Hype Cycle for Data and Analytics Governance and Master Data Management, 2021

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Initiatives: Data and Analytics Strategies

Data and analytics leaders must be able to evaluate and select the right decision and trust frameworks to drive organizational change and deliver business value. This report identifies the latest trends and innovations driving data and analytics governance and master data management.

Additional Perspectives

- Summary Translation: Hype Cycle for Data and Analytics Governance and Master Data Management, 2021
  (06 August 2021)

Strategic Planning Assumptions

Through 2025, 80% of organizations seeking to scale digital business will fail because they do not take a modern approach to data and analytics governance.

By 2024, 30% of organizations will invest in data and analytics governance platforms, thus increasing the business impact of trusted insights and new efficiencies.

By 2024, 75% of organizations will have deployed multiple data hubs to drive mission-critical data and analytics sharing and governance.

Analysis

What You Need to Know

Data and analytics leaders are faced with strategic business requirements on the one hand and increasingly distributed data and analytics initiatives on the other. Combined with disconnected business processes and data silos, it is difficult to take strategic decisions based on trusted data, resulting in inflexibility, complexity and higher business cost. As a result, the level of interest in data and analytics governance and MDM among data and analytics leaders is higher than ever, as new ways to exploit and refocus data and analytics are explored.

Adopting the right governance disciplines and technologies allows data and analytics leaders to better realize business value from data, analytics and business applications across the ecosystem. The scope of governed data and analytics can therefore span across the ecosystem and include enterprise applications, data lakes, analytics, content and AI. In this context, MDM enables a consistent, cross-organizational understanding of key master data.

There are additional Hype Cycles for 2021 that will help data and analytics (D&A) leaders to form a holistic view of D&A:

- Hype Cycle for Analytics and Business Intelligence, 2021
- Hype Cycle for Data Security, 2021
- Hype Cycle for Privacy, 2021
- Hype Cycle for Artificial Intelligence, 2021
- Hype Cycle for Enterprise Information Management, 2021
- Hype Cycle for Natural Language Technologies, 2021
- Hype Cycle for Data Management, 2021

The Hype Cycle

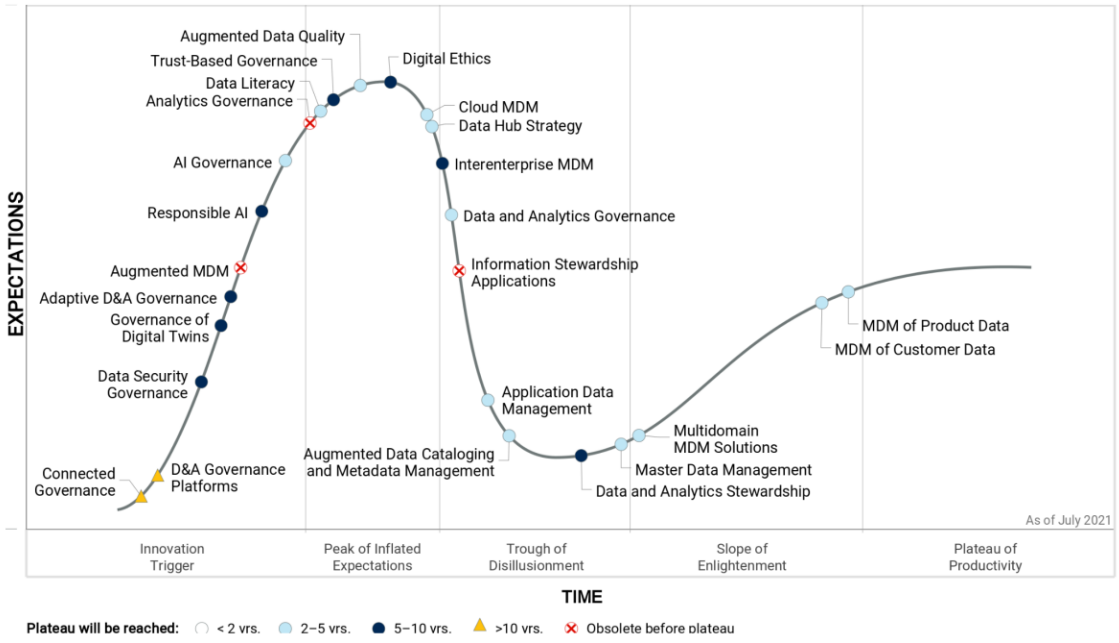
Data and analytics leaders recognize there is no shortage of digital business technologies but struggle to leverage their value to meet business expectations. That's because internal business practices (such as governance and MDM) are often inadequate, rendering even the best technology solutions worthless.

The overall level of market interest in innovations relating to data and analytics governance and MDM has increased. Over the past year, Gartner-client inquiry volume for data and analytics governance has risen over 40%, and MDM client-call volume has risen by 28%.

Hype and interest around some of the innovation profiles (IPs) in this Hype Cycle are growing at a fast rate, often manifested by vendor investment in enhanced functional capabilities. For example, multidomain MDM is now the most common MDM implementation approach, as its capabilities are exploited to deliver greater business value. Enhanced data sharing across organizations supports business scale and operational efficiencies, enabled by interenterprise MDM technologies. Augmented data catalogs and metadata management solutions are no longer perceived as just IT tools, rather as offering augmented and governed support for collaborative data and analytics activities in organizations. Furthermore, we are seeing innovations in technologies converge with functional capabilities that support specific organizational roles in the enterprise, such as data steward, data scientist and governance board member, in the creation of a new D&A governance platform.

As organizations turn to new practices, disciplines, and technologies for data and analytics governance and MDM, an expectation of “hype” is created: that adopting these will somehow address *all* their challenges. The growing recognition that data and analytics governance is complex, organizationally challenging and politically sensitive leads the overall hype for data and analytics governance to slowly descend on the Hype Cycle. However, for MDM, as the disciplines needed finally catch up with the technologies offered, we see its gradual progress toward productivity.

Figure 1: Hype Cycle for Data and Analytics Governance and Master Data Management, 2021



Source: Gartner (July 2021)

Downloadable graphic: Hype Cycle for Data and Analytics Governance and Master Data Management, 2021

The Priority Matrix

Data and analytics governance and MDM aim to increase the business value of data and analytic assets through better oversight, accountability and decision rights. By doing so, improved efficiency and productivity of established business processes can be realized, supporting business growth. Hype around technology always promises that technology alone will fix this problem, and that is never true. Investment decisions must be made in the context of information maturity and organizational culture.

Focus on the elements projected to reach the plateau of productivity within two to five years. Pay particular attention to IPs: interenterprise MDM, augmented data cataloging and metadata management solutions, data and analytics governance, and augmented data quality. More complex innovations, such as adaptive D&A governance and D&A governance platforms, also hold the promise of high benefit to organizations, albeit on a longer time horizon. Organizations seeking competitive advantage through data and analytics governance and MDM should begin to actively investigate and assess these innovations for integration into their business value chains.

Table 1: Priority Matrix for Data and Analytics Governance and Master Data Management, 2021

(Enlarged table in Appendix)

Benefit	Years to Mainstream Adoption			
	Less Than 2 Years	2 - 5 Years	5 - 10 Years	More Than 10 Years
Transformational			Adaptive D&A Governance Data Security Governance Responsible AI	
High		AI Governance Augmented Data Cataloging and Metadata Management Augmented Data Quality Data and Analytics Governance Data Hub Strategy Data Literacy Master Data Management MDM of Customer Data MDM of Product Data Multidomain MDM Solutions	Data and Analytics Stewardship Digital Ethics Interenterprise MDM Trust-Based Governance	Connected Governance D&A Governance Platforms
Moderate		Application Data Management Cloud MDM	Governance of Digital Twins	
Low				

Source: Gartner (July 2021)

Off the Hype Cycle

- Business Continuity for Data and Analytics — Despite the initial hype seen at the beginning of the COVID-19 pandemic, this has been incorporated within broader organizational business continuity strategies, rather than something distinct within data and analytics.
- Data Catalog — This has now been incorporated within metadata management solutions, and we see a consolidated innovation profile on this Hype Cycle as a result.
- Digital Twin — A new innovation profile, governance of digital twins, has emerged to reflect the rising market interest in the need for better governance of digital twins to realize business value.
- FinDRA — We have seen the hype for financial data risk assessment drop over the past year. In the context of data and analytics governance and MDM, FinDRA has not featured as much in our client inquiries and engagements.
- 360-Degree View — Though of continuing importance in the context of data management, this is less hyped as a discipline of data and analytics governance and MDM.

On the Rise

Connected Governance

Analysis By: Saul Judah, Malcolm Murray, Andrew White

Benefit Rating: High

Market Penetration: Less than 1% of target audience

Maturity: Embryonic

Definition

Connected governance is a framework for establishing a virtual governance layer across organizations and business functions, spanning one or several legal entities and multiple geographies, to achieve cross-enterprise business outcomes. By connecting existing governance bodies within and across enterprises, its component-based approach enables complex business challenges to be addressed without adding further layers of bureaucracy.

Why This Is Important

Governance bodies for enterprise functions such as HR, risk, and data and analytics are typically adequate for addressing their individual domain areas; however, cross-enterprise and interenterprise governance challenges are increasingly difficult to overcome. Rather than creating yet another permanent governance body, connected governance leverages existing governance bodies, and provides strategic oversight and accountability management across them through a virtual framework.

Business Impact

Senior business executives and board members in organizations spanning multiple legal entities and geographies will find value in exploring connected governance to address cross-enterprise strategic issues and opportunities, without setting up new governance boards. Organizations anticipating or undergoing M&As will also find value in connected governance, enabling risk management to be addressed earlier and allowing experimentation with governance bodies prior to their formal adoption.

Drivers

- The pace of digitalization is putting pressure on senior leaders across multiple business functions to respond to business demands at greater effectiveness and speed than they are able to with their existing capabilities. Existing governance bodies are designed to address their functional areas, but understanding accountability and decision rights across these proves very difficult. This is especially the case when some of the functional areas exist in different legal entities and different countries, and the same business asset is subject to potentially conflicting governance policies.
- While many responses to strategic, cross-enterprise business challenges have been to establish another layer of governance, this adds a greater overhead cost, creates another layer of bureaucracy and is often inflexible. Some strategic challenges (e.g., M&A and business model changes) require a one-off response for governance, and creation of additional governance layers in these circumstances is an excessive drain on executives' time, without accrued benefit.

Obstacles

- Connected governance expects to leverage existing governance bodies, but some of these governance bodies may operate poorly. As a result, the value that connected governance offers may be depleted in organizations that are not already mature in their governance.
- Siloed governance efforts might prevent the benefits of connected governance without disruptive organizational change. Either way, inertia and local success of siloed governance will slow down the adoption of connected governance.
- Once the board of directors or executive committee has approved the cross-governance initiative, an executive leader is expected to shape the cross-governance response. However, this requires support and facilitation from a strategic governance office, which may not yet have the skills needed.

User Recommendations

- Evaluate whether connected governance would be of value to your organization. If you operate in a complex environment, across multiple legal entities and geographies, there may be challenges that are currently difficult to address. In such situations, raise an agenda item at your executive committee to initiate a cost-benefit assessment and report its findings. If this is not the scenario in your organization, connected governance may not be relevant for you.

- Connected governance needs the support of a strategic, cross-enterprise governance. Analyze whether this needs a dedicated governance office, or if operating as a virtual governance office will be sufficient. If your strategic challenge is a one-off situation, or if you are trialing this as a new initiative, a virtual governance office may be sufficient for now. However, large enterprises operating in diverse and complex ecosystems and expecting to address many strategic scenarios may need to establish a dedicated strategic governance office to support connected governance.

Gartner Recommended Reading

Dynamic Risk Governance Works Better Than the 3 Lines of Defense Model

Executive Leadership: Strategic Risk Management Primer for 2021

How to Compose a Board of Directors for Strong Governance, Awareness and Success

D&A Governance Platforms

Analysis By: Guido De Simoni

Benefit Rating: High

Market Penetration: Less than 1% of target audience

Maturity: Embryonic

Definition

A data analytics governance platform represents a set of integrated technology capabilities that leverage automated data curation services (e.g., auto discovery, auto profile, auto data lineage, auto data quality analysis). It further exposes an extended user experience for decision management (including policy management) for all relevant participants (e.g., data steward, business analyst, LOB users, data scientist, and governance board members).

Why This Is Important

Modern D&A use cases need a portfolio of governance capabilities that cannot be fulfilled by existing, stand-alone products. This convergence is mandatory. Today the execution of data and analytics governance is inconsistent, with different organizations using different types of technology. This impedes the success of digital business initiatives. Governance needs have grown more diverse and complex; all aspects of governance for all types of policies can benefit from technology support.

Business Impact

- Emerging augmented data management services to match requirements across the enterprise data ecosystem.
- Analytics enablement for data at scale, critical and exposed linkages of data relationships, effective support of regulatory requirements.
- Enhanced productivity and efficiency in governance processes, more rigor in enforcement of policies, and therefore more control and trust in data and analytics.

Drivers

- Organizations want to have automated, synchronized, integrated, cost-effective and efficient solutions with a central design, yet a distributed deployment. This requirement is driven by the growing recognition that the work of data and analytics governance is different from the work of data management, but as such augmented data management supports the growth of these platforms of convergence.
- In particular, data and analytics governance, when implemented, provides a decision support system that leverages decision rights, accountabilities and behaviors for the valuation, creation, consumption and control of data and analytics.
- All these aspects are operationalized and more efficiency is gained when identification of data sources, curation of data, application of workflow, harmonization, and reporting and visualization are provided in a coherent platform and with automation. For example, you can address a platform auto generation of data quality rules from rule definitions and automated execution of data quality checks, AI-assisted data curation and association of business terms to technical artifacts, automated classification of sensitive data and build subject registry.

