Global Data Strategy
The Business of Data

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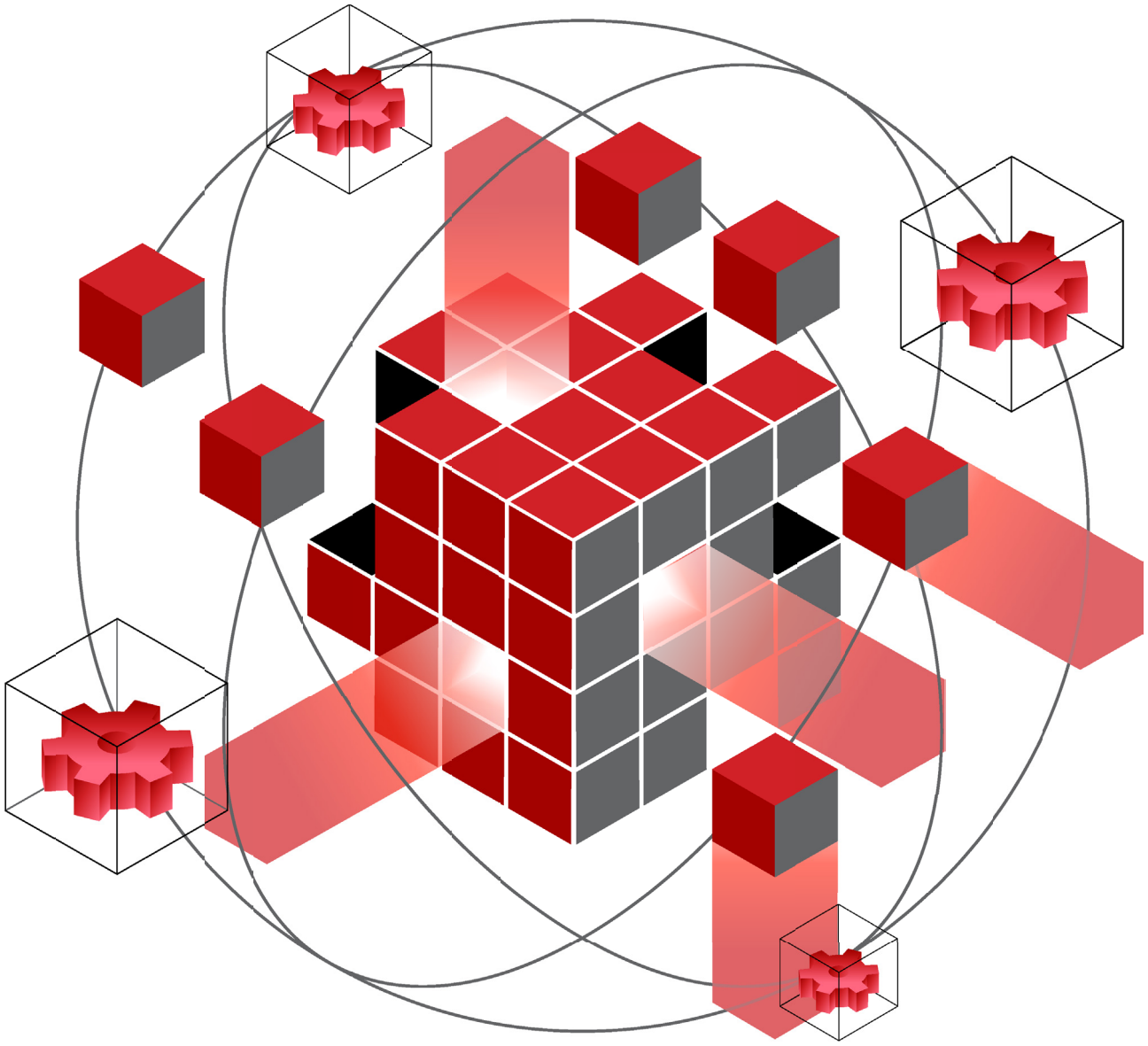
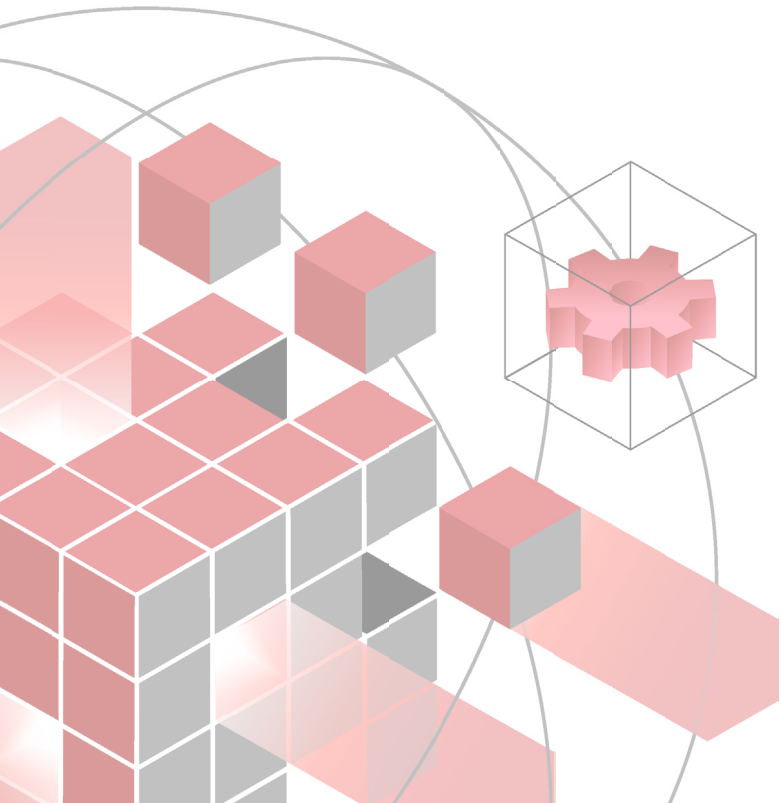


