allocation, leading to a reduction in ticket backlog within a month.</p>
<p><b><u>IT Knowledge Base/Support Article Creation - Automating IT Documentation for a Tech Firm</u></b></p> <p>For a global enterprise, maintaining an up-to-date knowledge base is a tedious task. Traditional BI dashboards provide static views of support article usage but lack the ability to highlight gaps or identify which issues need new documentation. This manual process leads to outdated content and inefficient support coverage.</p>	<p>By leveraging Gen AI, the global enterprise automates the creation and ongoing refresh of its knowledge base. The AI analyzes historical support tickets, troubleshooting logs, and common workflows to recommend new support articles. Machine learning identifies frequently asked questions, while NLG automatically generates detailed, searchable support articles. Real-time dashboards track usage metrics, identifying gaps in the knowledge base and ensuring that content remains relevant. This automation reduces the manual workload and ensures that support articles are always up to date, improving the overall support experience.</p>

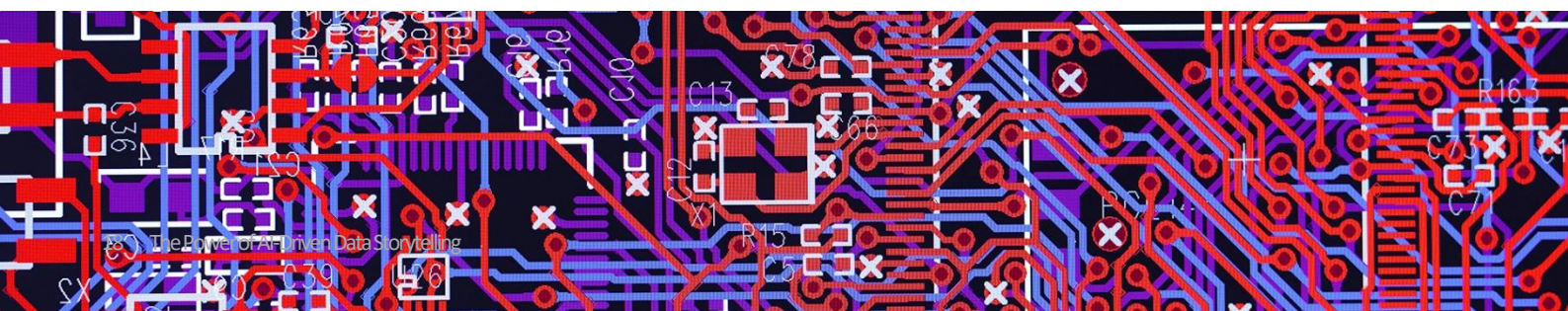
## A Glimpse into the Future of AI-driven Data Storytelling

As AI-driven data storytelling evolves, the possibilities for deeper integration and enhanced capabilities continue to expand.

- **Systems Integration** - Future advancements in systems integration will enable more seamless connections between AI models and business workflows. This will drive real-time insights across increasingly complex ecosystems and make AI-driven storytelling even more responsive to business needs.
- **Immersive Visualization** - Emerging technologies such as Augmented Reality (AR) and Virtual Reality (VR) will transform how insights are visualized. These immersive technologies will offer interactive storytelling experiences, allowing users to engage with data in entirely new ways.
- **Hyper-Personalized Insights** - GenAI will continue to automate complex data narratives, translating a single dataset into multiple customized outputs across end-user roles or preferences.

- **Transparency** - As AI becomes more embedded in storytelling, ensuring transparency in how AI models generate insights is essential. Explainable AI (XAI) frameworks will help demystify AI processes, making it clear to users how conclusions are reached and minimizing the risk of bias in hyper-personalized outputs.
- **Data Privacy and Governance** - With increased data volumes and personalization, maintaining data privacy and governance standards will be critical. Technologies like encryption, tokenization, and role-based access control will need to be integrated to ensure regulatory compliance.
- **Quantum Computing** - Breakthroughs in Quantum computing will revolutionize large dataset processing and unlock real-time storytelling at an unprecedented scale.

As these technologies converge, they will redefine the art of the possible in data storytelling, making it an even more powerful differentiator for businesses.





## The Power of AI Driven Data Storytelling

Given the rapid pace of these advancements, it is critical for organizations to take advantage of capabilities today, so that they are well positioned for this exciting future.

### References

<sup>1</sup>[IDC: Half of Asia's Top Firms to Embrace AI-Driven Headless BI and Analytics by 2026](#)

<sup>2</sup>[AdaptWorldwide: Data Storytelling](#)

<sup>3</sup>[TechTarget: Turning data into actionable insights with machine learning](#)

<sup>4</sup>[Gartner Predicts Data Storytelling Will Dominate BI By 2025](#)

<sup>5</sup>[Forrester: Generative AI Trends For Business: Why, When, And Where To Begin](#)

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