Obstacles

- The current convergence across data management may or may not satisfy what is needed by organizations across data and analytics governance.
- The data management platforms we are talking about today may be different to the platforms that will emerge for data and analytics governance, to service different uses and use cases (leveraging control, outcomes, agility and autonomy in the required combination).
- Other obstacles reside in the cultural shift that many organizations must address in leveraging the inherent value of data and analytics governance. Such obstacles can jeopardize the adoption of these platforms not as yet as another piece of technology but as enablers for continuous improvement when committing to data and analytics initiatives aligned to critical mission priorities. At the time of writing, we estimate this innovation to reach the Plateau of Productivity in more than 10 years.

User Recommendations

- Design proofs of concept that will capitalize on the required critical technology capabilities. Identify the relevance of these technologies and their connection to business outcomes as a first step. Then look into their ability to support specific use cases (such as, risk management and compliance).
- Minimize the number of tools and solutions deployed by analyzing your strategic approach to data and analytics governance and by using available market technology capabilities in end-to-end scenarios supported by emerging data and analytics governance platforms.

Sample Vendors

Alex Solutions; Collibra; Global Data Excellence; IBM; Informatica; OneTrust

Gartner Recommended Reading

Implement Your Data and Analytics Governance Through 5 Pragmatic Steps

The Role of Technology in Data and Analytics Governance Policy Management

Data Security Governance

Analysis By: Brian Lowans, Bart Willemsen, Joerg Fritsch, David Mahdi

Benefit Rating: Transformational

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Definition

Organisations face increasing challenges and associated business risks arising from security, data residency and privacy issues, as data is processed across ecosystems or shared with partners. Data security governance (DSG) enables the assessment and prioritization of business risks and allows organizations to establish a data security strategy that supports business outcomes.

Why This Is Important

While the opportunities to use data are growing, the associated business and financial risks are also growing. DSG offers a balanced approach to define how data can still be used to support business operations, while implementing appropriate data security and privacy controls to mitigate risks. Each dataset needs its own balance for business purposes, and different business and security risks.

Business Impact

DSG enables the assessment, prioritization and mitigation of business risks caused by security, privacy and other compliance incidents. But DSG requires cross-collaboration among chief information security officers (CISO), chief data officers (CDO) and business leaders to break down barriers of communication and contribute toward successful business outcomes. The rapid emergence of data protection and privacy laws also requires adequate privacy impact assessments are integrated through DSG.

Drivers

- It is essential to use DSG as a continuous process to manage data ownership and decision rights, assess and prioritize business risks and create focused data security policies that can mitigate those risks.
- DSG security policies are needed to guide the implementation of consistent security controls across a portfolio of datasets.
- There is a growing need to analyze each dataset in terms of privacy, confidentiality, integrity, availability, business purpose and lifetime issues to determine which user accounts should have certain access privileges.
- Organizations need to develop methods to create and orchestrate data security policies across multiple independent data security and IAM products to minimize data security policy gaps and inconsistencies.
- No single product will mitigate a business risk sufficiently which emphasizes the need for a centralised creation and coordination of data security policies.

Obstacles

- User accounts have a variety of roles and privileges across project teams, devices and IT devices and services.
- Data security and IAM products typically apply controls independently and do not integrate. IAM products control access to devices and processing environments but do not control access to data, while data security products operate on either unstructured or structured data and apply specific controls to specific environments.
- Each data security product will use a bespoke data identification and discovery technology which creates inconsistency when assessing security policies and data risks.
- There are huge challenges to identify, discover and establish data ownership and business access requirements for each dataset, due to the fragmented responsibilities of business, data and analytics, IT and security teams.
- DSG policies need to be applied manually to achieve consistent controls across the disparate products and will require a regular data risk assessment (DRA).

User Recommendations

- Use DSG to create and manage consistent data security policies across the portfolio of datasets according to the level of business risks defined.
- Use DSG to analyze business risks and their impacts due to specific security monetization choices using infonomics to evaluate the financial impacts on business outcomes.
- Use principles such as Gartner's financial data risk assessment (FinDRA) to establish prioritization of these security investment options.
- Cooperate and collaborate between the CDO and the CISO to reduce redundancy and waste in evaluating data management and security.
- Apply data security policies across all data security, IAM and application management products that interact with each dataset.

Gartner Recommended Reading

Use the Data Security Governance Framework to Balance Business Needs and Risks

A Data Risk Assessment Is the Foundation of Data Security Governance

Use Infonomics to Quantify Data Monetization Risks and Establish a Data Security Budget

Develop a Financial Risk Assessment for Data Using Infonomics

Governance of Digital Twins

Analysis By: Roger Williams, Alfonso Velosa, Marc Halpern

Benefit Rating: Moderate

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Definition

Governance of digital twins refers to the specification of decision rights and a framework to ensure that digital twins deliver their intended business benefits at an acceptable level of organizational costs and enterprise risks over the life cycle of the twin's physical world counterpart.

Why This Is Important

Digital twins can greatly reduce costs and risks of managing physical systems, but barriers to scaling them up operationally threaten the value organizations can achieve from them. Without effective governance, software engineering leaders (SWELs) risk inheriting a digital twin portfolio that is brittle, opaque and exposed. Thus, it is in the best interests of both the organization and the SWEL to address potential governance shortcomings proactively.

Business Impact

- Governance of digital twins is fundamental to realizing sustained value, as traditional project-based approaches will fail to sustain the value of digital twins across the long time spans that many of the items represent.
- Digital twins are poised to transform organizations by enabling new digital business models as well as updated existing models.
- Organizations that effectively govern digital twins will be best-positioned to maximize ROI.

Drivers

- No standards or common integration frameworks exist for digital twin data, models, analytics or security.
- Stakeholders from all business functions and across IT, operational technology (OT) and engineering technology (ET) seek significant, yet varied, benefits.
- The need for coordination between organizations on shared-data models adds another layer of complexity for composite and organizational digital twins.
- Competency in IT disciplines such as application portfolio management will be severely taxed because the number of digital twins will likely exceed the number of business applications by at least a factor of 10 (e.g., an organization with 100 business applications in its portfolio is likely within just a few years to have 1,000 digital twins).
- These factors threaten the scalability and value that organizations can realize from digital twins and related investments such as IoT.

Obstacles

When done well, governance is unobtrusive and can be easy to marginalize. When not done well, acute factors that lead to specific pain points often remain in focus, rather than chronic governance gaps such as:

- Unclear accountability for digital twin outcomes
- Ineffective stakeholder participation in defining desired digital twin outcomes and in digital twin project decision making activities
- Unpredictable identification, communication and action (e.g., causal analysis, course correction or project cancellation) regarding the business response to a deviation from expected performance
- Lack of transparency and reuse into decision mechanisms required to build collective trust in governance outcomes

User Recommendations

- **Accountability:** Create a charter for governing digital twins that emphasizes three primary roles — the executive sponsor, the program lead and the owner(s) of digital twins. Ensure steering committees and other governing bodies provide: accountability for outcomes; participation by appropriate stakeholders; predictability in how results are reported and acted upon; and transparency into digital twin performance and conformance.
- **Participation:** Define decision models that specify who (internally and externally) participates in decision phases (which digital twins to create, promotion of a digital twin to production, etc.)
- **Predictability:** Ensure that all stakeholders know what is required of them regarding digital twin management activities, how they will be informed of outcomes and what actions will be taken.
- **Transparency:** Validate that intentions, data quality, availability, timing and formats of digital twin information are available to stakeholders.

Sample Vendors

Bentley Systems; GE Digital; Mavim; Microsoft; Software AG

Gartner Recommended Reading

Strengthen 4 Elements for Successful Management and Governance of Digital Twins

Toolkit: Enterprise Readiness for Digital Twin Deployment

What Should I Do To Ensure Digital Twin Success?

What Data and Analytics Leaders Need to Know and Do About Digital Twins

Adaptive D&A Governance

Analysis By: Saul Judah

Benefit Rating: Transformational

Market Penetration: Less than 1% of target audience

Maturity: Emerging

Definition

Adaptive data and analytics (D&A) governance is an organizational capability that enables context-appropriate governance styles and mechanisms to be applied to different data and analytics scenarios in order to achieve desired business outcomes.

Why This Is Important

As organizations accelerate their digital business initiatives, ecosystems and platforms, their ability to deliver expected business value is limited by their current business practices — in particular, their governance of D&A assets. Despite greater diversity and complexity in business scenarios than ever before, D&A governance has typically continued to adopt a single, control-oriented approach, which is often unresponsive to business needs and leads to or reinforces data silos.

Business Impact

Adaptive D&A governance has the potential to be a transformational change agent for digital business. It enables application of different governance styles (control, outcome, agility and autonomous) to different D&A scenarios, depending on business context. This allows better enterprise collaboration in D&A initiatives, allowing the enterprise to respond faster to business opportunities and become more competitive, resilient and risk-aware.

Drivers

The hype relating to D&A governance has gradually increased over the past year, primarily due to the following factors:

- As organizations have largely addressed their more immediate needs to support a distributed workforce during the COVID-19 pandemic, their attention is again returning to the need for better accountability and a decision framework for D&A to drive organizational outcomes.
- Digital business demand has not only resumed but in some cases exceeded prepandemic levels (e.g., M&As), and D&A leaders are increasing their efforts to improve their governance practices to the levels of performance needed.
- Recognition by both vendors and organizational leaders that increased investment in infrastructure e.g., D&A platforms, cannot yield the ROI as expected, without corresponding improvement in D&A governance practices.

- Organizations maturing in D&A increasingly recognize the key role that business leaders play in driving their governance initiatives. Business demand for greater flexibility, agility, responsiveness and interconnectedness of D&A requires better governance practices than currently exist. This in turn is leading D&A leaders to explore adaptive D&A governance, as a response.

Obstacles

- In most organizations, maturity levels for D&A governance practices are lower than in other areas, such as data management and analytics. Governance is typically IT-oriented, center-out and control-oriented. Furthermore, current approaches resemble compliance rather than governance.
- Poor data literacy is prevalent in organizations. Business leaders often fail to understand or accept accountability for the information assets they create, instead expecting their data office (typically residing in IT) to 'sort out their data'. When data offices initiate governance initiatives, business leaders fail to engage effectively or at all.
- The COVID-19 pandemic has slowed down the adoption rate of D&A governance, with organizations changing focus to operational issues as a short-term response. However, as organizations have moved into recovery, the interest and hype for adaptive D&A governance is resuming due to its ability to promise flexible responses for changeable situations.

User Recommendations

- Use IT Score for D&A to evaluate your maturity and readiness to enhance governance capabilities. Don't attempt to establish agility and autonomous governance if the foundations for control- and/or outcome-based governance are missing.
- Create a proof-of-concept initiative to test the applicability of one of the more advanced governance styles (e.g., autonomous) in your environment, and evaluate the business outcomes and value, emerging risks, technological limitations, and cultural barriers to wider adoption.
- Engage senior business executive leadership to discuss the results of the POC and develop a business case and strategic roadmap to establish adaptive D&A governance.
- Establish the control and outcome styles of adaptive governance first. Then evolve to the agile and autonomous styles. Proceed on the basis of "minimum governance," focusing on limiting the scope of data, analytics and business processes to those that deliver greatest business value and organizational outcomes.

Gartner Recommended Reading

Data and Analytics Leaders Must Use Adaptive Governance to Succeed in Digital Business

7 Must-Have Foundations for Modern Data and Analytics Governance

Reset Your Information Governance Approach by Moving From Truth to Trust

IT Score for Data & Analytics

Augmented MDM

Analysis By: Malcolm Hawker

Benefit Rating: Moderate

Market Penetration: Less than 1% of target audience

Maturity: Embryonic

Definition

Augmented master data management (MDM) is the application of graph, machine learning and similar advanced technologies to MDM. Augmented MDM extends traditional MDM capabilities to reduce manual data management and governance tasks. It generates insights on complex relationships within and across both application and master data, allowing for technology to play an active role in enabling more adaptive and context-centric approaches to master data management.

Why This Is Important

Organizations use MDM to accelerate and differentiate digital transformations, particularly around customer/citizen and product/service experiences. This includes traditional as well as newly evolving MDM value propositions, like the use of application data to uncover previously unknown relationships across master data entities. Data and analytics leaders' need for such insights requires them to expand the scale and efficiency of their MDM programs, thus driving investment in augmented MDM.

Business Impact

Augmented MDM provides three primary benefits:

- Increased revenue associated with enhanced digital experiences, such as the use of augmented MDM to uncover a previously unknown sales opportunity.
- Reduced infrastructure costs by enabling more cost-efficient storage of, and compute of, increasing volumes of master data for entity relationship and discovery.
- Increased operational efficiencies and lower MDM program operating costs via the automation of several data management and governance tasks.

Drivers

- Increasing business focus on digital transformation and the critical role MDM plays in the enablement of a data-driven business strategy.
- Businesses' focus on creating "360-degree views" of their master data domains, fueling an expansion in the number of data types (such as application data) and data sources included in the scope of an MDM program. This is driving a need for increased scale, speed and efficiencies provided by augmented MDM.
- Business benefits realized by taking more context-centric views and governance of core master data objects.
- Improved operational efficiencies realized by IT organizations from the automation and scale related to the management and governance of master data.
- The value generated by exposing previously unknown relationships between master and nonmaster data within large, unstructured datasets.

Obstacles

- Augmented MDM is still in the early stages of development, both from the perspectives of customer demand and vendor focus.
- Augmented MDM suffers a lack of consistent definition and many MDM vendors claim to provide the functionality, but all in varying degrees.
- Individual capabilities described by augmented MDM are also available across other data and analytics solutions.
- The primary obstacles to broader market availability are technical. First, MDM software vendors must upgrade their platforms to integrate new features into existing infrastructures — which for many means a revamping of their underlying architectures. Second, companies seeking to reap the full benefit of augmented MDM will typically adopt cloud-based MDM deployments, a migration many have yet to make. We expect both of these obstacles to be largely overcome in the next two years, with broader availability from MDM vendors and wide-scale adoption shortly thereafter.

User Recommendations

- Be skeptical of vendors who focus their value propositions primarily on augmented MDM. This is because many MDM requirements, especially legal, finance or compliance-driven use cases, remain firmly rooted in traditional approaches to MDM.
- Evaluate your expected business outcomes and use cases — as some may not align well with augmented MDM, regardless of vendor.
- Be wary of augmented MDM vendors that lack the ability to integrate the use of graph and AI for data discovery, profiling and visualization with governance processes and operational MDM use cases.
- Contemplate a “best of breed” approach to solving for your needs when incumbent solutions lack augmented MDM capabilities. The combination of MDM, customer data platforms, analytics platforms, data quality and metadata management tools may support augmented MDM requirements for specific use cases.

Sample Vendors

CluedIn; Informatica; Reltio; Riversand Technologies

Gartner Recommended Reading

Top 10 Trends in Data and Analytics, 2020

Modern Data and Analytics Requirements Demand a Convergence of Data Management Capabilities

Responsible AI

Analysis By: Svetlana Sicular

Benefit Rating: Transformational

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Definition

Responsible artificial intelligence is an umbrella term for aspects of making appropriate business and ethical choices when adopting AI that organizations often address independently. These include business and societal value, risk, trust, transparency, fairness, bias mitigation, explainability, accountability, safety, privacy and regulatory compliance. Responsible AI encompasses organizational responsibilities and practices that ensure positive, accountable AI development and exploitation.

Why This Is Important

Responsible AI has emerged as the top AI topic for Gartner clients. The more AI replaces human decisions at scale, the more it amplifies the positive and negative impacts of such decisions. Responsible AI pursues positive outcomes and prevents negative results by resolving dilemmas rooted in delivering value versus tolerating risks. Recently, many jurisdictions globally introduced new and pending AI regulations that challenge data and analytics leaders to respond in meaningful ways.

Business Impact

Responsible AI signifies the move toward accountability for AI development and use at the individual, organizational and societal levels. If AI governance is practiced by designated groups, responsible AI applies to everyone involved in the AI process. Responsible AI helps achieve fairness, even though biases are baked into the data; gain trust, although transparency and explainability methods are evolving; and ensure regulatory compliance, despite the AI's probabilistic nature.

Drivers

Responsible AI means a deliberate approach in many directions at once. Data science's responsibility to deliver unbiased, trusted and ethical AI is just the tip of the iceberg. Responsible AI helps AI participants develop, implement, exploit and resolve the dilemmas they face. Ideally, it enhances both sides at the following levels:

- **Organizational** — Resolving AI's business value versus risk in regulatory, business and ethical constraints. It could also include employee reskilling and intellectual property protection.
- **Societal** — Resolving AI effectiveness for societal well-being versus limiting human freedoms. Existing and pending legal guidelines and regulations, such the EU's Artificial Intelligence Act, make responsible AI a necessity.

- **Customer, citizen —** Resolving privacy versus convenience involves a thin line between customers' readiness to give their data in exchange for goods or benefits and customer/citizen concerns about their privacy. Fairness and ethics are the greatest drivers in this space. Regulations shed light on the necessary steps — for example, the U.S. Federal Trade Committee's "Using Artificial Intelligence and Algorithms" for consumer protection. However, this does not relieve organizations of deliberation specific to their constituents.
- **Workplace —** Resolving work efficiency versus employer "creepiness" includes concerns about AI's effect on jobs and employee morale, as well as change management.

AI affects all ways of life and touches all societal strata; hence, the responsible AI challenges are multifaceted and cannot be easily generalized. New problems constantly arise with rapidly evolving technologies and their uses, such as using generative AI for creating deepfakes. Most organizations combine some of the following drivers under the umbrella of responsible AI:

- Accountability
- Diversity
- Ethics
- Explainability
- Fairness
- Human centricity
- Operational responsibility
- Privacy
- Regulatory compliance
- Risk management
- Safety
- Transparency
- Trustworthiness

Obstacles

- Unawareness of AI's unintended consequences prevails. Many organizations turn to responsible AI only after they hit AI's negative effects, whereas prevention is easier and less stressful.
- Legislative pace, uncertainty and complexity puts responsible AI on hold in many firms. It also leads to one-sided efforts for regulatory compliance, while ignoring other responsible AI drivers.
- Rapidly evolving AI technologies, including tools for explainability, bias detection, privacy protection, and some regulatory compliance, lull organizations into a false sense of responsibility, while mere technology is not enough. A disciplined AI ethics and governance approach that brings together multiple perspectives and diversity of opinions is necessary, in addition to technology.
- Poorly defined accountability and incentives for responsible AI practices make responsible AI look good on paper, but ineffective in reality.

User Recommendations

Data and analytics leaders, take responsibility — it's not AI, it's you who are liable for the results and impacts, either intended or unintended.

- Combine the responsible AI aspects you currently address independently to promulgate consistent approaches across all focus areas. The most typical areas of responsible AI in the enterprise are fairness, bias mitigation, ethics, risk management, privacy and regulatory compliance.
- Designate a champion accountable for the responsible development of AI, for each use case.
- Raise awareness of AI differences from the familiar concepts continuously. Provide training and education on responsible AI, first to most critical personnel, and then to your entire AI audience.
- Establish an AI ethics board to resolve AI dilemmas. Ensure diversity of participants and the ease to voice AI concerns.
- Participate in industry or societal responsible AI groups. Learn best practices and contribute your own, because everybody will benefit from this.

Sample Vendors

Google, H2O.ai, IBM, Microsoft, SAS, Tazi.ai

Gartner Recommended Reading

Predicts 2021: Artificial Intelligence and Its Impact on People and Society

Top Trends in Data and Analytics for 2021: Smarter, More Responsible and Scalable AI

Cool Vendors in AI Governance and Ethical Response

Case Study: Ethical AI With an External Board (Axon)

What Non-Technology Executives Should Do in Support of Responsible AI Initiatives

Financial Services CIOs Must Focus AI Investments on 'Responsible AI' in 2021

AI Governance

Analysis By: Svetlana Sicular

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Definition

AI governance is the process of creating policies, assigning decision rights and ensuring organizational accountability for risks and investment decisions for the application, and use of artificial intelligence techniques. AI governance is part of adaptive data and analytics governance. It addresses the perceptive, predictive and probabilistic nature of AI.

Why This Is Important

With AI now delivering value in practical enterprise application, data and analytics leaders see that scaling AI without governance is dangerous. When each AI output is replicated millions of times, they ask how to balance the business value promised by AI against the need for appropriate oversight, risk management and investment decisions. AI draws the attention of legislators worldwide. AI regulations proliferate, mandating actions but giving more clarity about AI governance priorities.

Business Impact

AI governance as part of organizational governance structure enacts responsible AI. It gives the common implementation and adherence mechanisms across the business ecosystem when it comes to:

- Ethics, fairness and safety to protect the business and its reputation
- Trust and transparency to support AI adoption via explainability, bias mitigation, model governance, operationalization and collaboration norms and capabilities
- Diversity to ensure the right technology and roles for each AI project

Drivers

- AI governance has moved to the Peak area of the Hype Cycle. Enterprise practitioners are making steps toward establishing AI governance. Leading organizations in the industries establish AI governance by addressing standards for AI development and operations, providing best practices, guidelines for model management and monitoring, data labeling and interpretation, explainability, fairness, bias mitigation, security and legal.

- Regulations around the Globe target AI directly and affect AI practices indirectly, making AI governance goals more concrete. The FTC's law enforcement actions, studies and guidance emphasize that the use of AI tools should be transparent, explainable, fair and empirically sound, while fostering accountability. The Algorithmic Impact Assessment is a mandatory risk assessment tool intended to support the Canada Treasury Board's Directive on Automated Decision Making. AI Governance in Japan provides intermediate, nonbinding guidelines and explanations of legal responsibilities for AI within the scope of the other laws. AI governance prioritizes methods for proactive regulatory compliance.

- Trust and transparency of AI solutions are crucial for AI adoption. The probabilistic and opaque nature of AI are new to the audience who is used to deterministic outcomes. AI governance can minimize misinterpretations of AI results via scrutinizing trust in data sources and explainability of AI decisions. It provides specific testing and validation guidelines, differentiating "life-critical AI."

- AI governance is necessary to establish AI accountability. It is difficult because all use cases differ in terms of their data, solution and outcomes requirements. It outlines reactive responsibilities, actions and procedures in the case of unanticipated and unintended consequences. It ensures ethics is considered for each use case.

Obstacles

- Often, AI governance is a stand-alone initiative, which stalls its progress. The best way is to extend existing governance mechanisms to take advantage of the recognizable policies and methods, such as in data governance. AI governance benefits from a conversation with security, legal and customer experience functions.
- Many governance initiatives assume command and control. Instead, adaptive governance supports freedom and creativity in AI teams, but also protects the organization from reputational and regulatory risks. Little or no governance in AI teams to facilitate freedom and creativity is an acceptable approach if this is a conscious governance decision.
- AI value assurance and model risk management are new in AI. While methods exist, for example, in the financial industry, they are largely unknown to others, and every governance organization is inventing its own.
- Technologies to support AI governance are nascent and fragmented.

User Recommendations

- Apply the framework of trust, transparency and diversity, and to data, algorithms and people: this lets them meet the AI-specific, ever-evolving considerations. This framework should extend and advance existing governance mechanisms, such as risk management or data and analytics governance.
- Decide on the common organizational structure and accountability for propagating responsible AI. For example, what to centralize and what to do locally.
- Establish and refine processes for handling AI-related business decisions.
- Establish processes for AI review and validation. For each AI use case, require an independent AI model validator, a data scientist whose job is to assure model explainability and robustness. Have everyone in the process defend their decisions in front of their peers and validators.
- Gain agreement on AI risk guidelines that are driven by the business risk appetite and regulations.
- Ensure that humans are in the loop to mitigate AI deficiencies.

Sample Vendors

Arthur; Chatterbox Labs; DarwinAI; DreamQuark; Google; IBM Watson OpenScale; KenSci; Prodago; SAS; Weights & Biases

Gartner Recommended Reading

Build AI-Specific Governance on Three Cornerstones: Trust, Transparency and Diversity

Adaptive Data and Analytics Governance to Achieve Digital Business Success

Effective Data Governance for Government AI Projects — What CIOs Need to Know

Cool Vendors in AI Governance and Responsible AI

Reset Your Information Governance Approach by Moving From Truth to Trust

At the Peak

Analytics Governance

Analysis By: Andrew White, Kurt Schlegel

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Definition

Analytics governance is the enforcement of D&A governance policy along the analytics pipeline from data discovery through to analytics model deployment, and access to the analysis and insight. Though the markets use the term “governance” here, the reality is that what is being sought is not related to policy setting but actually executing and enforcing policy along the analytics pipeline. A more appropriate name would be analytics stewardship.

Why This Is Important

For many years, organizations have limped along with semitrusted data in their analytics pipeline. With the increased adoption of data lakes and data sharing in the last few years, the gap between expectations and reality is starting to hit home. With analytical and forecasting models breaking in 2020 due to the COVID-19 pandemic, business leaders are finally grasping the reality: they, their decisions and even their organizational survival is held hostage to bad data and analytics.

Business Impact

If organizations do not implement data and analytics governance through their analytics pipeline, no amount of spending on the latest analytics tool or technology will survive scrutiny. Worse, business decisions may backfire and organizational performance may suffer as a result. With the right business outcome and adaptive governance focus, the least amount of mission-critical data and analytics will be governed, thus assisting with trusted and reliable analysis and insight leverage.

Drivers

- 2021 is marked with small and wide data, not big data. It is also marked with data and analytics everywhere and at the edge. With these new trends, additional pressures are being put on your organization.

- A shift in focus from truth to trust in governing data and analytics assets due to the vastness of data now to hand for analysis and the lack of accountability in third party sources.
- Protection and provenance of the inbound data to the analytics pipeline and at-rest data in the warehouse or lake.
- Need for enhanced integrity of the analytical model being developed.
- Guidance for ethical consideration.
- Continually evolving permissions for access to the data for model development or for consumption of the analysis output even as organizational boundaries shift almost daily.
- Often third-party-driven retention requirements for risk mitigation.
- Preservation of privacy that may even conflict when operating across multiple jurisdictions.
- No amount of technology can help; though it is with technology that D&A governance policies are applied and enforced (stewardship) along your analytics pipeline.
- While the hype is firmly placed on analytics governance, the reality is that organizations need to focus on extending their D&A governance program along the data and analytics pipeline.

Obstacles

- The biggest obstacle is the lack of a clear line-of-sight between a piece of rogue or untrusted data in a data warehouse or dashboard and its impact on a business decision or outcome. This lack of visibility between data and outcome helps explain why business leaders seem disinterested in the work of governance and stewardship.
- The second is that many organizations think that “analytics governance” is actually something different and distinct to data and analytics governance. This is just natural forces looking at the boundaries in front, and not visionaries looking beyond to see the same patterns and solutions emerging.

User Recommendations

- Recognize the work of policy setting (i.e., governance); policy enforcement (i.e., stewardship) and policy execution (i.e., management). Apply your response to your analytic pipeline.
- Extend or connect your data and analytics governance work so that the policy setting and enforcement efforts can be aligned — this will reduce redundancy and save money, and lead to improved outcomes
- Note also that most cloud analytics and cloud infrastructure vendors really don't understand what your needs are in this market. They mostly think it all hinges on tracking data lineage. That is nice, but not sufficient.
- Don't assume your analytics, business intelligence, data science or artificial intelligence solutions support your requirements for analytics stewardship (or governance). At most, they might respect the odd rule and follow it (i.e., management/execution). You may need to build your own capability outside of those solutions, until the vendors wake up and build what you need.

Sample Vendors

Alation; Collibra; ZenOptics

Gartner Recommended Reading

Data and Analytics Leaders Must Use Adaptive Governance to Succeed in Digital Business

Use Enterprise Metadata Management to Extend Information Governance to Analytics

The State of Data and Analytics Governance Is Worse Than You Think

Data Literacy

Analysis By: Alan D. Duncan, Sally Parker, Donna Medeiros

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Definition

Data literacy is the ability to read, write and communicate data in context, with an understanding of the data sources and constructs, analytical methods and techniques applied. It is the ability to describe the use-case application and resulting business value or outcome.

Why This Is Important

Data and analytics are pervasive in all aspects of all businesses, in communities and in our personal lives. The ability to understand, interpret and act upon data — data literacy — is increasingly foundational to the digital economy and society. Data literacy helps explain to the board how data and analytics manifest in a company's use cases, explain how to identify, access, integrate and manage internal and external datasets, and describe advanced analytics techniques and enabling AI.

Business Impact

Data-driven enterprises require explicit and persistent organizational change to achieve measurable business outcomes. Employees know their organization is serious about change only when they see their leaders changing their own behavior. CDOs need to promote and orchestrate "leadership moments" where they act as role models, exemplifying new cultural traits at critical points. Central to success will be the ability to guide the workforce by addressing both data literacy and data-driven culture.

Drivers

- With the steady rise of the digital economy, and the need for businesses to be digitally literate, there is growing recognition of the role that employees' data literacy plays within an organization's overall digital dexterity.
- The role of the data and analytics function has changed. It is now at the core of an organization's business model and digital platforms.
- CDOs can emulate their higher-performing peers by putting much more emphasis, energy and effort into meeting the change management requirements of their data and analytics strategies.
- Defining what data-driven behaviors are expected, using a "From/To/Because" approach, is central to employee development plans. It ensures that creators, consumers and intermediaries have the necessary data and analytics skills, knowledge and competencies.
- CDOs need to take immediate action to create and sustain data literacy. Quick wins build momentum, but lasting and meaningful change takes time because it requires people to learn new skills and behave in new ways.

Obstacles

- Lack of common data literacy models/frameworks/standards
- A piecemeal approach to training and certification
- Aversion to change
- Lack of talent and poor data literacy
- Lack of initiatives to address cultural and data literacy challenges within strategies and programs
- "Data literacy" means different things to different providers: from enhanced data visualization skills to fostering curiosity about data more broadly
- Overall adoption will still take years

User Recommendations

- Create a strong narrative vision of desired business outcomes, particularly with respect to innovation. Raise awareness through storytelling.
- Call out examples of “good” and “bad” data literacy to promote desired behaviors.
- Work with stakeholders who have enthusiasm and appetite, and who recognize that improved data literacy is a factor for success.
- Partner with HR and business leaders to identify the level of data literacy, learning goals and outcomes for various job roles and personas. Use data literacy assessments to evaluate current data literacy levels and desire to participate.
- Go beyond vendor product training to focus on people’s other role-related skills. Use a mix of training delivery methods (classroom, online, community, on the job) to improve overall learning effectiveness.
- Align training and self-service solutions with a broader data literacy portfolio to meet the data literacy needs of both data consumers and creators.

Sample Vendors

Avado; Coursera; Data To The People; Gartner Consulting; Pluralsight; Skillsoft; The Center of Applied Data Science (CADS); The Data Lodge; Udacity; Udemy

Gartner Recommended Reading

Roadmap for Data Literacy and Data-Driven Business Transformation: A Gartner Trend Insight Report

Tool: Communicating the Need for Data Literacy Improvement

Chief Data Officers Must Address Both ‘Skill’ and ‘Will’ to Deliver Data-Driven Business Change

Tool: Data Literacy Personas

Data Literacy Providers Will Accelerate the Time to Value for Data-Driven Enterprises

Trust-Based Governance

Analysis By: Andrew White, Saul Judah

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Emerging

Definition

Trust-based governance prescribes and reports the desired and actual trust, reliability and efficacy observed in data, analytics, systems, partners and organizations, so that asset usage and risk mitigation are appropriate. Traditional D&A governance (including data quality, MDM and ADM) focuses on single dimensions (e.g., yes/no compliance or single version of the truth) for policy or definitional rules and policies and leads to excessive effort and high risk mitigation costs.

Why This Is Important

Trust-based governance alleviates the demands put on people, processes and data that use distinct and precise definitions of boundaries for policies such as quality and standard definitions. It supersedes traditional approaches to governance, which use simplistic yes/no conclusions (e.g., the attribute is or is not of the right quality) that may not serve business needs adequately. This reinforces a view that governance is slowing work down and preventing the business from achieving its goals.

Business Impact

Where business complexity is held back by traditional or trust-based data quality and entity resolution definitions (e.g., yes/no or single version), a trust-based approach (e.g., graduated) will help reduce and align the governance effort to the value such data offers:

- Truth-based efforts lead to excessive costs, controls and delays in achieving business goals.
- Trust-based approach will reduce costs, mitigate risks and help businesses achieve their expected goals more effectively.

Drivers

- Hype around trust and trust-based governance models is increasing. This is because the use of data to drive decisions and outcomes is at fever pitch. Boards of directors for the last two years have highlighted how analytics and AI are critical game-changing technologies (see Survey Analysis: Board Directors Say Pandemic Drives Increased Investments in IT). Trust is at the center of effective use of analytics since it aligns with the vagaries and contexts of complex situations and models. Absolute forms of data quality and definitions do not work well in these new environments, which are predicated on openness, shareability and exploration.

- Trust cannot be assumed; it needs to be evaluated, and is hard to earn when people or relationships are involved. New technologies like ML-augmented knowledge graphs and entity resolution/data quality are helping discover relationships in data to help infer or inform additional insights on data use, which can help reinforce trust. For example, data logs can be used to discover the most often used version of "customer" data.

- We have seen some trust-based governance in a few key situations, often related to intelligence work, but they are very manual. Technology vendors have yet to operationalize support for the need. In 2021, we are seeing more commercial and private organizations realize they need to develop their traditional data quality, MDM and D&A governance programs with a more flexible, trust-based approach. More pilots are underway, and there is greater likelihood of vendors offering more operational capabilities.

Obstacles

- Lack of maturity is the biggest obstacle to trust-based governance. Data and analytics teams often spend much of their time firefighting operational issues (e.g., data quality issues that prevent a business transaction or a report with “bad” data) and don’t have the opportunity to step back and assess their landscape and understand lineage, curation and usage of their ecosystem by their organizational users. As a result, they are unable to put in place the framework that will help them reduce the issues that they face on a daily basis.
- Numerous widely deployed technologies, such as data dictionaries, glossaries, catalogs, data quality and entity resolution, and business rule engines, all need to evolve to support the enhanced trust-based models.
- Intelligence agencies have used trust-based governance in the last few years, but widespread adoption across industries is probably held back due to lack of investment in supporting or enabling tools.

User Recommendations

- Pilot a trust framework to some critical data and its source where DQ efforts appear costly or onerous. Explore how it can help users of the data align their risk mitigation efforts to the value and use of the (trusted) data.
- Where data quality only has a single dimension (e.g., yes/no), use a simple three-tier framework (untrusted, unknown, trusted), and test the boundaries and the savings in time and effort to govern such data.
- Align trust-based governance to your data use case and enterprise goals. Many use cases will still work very effectively with traditional rules and policies, such as those defined by yes/no qualification or definitions — these might be central MDM. But for departmental use, that data might be treated differently, especially if enriched with third-party data for analytics, such as a customer data platform (CDP). It is in the CDP that trust may be more useful than a truth-based approach.

Gartner Recommended Reading

7 Must-Have Foundations for Modern Data and Analytics Governance

Reset Your Information Governance Approach by Moving From Truth to Trust

Augmented Data Quality

Analysis By: Melody Chien

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Early mainstream

Definition

Augmented data quality represents an enhanced capability to evolve data quality processes — for improved insight discovery, next-best-action suggestions and accuracy — through the use of metadata, knowledge graphs and AI-related technologies. This capability exists in data quality solutions and is aimed at increasing efficiency and productivity by automating process workflows, minimizing dependency on humans and reducing time to value by means of data quality improvement.

Why This Is Important

Data quality is a key enabler for digital business initiatives. As organizations accelerate their pace in the digital transformation journey, the challenge of managing trusted, high-quality data at scale has increasingly become a limiting factor. With rapid growth of distributed data landscapes, the diversity of data and the number of new business requirements, augmented data quality technologies facilitate and even automate manually intensive data quality processes.

Business Impact

Data quality vendors build AI models to improve discovery of data characteristics, suggest next best actions and automate data quality processes by using metadata, reference data, application logs, users' actions, best practices and AI algorithms. The discovery of certain data patterns or outliers can inspire corrective actions. Automation helps organizations solve complex data quality requirements quickly and effectively. It also leads to higher productivity, greater accuracy and quicker ROI.

Drivers

- Traditional data quality applications provide tooling for common data quality practices such as profiling, matching, cleansing and monitoring. These applications, however, depend to a large degree on SMEs to troubleshoot and remediate data quality problems. Complex and exception-prone issues are difficult to solve with existing practices and technologies.
- Augmented data quality provides transformational means of enabling organizations to process data quality tasks with deeper data insights, next-best-action suggestions and higher degree of automation.
- Augmented data quality aids discovery and classification of sensitive PII data, pattern detection and correlation identification among data entities.
- By using active learning and collective knowledge, augmented data quality suggests matching proposals. It also proposes mapping of data quality rules to data elements based on previous user actions and data similarities, and automatically infers, creates or curates data quality rules to apply fixes to data following patterns previously identified.
- As underlying technologies (ML, NLP, active metadata, knowledge graphs, predictive analytics) mature over time and become more widely adopted, we expect augmented data quality support broadening to the entire spectrum of data quality tasks.

Obstacles

- Trustworthiness of AI models: The degree of accuracy depends on the accuracy and consistency of the metadata controlling the process and the data used to train models. “Data drift” may occur over time and affect supervised models.
- Inclusion of data and analytics governance: AI-driven automation enables users to be independent, but existing requirements for governance need to be embedded into AI models to avoid data-related risks.
- Requirement for experts to maintain AI models: Vendors produce augmented data quality differently using supervised or unsupervised techniques. Continuous model improvement may be required through active learning. Business users may need to learn how to “talk to the machine” to receive correct results.

User Recommendations

- Identify data quality use cases that could benefit from augmented data quality capabilities by focusing on solving specific data quality problems with well-defined business outcomes.
- Start with data quality problems that are currently tackled manually and are time-consuming or prone to exceptions.
- Explore the augmented data quality capabilities that are available in the market by investigating their features, upfront setup, required skills and possible constraints. Depending on vendors' technology maturity, it's very likely that some degree of custom development may be required to fully leverage the features.
- Assess incumbent data quality vendors' existing offering and future product roadmap for enhancement.
- Partner with business stakeholders to evaluate and monitor solutions supported with augmented data quality by checking for adherence to existing governance requirements and establishing metrics to show tangible benefits.

Sample Vendors

Ataccama; Collibra (OwlDQ); DQ Labs; IBM; Informatica; MIOsoft; Precisely; SAP; SAS; Talend

Gartner Recommended Reading

Augmented Data Quality Represents a New Option for Upscaling Data Quality Capabilities

Building Automation Into Your Data Quality Initiatives

Magic Quadrant for Data Quality Solutions

Critical Capabilities for Data Quality Solutions

Predicts 2021: Data Management Solutions — Operational Efficiency Rises to the Top

Digital Ethics

Analysis By: Pieter den Hamer, Frank Buytendijk, Svetlana Sicular, Bart Willemsen

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Definition

Digital ethics comprise the systems of values and moral principles for the conduct of electronic interactions among people, organizations and things.

Why This Is Important

Digital ethics, and in particular privacy and bias, remain a growing concern. The voice of society and AI-specific ethical considerations are rapidly coming into focus for individuals, organizations and governments. People are increasingly aware that their personal information is valuable; they're frustrated by lack of transparency and continuing misuses and breaches. Organizations act to mitigate the risks involved in securing and managing personal data, and governments are implementing strict legislation in this area.

Business Impact

Digital ethics strengthens the organization's positive influence and reputation among customers, employees, partners and society. Areas of business impact include influencing innovation, product development, customer engagement, corporate strategy and go-to-market. Intention is key. If ethics is simply a way to achieve business performance, it leads to window dressing. The goal to be an ethical company serves all parties and society more broadly and leads to better business trust and performance.

Drivers

- Despite the hype around digital ethics, many organizations are still ignoring it. They think it doesn't apply to their industry or domain without giving it a deliberate consideration.
- Board members and other executives are sharing concerns about the unintended consequences that the innovative use of technology can have.
- There is frequent, high-profile press coverage of stories that concern the impact of data and technology on business and society more broadly.
- With the emergence of artificial intelligence, for the first time the ethical discussion is taking place before — and during — a technology's widespread implementation. AI ethics and other responsible AI steps are a foundation to reverse the negative popular sentiment around AI and lead to a more responsible use of its powers.
- Government commissions and industry consortia are actively developing guidelines for ethical use of AI. Examples include Ethical Framework for Artificial Intelligence In Colombia, New Artificial Intelligence Regulation in the EU and Using Artificial Intelligence and Algorithms in the U.S.
- Over the past year, a quickly growing number of organizations declared their AI ethics principles, frameworks and guidelines. They have a long way to go from declaration to execution, although some organizations already have digital ethics practices.
- Gartner predicts that by 2024, 30% of major organizations will use a new "voice of society" metric to act on societal issues and assess the impact on their business performance. The voice of society will put more pressure on governments and public and private organizations alike to ethically use technology. "Big tech" is already a negative stereotype in societal jargon.
- More universities across the globe are adding digital ethics courses and launching programs and centers to address ethical, policy and legal challenges posed by new technologies.

Obstacles

- Digital ethics is seen as a moving target because of confusion on what society expects. It might even lead to opposing the majority's opinion, based on an organization's position and beliefs.
- Digital ethics is too often reactive and narrowly interpreted as compliance, or confined to the technical support of privacy protection or viewed as explainable AI only.
- AI ethics is an emerging area in overall digital ethics. Early high-level guidelines are inconsistent and will evolve over time.
- The voice of society is a new metric where digital ethics should be present, but its weight is still to be understood. Insufficient attention leaves organizations exposed to lost business, higher costs and increased risk.
- Opinions differ across people, regions and cultures on what constitutes "good" and "bad." Even in organizations where ethics have been recognized as an important issue, consensus between internal and external stakeholders (such as customers) remains sometimes difficult to achieve.

User Recommendations

Business and IT leaders responsible for digital transformation in their organizations:

- Identify specific digital ethics issues and opportunities to turn awareness into action.
- Discuss ethical dilemmas from diverse points of moral reasoning. Ensure that the ethical consequences have been accounted for and that you are comfortable defending the use of that technology, including unintended negative outcomes.
- Elevate the conversation by focusing on digital ethics as a source of societal and business value, rather than simply focusing on compliance and risk. Link digital ethics to concrete business performance metrics.
- Ensure that digital ethics is leading and not following digital transformation. Address digital ethics early "by design" to move faster by knowing methods to resolve ethical dilemmas.
- Organize training in ethics and run workshops to create awareness within all AI initiatives about the importance that AI design and implementation require an ethical mindset and clear accountability.

Gartner Recommended Reading

Digital Ethics: From Compliance Duty to Competitive Differentiator

AI Ethics: Use 5 Common Guidelines as Your Starting Point

Every Executive Leader Should Challenge Their Teams on Digital Ethics

Digital Ethics by Design: A Framework for Better Digital Business

Data Ethics and COVID-19: Making the Right Decisions for Data Collection, Use and Sharing

Use Privacy to Build Trust and Personalize Customer Experiences

Cloud MDM

Analysis By: Sally Parker, Simon Walker

Benefit Rating: Moderate

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Definition

Cloud master data management (MDM) solutions are available in the cloud across a spectrum of resource delivery models, ranging from single-tenant share nothing (IaaS) to multitenant share something (PaaS) to multitenant share everything (SaaS).

Why This Is Important

Trusted master data is a foundational requirement of digital business. Organizations that have invested in establishing an enterprisewide trusted view of their master data (e.g., customers, products, suppliers) benefit from greater levels of business agility. As organizations' applications have moved to the cloud and the data they seek to master has moved to the cloud the center of gravity has shifted in favor of cloud based MDM solutions.

Business Impact

Cloud-based MDM solutions lower the barrier to entry from a technology solutions perspective, providing access to new licensing models, deployment flexibility and improved time to value.

Leading organizations draw the causal link between trusted master data and the business outcomes it supports, including:

- Business agility
- Process optimization
- Improved customer experience
- Reduced time to market
- Operational efficiency
- Governance, risk and compliance requirements

Drivers

In 2019, Gartner saw the MDM adoption trend favor cloud-based MDM deployments over on-premises, a trend that has continued through 2020, driven by five key themes:

- **Broader acceptance of, and trust in, cloud for master data:** Much of the software solutions market shifted to cloud deployment models some time ago, the MDM market has been slow to follow as vendors delayed offering cloud-based solutions until end-user organizations were ready to embrace cloud for their most critical data — their master data.
- **Gravitational pull of the organizations' application and data ecosystems:** MDM is about creating a single source of truth (or common trusted foundation) for master data across the enterprise's heterogeneous applications. As the center of gravity for these applications has shifted to cloud the MDM market is now finally following.
- **Lower barrier to entry cloud affords MDM solutions:** Today new initiatives favor cloud-based MDM solutions with adoption expected to accelerate over the next two to five years as interest in MDM expands to a previously untapped and broader client base favoring the lower barrier to entry cloud affords. Cloud-based offerings and, in particular, SaaS also help organizations where MDM skills required to deploy and maintain on-premises MDM solutions are lacking.

- **Increased availability of cloud-based offerings:** MDM vendors have progressed well in transitioning their solutions from perpetual to subscription-based licenses and from on-premises to cloud-based solutions. The latter will ultimately pull the market to the cloud as vendors favor new feature rollout and support for cloud-based platforms to streamline their own product management cycles.
- **Scalability:** To handle compute intensive requirements such as ML/AI for matching.

Obstacles

- **Vendor comparisons:** SaaS solutions are attractive where MDM skills are lacking. PaaS/IaaS options exist for greater configuration flexibility. Various licensing approaches and bring your own cloud (lower initial purchase price) further add to the complexity. Some vendors offer rapid self-provisioning in cloud vendor marketplaces, others go further with MDM spend counting toward clients' annual committed cloud provider spend. Without appropriate capacity planning and cost modeling, cloud services may prove more expensive on a TCO basis.
- **Governance:** As master data is heavily shared, a need for real-time integration into associated data sources and processes arises. Organizations in transition to cloud must optimize the business processes and more complex governance of a hybrid ecosystem.
- **Migration:** Some MDM vendors have taken the opportunity to rearchitect their solutions for cloud, requiring a migration from on-premises to cloud that often requires external support.

User Recommendations

Although cloud-based MDM solutions are attractive, organizations should:

- Evaluate any gaps in capability between candidate vendors' cloud-based and on-premises MDM solutions to determine when and whether a migration between the cloud and on-premises environments is viable.
- Cost should not be the driver for cloud MDM and due diligence is required around capacity planning and TCO modeling.
- Conduct a thorough review of current governance practices as a precursor to cloud readiness. Governance complexity increases in a hybrid ecosystem.

- Map and actively track the center of data gravity within your organization for each master data domain, to identify and plan for prospective transition points for cloud.
- Review and document integration complexity to provide a manageable integration scenario that does not negate any benefits of cloud-based MDM.

Sample Vendors

Ataccama; IBM; Informatica; Profisee; Reltio; Riversand; SAP; Semarchy; Stibo Systems; TIBCO Software

Gartner Recommended Reading

Magic Quadrant for Master Data Management Solutions

Critical Capabilities for Master Data Management Solutions

Three Essentials for Starting and Supporting Master Data Management

Create a Master Data Roadmap With Gartner's MDM Maturity Model

Data Hub Strategy

Analysis By: Ted Friedman, Andrew White

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Definition

A data hub strategy effectively determines where, when and how data needs to be mediated and shared in the enterprise. It layers data and analytics governance requirements atop sharing demands to establish the patterns for data flow. The strategy drives the implementation of one or more data hubs — logical architectures that enable data sharing by connecting data producers (e.g., applications, processes and teams) with data consumers (e.g., other applications, processes and teams).

Why This Is Important

Digital business demands an emphasis on the connections among systems, people and things as a source of competitive advantage. Enterprises often meet this need by two approaches:

- Connecting applications and data sources via point-to-point interfaces
- Centralizing as much data as possible in a single system

Both approaches always become costly and inflexible. Executing a data hub strategy enables improved data sharing via more consistent, scalable and well-governed data flow.

Business Impact

A data hub strategy can capture benefits including:

- Increased operational effectiveness through consistent governance of data and analytics across sets of endpoints that need to share data
- Improvements in understanding and trust of critical data across process and organization boundaries
- Reductions in cost and complexity, compared with point-to-point integration
- Alignment of data and analytics initiatives focused on governance and sharing of critical data, such as master data management (MDM)

Drivers

Data and analytics leaders and their teams continue to expend significant resources to support and expand the reach and scale of various types of data flows across the enterprise. The interest in data hub strategy concepts and data hub architectures continues to grow as a result of:

- Demands for seamless data flow across teams, processes and systems in the enterprise, which have increased dramatically in complexity and mission criticality
- New demands for consistent and reliable sharing of critical data between the organizations and things that comprise the extended enterprise — for example, in support of Internet of Things (IoT) solutions and new digital products

- Longtime and continued frustration of business stakeholders over the lack of consistency and trust of data driving strategic business outcomes — a data hub strategy enables more-focused application of governance controls, as compared with changing governance approaches inside numerous endpoint systems
- The high cost, complexity and fragility of traditional architectures involving only point-to-point interfaces or centralized data stores
- Desire of many organizations to leverage the concepts of MDM programs toward governance and sharing of other types of data
- Increasing numbers of technology providers adopting data hub messaging and delivering product offerings that enable data hub architectures
- Better collaboration across business-oriented (governance) and IT-centrc (integration) roles concerned with delivering data to points of need across the enterprise

Obstacles

Although the benefits of a data hub strategy are compelling, many data and analytics leaders find challenges in realizing them, including:

- Substantial investment in traditional governance and integration approaches, which have created complexity and make change difficult and risky
- Resistance from teams or business units that prefer to retain control over their choices regarding how data is shared and governed
- Inability to enable collaboration and agreement of critical stakeholders on data sharing and governance requirements across boundaries in the enterprise
- Over-reliance on technology and viewing governance and sharing of data as purely an implementation issue

User Recommendations

Data and analytics leaders and their teams should work with stakeholders to craft a data hub strategy that will align initiatives involving governance and sharing of critical data. Specifically, they must:

- Focus on the most high-value or complex areas, first to gain a significant business benefit impact through the initial deployment of data hubs.

- Design a data hub strategy to understand data and analytics governance and sharing requirements, and to drive integration efforts.
- Identify the data that is most frequently used or is most important, with most business value, and that requires effective governance and sharing.
- Include any master data, application data, reference data, analytics data hubs or other intermediaries (e.g., customer data platforms) in your overall data hub strategy.
- Iterate changes to your data hub strategy as requirements for governance, sharing and integration change.

Gartner Recommended Reading

Data Sharing Is a Business Necessity to Accelerate Digital Business

Use a Data Hub Strategy to Meet Your Data and Analytics Governance and Sharing Requirements

Data Hubs: Understanding the Types, Characteristics and Use Cases

Data Hubs, Data Lakes and Data Warehouses: How They Are Different and Why They Are Better Together

Sliding into the Trough

Interenterprise MDM

Analysis By: Malcolm Hawker, Simon Walker

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Adolescent

Definition

Interenterprise MDM is a technology-enabled discipline supporting shared governance and utilization of common master data assets across two or more interrelated businesses supporting a variety of MDM implementation styles and use cases. Interenterprise MDM enables the creation of shared master data assets used within data pools or consortiums (such as those supporting product data or commercial credit data), data marketplaces and exchanges, and shared reference datasets.

Why This Is Important

Commercial trade depends on increasingly complex digital ecosystems, making it harder for businesses to optimize their interactions with other businesses. Global supply chains, distributor networks, third-party e-commerce and outsourced customer service are examples where the exchange of master data (like customer or product data) between business entities is a critical dependency. Interenterprise MDM provides efficient B2B data exchange through shared governance of master data assets.

Business Impact

Interenterprise MDM optimizes processes that span two or more businesses by enabling the uniformity, accuracy, stewardship and semantic consistency of the master data assets used in those processes. A shared approach to governance policies and MDM allows for scalability and automation by removing barriers to systems, process and data integration across organizations. Any relationship between businesses that is facilitated by the exchange of master data can benefit from interentrprise MDM.

Drivers

The primary business drivers of interenterprise MDM are automation, scale and operational efficiencies that result from taking a shared approach to the management of master data assets used across interdependent business processes spanning more than one business entity. These drivers support a myriad of use cases, including:

- Optimizing the processes involved in moving goods, including raw materials, through a supply chain.
- Increasing the speed and efficiency of the process of procuring goods or services, often in support of inventory optimization efforts.
- Selling, marketing or distributing products or services in third-party channels through the use of shared product (and related) definitions and catalogs.
- Utilizing external resources to manage customer service or support processes.
- Creating a consistent customer definition/view in support of a complex multichannel partner or reseller network.
- Systems to support the extraordinarily large number of devices and volumes of data associated with the Internet of Things (IoT), especially where the IoT-enabled components of a given product may be sourced from multiple providers.
- Connecting product and customer transactions across consistent master identifiers between offline and online retail experiences.
- The reduction in data management costs that result from taking a shared approach to the governance and stewardship of a shared pool of master data assets.
- Increased efficiencies realized by taking a data hub approach to integrating master data across business entities, as opposed to multiple point-to-point integrations.

Obstacles

- The dynamics of certain market segments that provide a limited number of large players the power to dictate master data standards to their customers or suppliers.
- A lack of data governance maturity within organizations, particularly around an inability of organizations to make a connection between investments in MDM and desired business outcomes.
- Political and cultural forces within organizations which create fear and uncertainties around the acceptability or legality of external master data sharing.

- Limited market opportunities to participate in data pools, consortiums or other similar approaches to external master data sharing.
- The time, resources and organizational model needed to create a data governance body that works for shared mutual interests, and not the interests of any one corporate entity.

User Recommendations

For companies which would benefit by taking more of an interenterprise approach to MDM, we recommend:

- Take an outcome-driven approach to identity use cases which would be optimized by interenterprise MDM. Use a limited number of use cases to limit your scope and build a business case.
- Evaluate participation in data exchanges or consortiums to support the use cases you have identified for optimization.
- Engage directly with your business/trade partners to collaborate to identify areas of mutual benefit, where no data consortiums (or similar) exist to support your use cases.
- Address any existing barriers to external data sharing by taking a 'must share data unless' approach, including a recalibration of the real business risks of external master data sharing.
- Evaluate the impacts on people, process and technologies needed to support an interenterprise MDM business case, and their impacts on any existing governance processes.

Sample Vendors

CDQ; Winshuttle

Gartner Recommended Reading

Modernize Your MDM Program With External Master Data Sharing

Smart Data Sharing — Five Insights to Get It Right

Data Sharing Is a Business Necessity to Accelerate Digital Business

Flip 'Don't Share Data' Mantras — Introducing Gartner's 'Must Share Data Unless' Data Sharing Model

Data and Analytics Governance

Analysis By: Saul Judah, Debra Logan, Andrew White

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Definition

Data and analytics governance is the specification of decision rights and an accountability framework to ensure the appropriate behavior in the valuation, creation, consumption and control of data and analytics. It includes the processes, roles and policies, standards and metrics that ensure the effective and efficient use of data and analytics in enabling an organization to achieve its goals.

Why This Is Important

Data and analytics governance allows organizations the oversight to drive better behaviors relating to information assets in the enterprise, enabling better business outcomes. Data and analytics leaders need good governance practices to enable key business outcomes, such as market growth, cost optimization and merger and acquisition scenarios.

Business Impact

Data and analytics leaders should anticipate the following impacts:

- Better governance oversight, accountability and understanding of decision rights relating to data and analytics across the enterprise and within business areas
- Increased levels of business collaboration, engagement and innovation to drive mission critical priorities in the enterprise
- Increased levels of data literacy and cultural change enabled by better governance

Drivers

- Since the initial outbreak and response to the COVID-19 pandemic, many markets have rallied, with organizations now increasing investment in data and analytics to accelerate their digital business optimization and transformation initiatives. As a result, their effort to establish governance has gained momentum, which in turn drives hype. Gartner-client call volume has increased by more than 40% year over year for data and analytics governance.
- Investment in data and analytics is widespread across enterprises, with business functions spending as much on these initiatives as central IT teams, causing proliferation of information silos. The need for effective governance capabilities has therefore become an increasing concern for data and analytics leaders, as a framework for enabling the connected enterprise, while addressing the local information needs of business functions.
- Organizations with higher information maturity increasingly recognize that taking a data *and* analytics governance approach — rather than one focusing on individual information asset types (e.g., data governance) — yields better business results. Elsewhere, we have seen organizations recognize the urgent need to establish governance "to get the ball rolling," even if it is for only data governance or analytics governance. This significant increase in effort and hype relating to data and analytics governance is being seen in all industries, geographies, organization types and maturity levels.
- Hype and interest are also growing in many areas related to data analytics and governance, such as AI model governance, analytics governance in data warehouses and data lakes, trust-based governance, IoT data governance, and ethics as a discrete policy.

Obstacles

- Data and analytics governance is complex, organizationally challenging and politically sensitive. It is often difficult to get executive-level consensus for data and analytics governance programs, and as a result they are led by IT, with a view to "bringing in the business later." Because these initiatives are not business-outcome-based, they typically result in failure.
- Despite the diversity and complexity of business scenarios, most organizations continue to take a one-size-fits-all, command-and-control approach to their data and analytics governance. Furthermore, most organizations have a poor understanding of executive leader accountability and decision rights for information. Establishing an effective governance for data and analytics is therefore difficult to achieve. As organizations' expectations of what can realistically be achieved through data and analytics governance decline, we see its position on the Hype Cycle descend into the Trough of Disillusionment.

User Recommendations

- Identify critical business outcomes that need good data and analytics to be successful. Focus your governance work here to maximize your investment, developing a business case if needed.
- Engage key business stakeholders in sponsoring and driving the initiative, alongside the CDO, to enable information culture change.
- Focus on the least amount of data with the maximum business impact, while managing your risk to embed data and analytics governance in the full business context.
- Clearly define the scope of work related to data and analytics governance: policy evaluation and setting, policy interpretation and enforcement, and policy execution. The first two must be led by business; the latter can be enabled by IT.
- Consider how data standards and metadata management can be used to implement data and analytics governance in the enterprise. Though business leaders may not fully understand their importance, an industrial governance capability needs enterprise-scale data and analytics capabilities.

Gartner Recommended Reading

The State of Data and Analytics Governance Is Worse Than You Think

Next Best Actions to Improve Your Data and Analytics Governance

7 Must-Have Foundations for Modern Data and Analytics Governance

Deploying Effective Data and Analytics Governance: 3 Companies That Got It Right

Adaptive Data and Analytics Governance to Achieve Digital Business Success

Information Stewardship Applications

Analysis By: Guido De Simoni, Andrew White

Benefit Rating: High

Market Penetration: 1% to 5% of target audience

Maturity: Obsolete

Definition

Information stewardship applications support the work of information stewards, by providing application capabilities such as policy performance monitoring, data quality analysis, business glossary, workflow and exception management. These applications may also include playbooks and preloaded templates to help make this business role more effective.

Why This Is Important

Information stewardship applications emerged as a new technology to support effective operationalization of data and analytics governance policy management — from the perspective of data stewards — in use cases spanning business applications, operational data and analytics in data warehouses and data lakes.

Business Impact

Data and analytics governance cannot be sustained and scaled without an operational data and analytics stewardship role and function. A successful stewardship routine will lead to sustainable and persistent benefits in support of programs and projects such as EIM, MDM, application data management, analytics and business intelligence. These benefits include increased revenue, lower IT and business costs, reduced cycle times, improved trust in organizational data and increased business agility.

Drivers

- Encouragement to share data, increased data reuse, improved consistency and accelerated time to value because of the use of existing data dictionaries to identify areas of synergy between data used for different business initiatives (both data content and meaning)
- More effective understanding and communication of the semantic meaning of data will facilitate resolution of contention between business teams when inconsistency arises and reduce the amount of time and effort wasted on reconciliation, so that efforts can focus on new business actions
- Intelligent decisions about the information life cycle, from data interoperability and standards to archiving, disposal and deletion

Obstacles

- The overlap between the data governance board and the analytics center of excellence, which is now discovering that it needs to comply with and respect policy set by others, has not been captured yet in the market.
- The variety of requirements affects vendors' experimentation with and assessment of information stewardship applications. In particular, we observe clear market disruptions related to the adoption of data catalogs and organizations scrambling to work within the privacy management requirements of regulations such as the EU's General Data Protection Regulation (GDPR).
- The potential convergence of capabilities in the context of data and analytics governance. This is leading to the emergent market of data and analytics governance platforms that will consume information stewardship applications. For this reason they are becoming obsolete before the Plateau of Productivity and in a state of stall on the Hype Cycle.

User Recommendations

- Evaluate the capabilities needed from fit-for-purpose, business-user-oriented information stewardship and other solutions, as compared with IT-centric data management tools, including data quality, metadata management and federation/integration capabilities.
- Run a proof-of-concept for vendor solutions involving all contributing roles, such as business users, information governance board members, information architects, information stewards and business analysts.
- Focus on all dimensions (people, process, technology and data) when addressing the data and analytics stewardship use case. These dimensions are relevant for effective use of a solution to maximize your ROI through reuse, while also minimizing administrative costs and errors due to inconsistencies across technologies.
- Explore the emerging data and analytics governance platforms for all their data and analytics stewardship operational requirements

Sample Vendors

Alation; Alex Solutions; Collibra; Global Data Excellence; Infogix; Informatica; OvalEdge; Prodago

Gartner Recommended Reading

Predicts 2021: Data and Analytics Strategies to Govern, Scale and Transform Digital Business

The Role of Technology in Data and Analytics Governance Policy Management

Implement Your Data and Analytics Governance Through 5 Pragmatic Steps

Application Data Management

Analysis By: Andrew White, Malcolm Hawker

Benefit Rating: Moderate

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Definition

Application data management (ADM) is a technology-enabled discipline where business and IT work together to ensure uniformity, accuracy, stewardship, governance, semantic consistency and accountability for data in an application or suite, such as ERP, customer data platform or custom-made app. Application data is the consistent and uniform set of identifiers and extended attributes used within an application or suite for things like customers, products or prices.

Why This Is Important

Clients are often shocked to find their vendor offers modern business applications that take scant care of governance of the data used in them. Application vendors often fail to offer governance and stewardship solutions as part of the application service. As a result, quality and trust in such data falls over time and eventually business process integrity falls and outcomes start to suffer. Note that application data may include reference to or copies of master data.

Business Impact

The primary benefactors of this discipline are:

- Application data once identified ensures the right level of governance effort is aligned to the right kind of business impact the data has.
- The application of stewardship roles, in operational and analytical use cases, can be determined more effectively.
- Business goals for overall D&A governance is more likely assured with a more organized approach that now includes application data.

Drivers

- The vast majority of “successful” go-lives of business appalachian such as ERP, CRM or custom-built applications do not include any qualification of data and analytics governance. The result, very often observed in client inquiry, is that on average 7 months after the go-live, organizations spot the vast array of small but noticeable business issues held hostage to lack of governed data. Business performance and process integrity fails and business outcomes start to be negatively impacted.
- MDM was misunderstood. MDM was meant to have a laser-like focus on the minimal number of most widely shared attributes describing things like customer and product. This was confused with idealistic technical jargon that ended up trying to master all data for every use equally. This has now been exposed by too many organizations that still don’t see the difference and so MDM continues to fail and the need for ADM continues to grow.
- Digital business success hinges not on the quality and governance of all data equally, but a graduated, efficient means to classify data and apply only the needed level of governance. Such growing demand on scaling digital business will, of necessity, drive increased need to recognize and adopt ADM.

Obstacles

- The half-life of a successful “go live” of business application success is 7 months. After that we get phone calls from clients noting, “we have lost control of our data.” The reason this has become acceptable is that, for the most part, most organizations don’t fail.
- The ability for the organization to change is held back by budgeted-for mediocrity of meddling with data while the customer sits and waits for service. This is not an acceptable way to run an organization but too few D&A leaders stand up and say this.
- Poorly scoped MDM programs prevent successful MDM and ADM from taking shape since the result is that too much data is treated equally as master data (when it clearly is not).
- Traditional top-down governance programs lead to the same misunderstanding and poorly scoped initiatives.

User Recommendations

Starting with a focus on business outcomes to identify what data matters most, organize, classify and govern data based on which drives the most important business outcomes:

- Identify your application data to scope ADM: The data that matters most to a specific set of use cases supported by one application or suite like ERP, e-commerce, product information management, or customer data platform.
- Consider reusing MDM solutions to support your ADM implementation — even if in a distinct instance. The business requirements are very similar — but the value propositions are different.
- Demand from your business application provider (and those in the cloud) for the necessary capability to set (that is, govern) and enforce (that is, steward) information policy pertaining to data used in the application or suite.
- Implement ADM alongside any MDM program so that they can operate at their own speed and benefit. They do align and share metadata in support of a wider EIM program.

Sample Vendors

ChainSys; Epicor Software; Oracle; PiLog; Tealium; Utopia Global

Gartner Recommended Reading

Design an Effective Information Governance Strategy

Create a Master Data Roadmap With Gartner's MDM Maturity Model

How Augmented Data Management Capabilities Are Impacting MDM and Data Governance

Think Big, Start Small, Be Prepared — Master Data Management

Augmented Data Cataloging and Metadata Management

Analysis By: Guido De Simoni

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Early mainstream

Definition

Metadata management solutions (MMSs) are software that includes one or more of the following: metadata repositories, a business glossary, data lineage, impact analysis, rule management, semantic frameworks, and metadata ingestion and translation from different data sources. Modern AI-driven augmented data catalogs are part of these solutions, automating metadata discovery, ingestion, translation, enrichment and the creation of semantic relationships between metadata.

Why This Is Important

Augmented data cataloging and MMSs support organizations that manage varied data assets. Moreover, demands for accessing and using data are no longer limited to IT, and data-oriented citizen roles are emerging in the business. Also, data and analytics leaders are facing privacy requirements that force new approaches to data management. The pervasive use of metadata is across the data management landscape and results in the automation of many activities.

Business Impact

- Management of complexity: Augmented data cataloging and MMSs help to break down and reduce the complexity often inherent in data.
- Automation of processes: Because data is subject to change, there are numerous recurring activities that MMSs may enable or streamline by (partial) automation.
- Collaboration: Metadata requires the contribution of numerous people from different divisions and countries. An MMS can provide a multiuser environment able to address rich collaboration requirements.

Drivers

- Augmented data cataloging and MMSs are accelerating due to innovation generated by active metadata that leverages AI and machine learning.
- Active metadata enables real-time analysis of the applicability of data, checks on the veracity of data sources used and monitors the ways that users act.
- Informal and formal teams emerge and convert to community participation with as much automation as possible when supported by augmented data cataloging and MMSs. These demands are only starting to be addressed by vendors, with modern metadata management practices slowly being established within organizations.

Obstacles

- The lack of maturity of strategic business conversations about metadata.
- The expensive, but required, effort to integrate metadata management solutions in multivendor environments. This inhibitor has started to be addressed by new vendors' initiatives relating to openness and interoperability (see, for example, ODPi).
- The lack of identification of metadata management solutions with capabilities that meet the current and future requirements of specific use cases.

User Recommendations

- Data and analytics leaders who have already invested in data management technologies should first evaluate the metadata management capabilities of their existing data management tools, including data integration, data quality and even master data capabilities, before buying a modern MMS.
- If dealing with emerging use cases, including data and analytics governance, security and risk, and support for analytics and augmented data value, they should learn about these use cases, and build pilot implementations using MMSs.
- The introduction of "active metadata" concepts means that some of the more basic catalog capabilities no longer differentiate solutions in the market. We expect augmented data cataloging and MMSs to take two to five years to reach the Plateau of Productivity as the technology continues to expand in terms of both capabilities and support for both existing and emerging use cases.
- Innovation continues to leverage this market that is in the early mainstream phase.

Sample Vendors

Alation; Alex Solutions; Collibra; data.world; erwin; IBM; Infogix; Informatica; Semantic Web Company; SAP

Gartner Recommended Reading

Magic Quadrant for Metadata Management Solutions

Critical Capabilities for Metadata Management Solutions

Data and Analytics Stewardship

Analysis By: Guido De Simoni, Andrew White

Benefit Rating: High

Market Penetration: 5% to 20% of target audience

Maturity: Adolescent

Definition

Data and analytics stewardship is the analysis, management and control of the operational processes and data needed to enforce approved data and analytics governance policies and standards. Information in this context includes data, analytics, algorithms, documents, images and metadata — effectively, any and all data assets as needed.

Why This Is Important

Data and analytics stewardship enables better information behaviors to be achieved in the enterprise. Organizations with established data and analytics stewardship practices are equipped to evaluate and implement modern technology that supports operationalization and automation of data and analytics governance leveraging ML/AI.

Business Impact

- Data and analytics stewardship improves the level of trusted data for business operations, through adoption and enforcement of agreed-on data standards in the organization.

- Records management is similarly impacted by stewardship issues, where poor information handling and mismanagement of information classification and retention schedules can lead to increased costs, as well as greater exposure to risk and regulatory fines.

Drivers

- Recognizing that effective data and analytics governance and advocacy are critical for enterprise information management (EIM) programs, like master data management (MDM), application data management (ADM), or business intelligence and analytics, has resulted in wider (although still limited) acceptance of data and analytics stewardship.
- What data and analytics stewardship brings to a data and analytics governance initiative, when adopted correctly, is operational support in a day-to-day business context environment.
- The work of data and analytics stewardship is focused on problem solving, making it a critical business driver for continuous improvement when organizations drive strategic data and analytics programs.

Obstacles

- Despite the wider acceptance of information stewardship needs, many organizations have relied on the often reactive and heroic efforts of “citizen stewards” to solve data problems, holding outcomes and decisions back.
- Organizations are not yet, “en masse,” ready to invest the necessary time and money on the right solutions or training of their business users to deliver an operational function for stewardship. In the recent past, we have seen organizations maturing in this area still trying to shape data and analytics stewardship (even within business areas) by testing and validating the approach before committing to an established discipline.
- This has been largely affected by the lack of maturity in the overall discipline of data and analytics governance. The profile is moving slowly in the Hype Cycle.

User Recommendations

- If data stewardship exists in IT, movement of aligned roles within the jurisdiction of a business operational area should be investigated and appropriate action taken as the knowledge needed for business data work might not exist in IT.
- Where strategic programs such as MDM or compliance are underway, organizations should also commit to information stewardship that spans multiple business areas, and should potentially identify a lead information steward.
- Where a chief data officer is in place, the relationship with the business area information stewardship process should be made clear and the reporting lines for information stewards should be established for consistency with desired business outcomes. IT can execute the instructions and results of stewardship (for example, data maintenance or policy execution).
- Do not outsource the work of policy enforcement, because of the lack of context and limited business domain knowledge of the outsourcing partners.

Gartner Recommended Reading

What Are the Must-Have Roles for Data and Analytics?

Master Data Management

Analysis By: Sally Parker, Simon Walker

Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Definition

Master data management (MDM) is a technology-enabled business discipline in which business and IT work together to ensure the uniformity, accuracy, stewardship, governance, semantic consistency and accountability of the enterprise's official shared master data assets. Master data is the consistent and uniform set of identifiers and extended attributes that describes the core entities of an enterprise.

Why This Is Important

MDM is a cross-organizational, collaborative effort that is focused on the consistency, quality and ongoing stewardship of master data. Master data is that subset of data which describes the core entities of an organization; those required for it to function — such as its customers, citizens, products, suppliers, assets and sites. This master data sits at the heart of the most important business decisions — driving a need for a consistent view across business silos.

Business Impact

Trusted master data is a foundational requirement of digital business with a range of vested stakeholders across the organization. Leading organizations draw the causal link between master data and the business outcomes it supports across finance, sales, marketing and supply chain, as examples. Improvements include:

- Risk management and regulatory compliance
- Customer experience
- Cross-sell and upsell
- Supply chain optimization
- Accurate reporting
- End-to-end process optimization
- Reduced time to market

Drivers

Trusted master data is a foundational requirement of digital business:

- Organizations with complex or heterogeneous application and information landscapes typically suffer from inconsistent master data, which in turn weakens business-process integrity and outcomes. As a result, interest in MDM extends beyond the office of the CDO/CIO to business leaders across finance, marketing and supply chain who have drawn a causal link between trusted master data and the ability to optimize their business strategies.

- Organizations having invested in establishing a trusted enterprisewide view of their master data benefit from a greater agility to predict and respond to unexpected events — to pivot strategies in response to external factors such as COVID-19. Gartner inquiries on MDM rose 28% from March 2020 to December 2020 (n = 1,534) compared with the same period in 2019 as organizations scrambled to get their "data houses" in order.
- Although MDM is not a new concept, market penetration of MDM as a whole is led by North America, followed by Europe, then Asia/Pacific, with Latin America trailing.
- A prior hesitance to embark upon MDM initiatives due to complexity and cost is easing. This can be attributed to two contributing factors: increased recognition of the causal link between trusted master data and business agility/outcomes by a broader range of stakeholders; a lowering of the barrier to entry to adopt commercial MDM solutions. As the technological barrier to entry has lowered, the target audience has expanded beyond large enterprises with deep pockets.

Obstacles

In recent times technological barriers to MDM solutions have eased — but this addresses only part of the complexity.

- Slow to embrace cloud, the MDM solutions market has relatively recently shifted toward subscription pricing, cloud-based offerings and simpler (configure vs. code) products, which now contributes to a more approachable solution and shortening of deployment times.
- Technology alone is insufficient to solve a problem that traverses people, process and technology across the enterprise. Thus, MDM remains a complex and maturing undertaking.
- Successful MDM implementations require capabilities including business acumen, technical know-how, domain understanding and data governance. Finding the right balance and availability of these skill sets remains problematic and is driving a need for third-party services as the norm.

User Recommendations

If your business strategy depends on the consistency of data within your organization, you will likely consider MDM as an enabler of this strategy. MDM is leaving the Trough of Disillusionment as organizations better understand both the opportunity and the challenges — challenges many are often now unable to overcome without external guidance.

Organizations investigating MDM should:

- Approach MDM as a technology-enabled business initiative
- Secure executive sponsorship to facilitate cross-organizational collaboration.
- Ensure the causal link between the MDM initiative and the business outcomes it supports are clearly understood and articulated.
- Keep it lean and focused.
- Leverage third-party services to fast-track time to value. Over 90% of organizations leverage external support with their MDM strategy and/or implementation. Third parties offering industry expertise and accelerators can greatly impact time-to-value.

Gartner Recommended Reading

Magic Quadrant for Master Data Management Solutions

Critical Capabilities for Master Data Management Solutions

Three Essentials for Starting and Supporting Master Data Management

Create a Master Data Roadmap With Gartner's MDM Maturity Model

Climbing the Slope

Multidomain MDM Solutions

Analysis By: Simon Walker

Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Definition

Multidomain master data management (MDM) is an enabling technology that supports the management of any number of master data domains across the full spectrum of MDM implementation styles. This can be achieved via implementation of either a single, integrated offering or portfolio-domain-specific MDM offerings.

Why This Is Important

Multidomain MDM solutions provide the enterprise with the capability to achieve a consistent, trusted semantic view of some or all of its key master data domains. This offers significant advantages that accrue from strategic, enterprisewide data governance, management of consistent master data across organizational units, alignment of business data definitions and the effective execution of data stewardship. As such, multidomain MDM solutions aid more advanced business outcomes.

Business Impact

Organizations often begin with a single domain for master data management, but multidomain MDM is now the most common implementation:

- Multidomain MDM allows for MDM programs to scale to meet the evolving needs of digital business.
- Multidomain supports modern D&A strategies, such as adaptive governance and data fabrics.
- The majority of MDM software solutions available today can support multiple domains.
- Multidomain platforms help lower total cost of ownership (TCO) when compared to multiple single-domain solutions.

Drivers

- MDM solution vendors fully embrace multidomain as a concept. Vendors drive innovation of multidomain solutions. As a result, their clients have taken advantage of the inherent capabilities of the technology they have invested in.
- Multidomain MDM is the natural progression of an MDM program. For example, if you have product master data, those products may come from suppliers, which is a second master data domain.
- Multidomain MDM enables the possibility of cross-domain relationships. Graph technology is often utilized. Cross-domain relationships and relationship discovery can provide greater insights and value for business users.

Obstacles

- Governance and stewardship maturity, political or cultural readiness, and the ability to establish organizational leadership across multiple business areas spanning multiple data domains.
- It is critical to understand that MDM technology adoption alone does not ensure success, because greater effort is needed in terms of design, governance, business process and organizational change management.
- There must be clear use cases and measurable business outcomes requiring multidomain MDM capabilities.
- Internal skills are often lacking, requiring third-party assistance.
- How MDM vendors define a “multidomain MDM solution” can vary. A vendor and its solution(s) may not support all domain requirements and capabilities equally.

User Recommendations

- Take a programmatic approach to multidomain MDM by using Gartner’s MDM Operating Model (see Three Essentials for Starting and Supporting Master Data Management).
- Identify measurable business outcomes that require a multidomain capability.
- Build a roadmap that aims to deliver one domain at a time.
- Assess organizational maturity. This can vary per master data domain.

- Include varying models, maturity and implementation styles across the different master data domains within the roadmap.

Sample Vendors

Ataccama; IBM; Informatica; Profisee; Riversand; SAP; Semarchy; Stibo Systems; TIBCO Software

Gartner Recommended Reading

Which Data Is Master Data?

Three Essentials for Starting and Supporting Master Data Management

Articulating MDM Value to the Business

Magic Quadrant for Master Data Management Solutions

MDM of Customer Data

Analysis By: Malcolm Hawker

Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Definition

Master data management (MDM) of customer data enables business and IT organizations to ensure the uniformity, accuracy, stewardship, governance, semantic consistency, and accountability of an enterprise's official shared customer data assets (including, for example, customers, patients and citizens). Such implementations enable downstream systems or processes to author and/or consume customer master data and conform to one or more MDM implementation styles.

Why This Is Important

The ongoing digital transformation strategies of organizations are creating increased urgency around the need for consistent customer master data across business silos, as are pandemic recovery efforts. Optimizing the customer experience (CX) across all touchpoints in the digital world requires an accurate, consistent and holistic view of the customer, which depends on trusted customer master data. A lack of customer master data leads to fragmented experiences and operational inefficiencies.

Business Impact

Trusted customer master data is key to the success of any digitalization strategy or supporting element, like CRM, digital commerce, or CX. MDM programs and solutions are key components of these initiatives. The ability to correctly draw on a trusted, accurate and comprehensive single customer view can help organizations:

- Optimize the CX
- Cross-sell across products and markets
- Retain customers
- Execute end-to-end customer processes efficiently
- Manage risk and regulatory compliance

Drivers

- With an increased focus on digital transformation and acceleration there is more customer data being generated within organizations than ever before — both from traditional and digital sources. The same is true with potential external sources of customer data, which when aggregated with internal data together, can create a massive challenge for organizations seeking a consistent, accurate, and trustworthy source of all relevant customer interactions.
- An additional driver of customer data growth is the increasing adoption of applications to help organizations automate and optimize the growing number of digital interactions, which creates more silos of customer data. Two examples include customer data platforms (CDPs) and CRM solutions. These solutions, and others like them, create additional complexities around effective MDM of customer data.
- More traditional drivers of MDM of customer data, including regulatory compliance, fraud, credit risk and multiple other operational processes. These are dependent on accurate and trustworthy customer data, and remain highly relevant, even for companies prioritizing digital transformation.
- Increases in customer data and the number of systems housing it are putting pressure on companies to optimize and modernize their MDM programs to support these needs. Vendors are enhancing their capabilities to provide the added scale within their MDM processes, needed to handle exploding data volumes. This includes the migration of MDM software solutions to cloud and cloud-native platforms, and the integration of more augmented MDM capabilities. This leverages graph, AI/ML and other new technologies to bridge the gap that exists between enterprise MDM solutions and customer data-centric applications, such as customer data platforms (CDP's).
- Forward-thinking companies are also evaluating data fabrics and other metadata driven approaches as longer-term solutions to provide more flexible and scalable alternatives for effective customer MDM.

Obstacles

- MDM of customer data is inhibited by inadequate focus on MDM best practices. However, domain-specific MDM solutions and implementations are approaching the Plateau of Productivity more rapidly than enterprisewide MDM.
- Enterprise wide MDM is becoming a multifunctional data platform, increasing the overlap between customer MDM solutions and customer-data-specific applications. This increases confusion over the definition of customer master data versus application data. Broadening an MDM program scope to include application data adds risk to a customer MDM implementation.
- A major obstacle to effective customer MDM is data governance maturity. The capabilities of MDM technologies around context-centric and AI-driven insights generally exceed the governance maturity of most companies, hindering the value of more advanced forms of customer MDM.
- Hyped technologies in adjacent categories, like CDPs, which claim to offer customer MDM features, but often lack the capabilities Gartner expects.

User Recommendations

- Use an MDM style (or styles) that reflects the business strategy of the organization and delivers business value by providing trustworthy customer data for consumption in operational business processes and downstream analytics systems.
- An MDM of customer data strategy should support requirements spanning multiple usage scenarios, implementation styles and data domains, and any governance and organizational models supporting MDM.
- Evaluate MDM solutions based on capabilities for data modeling and quality, integration, data stewardship and information governance, business services and workflow, measurement, and manageability. Be aware of hyped technologies in adjacent categories, like customer Data platforms (CDPs), which claim to offer customer MDM features, but often lack the capabilities Gartner expects from enterprise MDM platforms.

Sample Vendors

Informatica; Profisee; Reltio; Semarchy; TIBCO Software

Gartner Recommended Reading

Magic Quadrant for Master Data Management Solutions

Choose Between Customer Data Platforms and MDM Solutions for 360-Degree Customer Insights

CRM Success Requires Master Data Management Integration

MDM Is Critical to Maximizing CRM and Customer Experience

Improve CRM and Customer Data With Master Data Management

MDM of Product Data

Analysis By: Simon Walker

Benefit Rating: High

Market Penetration: 20% to 50% of target audience

Maturity: Early mainstream

Definition

Master data management (MDM) of product data enables organizations to ensure the uniformity, accuracy, stewardship, governance, semantic consistency and accountability of an enterprise's master product data. The two use cases for master product data are supply-side MDM (onboarding product master data from partners upstream in a supply chain) and sell-side MDM (syndicating product master data to commerce channels and partners downstream in a supply chain).

Why This Is Important

Digitalization continues to drive broader business initiatives such as digital commerce and demand-driven supply chains that, in turn, drive expanded and increasingly complex requirements for end-to-end product data across a spectrum of business outcomes.

Business Impact

MDM of product data can provide multiple benefits to product-centric organizations, including:

- The quality and availability of product master data is critical to operational efficiencies and effectiveness.

- Manufacturing, distribution, retail and healthcare in particular derive enhanced business agility from a holistic and trusted enterprise view of their product data.
- Customer satisfaction is enhanced through improved commerce experiences.

Drivers

- Regulatory compliance in industries such as medical device manufacturing and food processing
- Reducing time to market for new products and services to achieve a competitive advantage
- Increased revenue through better upselling and cross-selling
- Enabling product data syndication to sell-side partners to avoid penalties
- Achieving greater business agility to adapt to a crisis like COVID-19
- Improved operational efficiencies/cost savings of product development processes, product innovation, better digital product experiences

Obstacles

This discipline has continued to progress slowly along the Hype Cycle for a number of years; yet it continues to be inhibited by:

- Experiences of prior failures often due to inadequate program preparation
- Perceived high cost of MDM programs
- The lack of, or immaturity of, a data governance program
- Focusing only on technologies
- Failure to communicate business value and engage business stakeholders
- Failures due to inadequate program preparation

User Recommendations

- Take a programmatic approach to MDM of product data using Gartner's MDM Operating Model (see Create a Master Data Roadmap With Gartner's MDM Maturity Model).
- Engage stakeholders by focusing on measurable business outcomes.
- Rightsize the MDM roadmap. A series of small deliveries will minimize cost, risk and failures. Think big, start small and be prepared.
- Focus on governance, people and process not technologies. MDM is a technology-enabled business discipline; a technology-only approach leads to failures.

Sample Vendors

Contentserv; IBM; Informatica; Riversand; Stibo Systems; Viamedici; Winshuttle

Gartner Recommended Reading

Which Data Is Master Data?

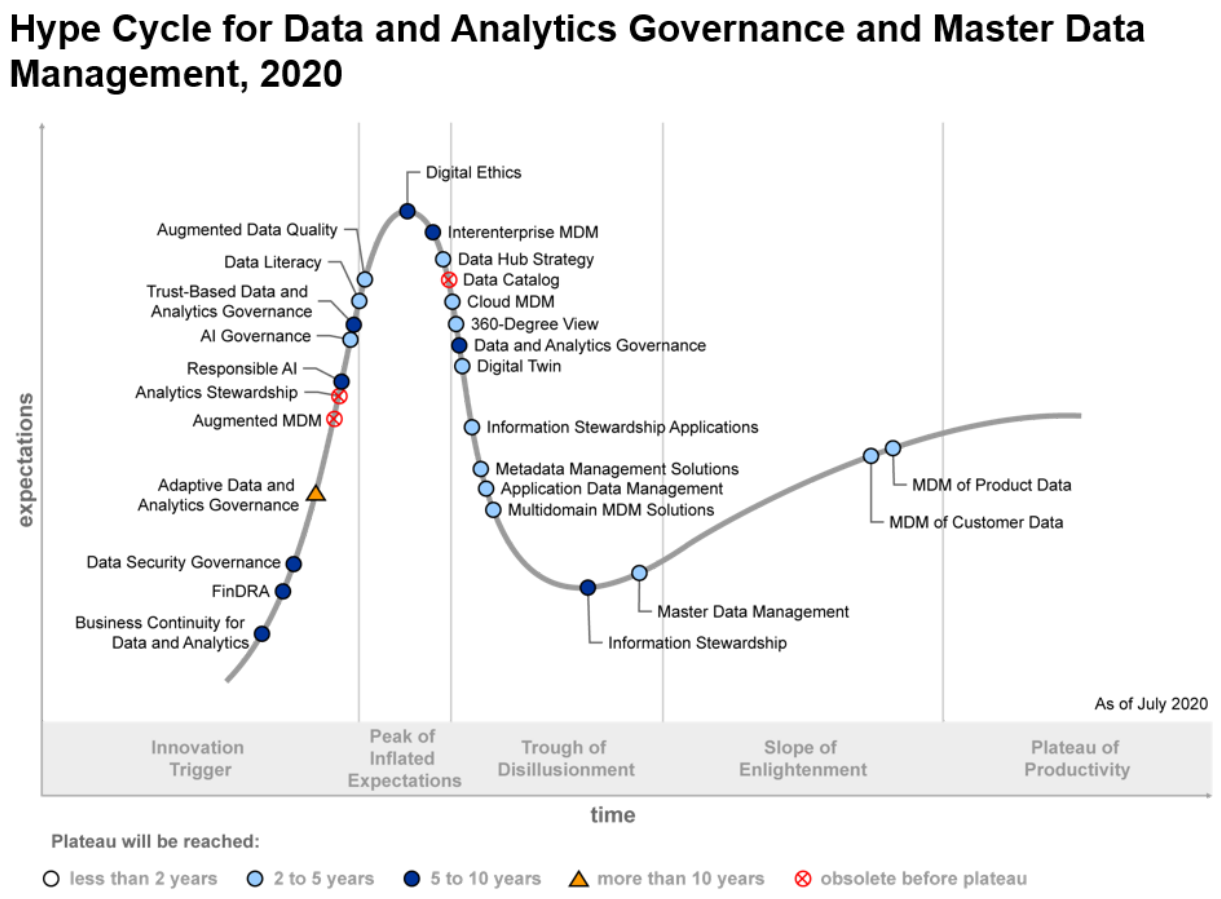
Three Essentials for Starting and Supporting Master Data Management

Articulating MDM Value to the Business

Magic Quadrant for Master Data Management Solutions

Appendixes

Figure 2: Hype Cycle for Data and Analytics Governance and Master Data Management, 2020



Source: Gartner
ID: 441544

Gartner

Source: Gartner (July 2020)

Hype Cycle Phases, Benefit Ratings and Maturity Levels

Table 2: Hype Cycle Phases

(Enlarged table in Appendix)

Phase	Definition
Innovation Trigger	A breakthrough, public demonstration, product launch or other event generates significant media and industry interest.
Peak of Inflated Expectations	During this phase of overenthusiasm and unrealistic projections, a flurry of well-publicized activity by technology leaders results in some successes, but more failures, as the innovation is pushed to its limits. The only enterprises making money are conference organizers and content publishers.
Trough of Disillusionment	Because the innovation does not live up to its overinflated expectations, it rapidly becomes unfashionable. Media interest wanes, except for a few cautionary tales.
Slope of Enlightenment	Focused experimentation and solid hard work by an increasingly diverse range of organizations lead to a true understanding of the innovation's applicability, risks and benefits. Commercial off-the-shelf methodologies and tools ease the development process.
Plateau of Productivity	The real-world benefits of the innovation are demonstrated and accepted. Tools and methodologies are increasingly stable as they enter their second and third generations. Growing numbers of organizations feel comfortable with the reduced level of risk; the rapid growth phase of adoption begins. Approximately 20% of the technology's target audience has adopted or is adopting the technology as it enters this phase.
Years to Mainstream Adoption	The time required for the innovation to reach the Plateau of Productivity.

Source: Gartner (July 2021)

Table 3: Benefit Ratings

Benefit Rating ↓	*Definition* ↓
Transformational	Enables new ways of doing business across industries that will result in major shifts in industry dynamics
High	Enables new ways of performing horizontal or vertical processes that will result in significantly increased revenue or cost savings for an enterprise
Moderate	Provides incremental improvements to established processes that will result in increased revenue or cost savings for an enterprise
Low	Slightly improves processes (for example, improved user experience) that will be difficult to translate into increased revenue or cost savings

Source: Gartner (July 2021)

Table 4: Maturity Levels

(Enlarged table in Appendix)

Maturity Levels	Status	Products/Vendors
Embryonic	In labs	None
Emerging	Commercialization by vendors Pilots and deployments by industry leaders	First generation High price Much customization
Adolescent	Maturing technology capabilities and process understanding Uptake beyond early adopters	Second generation Less customization
Early mainstream	Proven technology Vendors, technology and adoption rapidly evolving	Third generation More out-of-box methodologies
Mature mainstream	Robust technology Not much evolution in vendors or technology	Several dominant vendors
Legacy	Not appropriate for new developments Cost of migration constrains replacement	Maintenance revenue focus
Obsolete	Rarely used	Used/resale market only

Source: Gartner (July 2021)

Document Revision History

Hype Cycle for Data and Analytics Governance and Master Data Management, 2020 - 16 July 2020

Hype Cycle for Data and Analytics Governance and Master Data Management, 2019 - 10 July 2019

Hype Cycle for Information Governance and Master Data Management, 2018 - 24 July 2018

Hype Cycle for Information Governance and Master Data Management, 2017 - 24 July 2017

Hype Cycle for Information Governance and Master Data Management, 2016 - 11 July 2016

Recommended by the Authors

Some documents may not be available as part of your current Gartner subscription.

Understanding Gartner's Hype Cycles

Create Your Own Hype Cycle With Gartner's Hype Cycle Builder

7 Must-Have Foundations for Modern Data and Analytics Governance

Data and Analytics Leaders Must Use Adaptive Governance to Succeed in Digital Business

The State of Data and Analytics Governance Is Worse Than You Think

5 Steps to Build a Business Case for Data and Analytics Governance That Even Humans Will Understand

Build AI-Specific Governance on Three Cornerstones: Trust, Transparency and Diversity

Choose Between Customer Data Platforms and MDM Solutions for 360-Degree Customer Insights

Evolve From Product Information Management to Product Experience Management With a 360-Degree Analytics Strategy

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Table 1: Priority Matrix for Data and Analytics Governance and Master Data Management, 2021

Benefit	Years to Mainstream Adoption			
	Less Than 2 Years	2 - 5 Years	5 - 10 Years	More Than 10 Years
Transformational			Adaptive D&A Governance Data Security Governance Responsible AI	
High		AI Governance Augmented Data Cataloging and Metadata Management Augmented Data Quality Data and Analytics Governance Data Hub Strategy Data Literacy Master Data Management MDM of Customer Data MDM of Product Data Multidomain MDM Solutions	Data and Analytics Stewardship Digital Ethics Interenterprise MDM Trust-Based Governance	Connected Governance D&A Governance Platforms
Moderate		Application Data Management Cloud MDM	Governance of Digital Twins	
Low				

Source: Gartner (July 2021)

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Phase	Definition

Source: Gartner (July 2021)

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