Trends in Data Management

A 2023 DATAVERSITY® Report

Donna Burbank and Michelle Knight



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1. EXECUTIVE SUMMARY

Data powers the modern organization; more and more enterprises are looking to make data-driven decisions through reporting and analytics to drive efficiency and growth. While this remains the goal of most organizations, they are often hampered by poor quality data, lack of data integration, and limited skills across teams in preparing data for business use. These challenges have fueled the demand for Data Governance, Data Architecture, and a business-driven Data Strategy to ensure that data is fit for purpose to drive digital transformation and business agility through analytics.

Key themes and findings of this survey include:

- 88.05% of participants surveyed have a Data Governance program in place at various stages of maturity.
- Those surveyed chose "gaining insights through reporting & analytics" at 69.4% as a top driver for Data Management. This result has remained consistent since the first TDM survey in 2019.
- The "number of data silos" remains a top challenge for Data Management, reported by 60.94% of respondents.
- Business and IT cited improved collaboration when using a defined Data Architecture. Survey results showed an improved collaboration, at 32.08% for business and 34.91% for IT, respectively.
- A Data Governance lead drives Data Management in 41.42% of organizations, while 29.48% is the CIO, 22.76% is the CDO, and 22.39% is a data architect.
- 39.74% of organizations plan on implementing Data Strategy in the next one to two years, while 37.55% are planning to implement MDM, and 34.93% Metadata Management.
- The top three choices for Data Management education were "blogs, screencasts, and other various sources from the Web" (62.72%), "books on Data Management" (60.96%), and "Data Management courses outside of university work" (52.19%).
- 23.33% are currently implementing a data lake in conjunction with a data warehouse, while 23.81% said they do not have a use case for a data lake.
- More than 50% of respondents said their organization is actively using Data Modeling.
- The top three new technologies/trends that organizations are planning on implementing by 2025 are data fabric or data mesh (26.11%), serverless computing (22.78%), and microservices (15%).

2. RESEARCH AND DEMOGRAPHICS

A. Scope of Research

DATAVERSITY's *2023 Trends in Data Management Survey (TDM)* offers insights into businesses' directions and concerns as Data Management evolves. This report represents the fifth in a series that started in 2019.

The overall structure and methodology of the 2023 study have remained like those of previous years. When relevant, we will compare previous Trends in Data Management surveys with 2023's to determine long-term trends.

This year's survey had a total of 285 participants from 35 countries, spanning five continents and 25 industries. Businesses of all sizes were surveyed, along with a variety of roles.

Most respondents worked with Information/Data Governance (38.08%), followed by Data and/or Information Architecture (19.57%), Business Intelligence (BI)/Analytics/Data Science (11.39%), and consultants (8.90%). The remaining roles spanned from auditors to business executives and marketers.

Additionally, a broad selection of industries was represented, from mining, cement, pharmaceuticals, and government.

This survey had 29 questions. Two of the questions were open-ended, with the remaining questions offering a selection of answers, and some with instructions to check off all answers that apply.

The questions offering checked-off responses typically included an "other (please specify)" box, with space available for a short description. Those comments will be included where relevant to the analysis.

The survey had eight sections, each followed by a space for additional comments. The eight sections of questions are:

- General Demographics (four questions)
- The Current State of Data Management (six questions)
- Challenges, Priorities, and Training (four questions)
- Data Governance and Metadata Management (two questions)
- Data Architecture (three questions)
- Data Modeling (three questions)
- Data Platforms and Storage (four questions)
- New Technologies and Trends (three questions)

DATAVERSITY recruited survey participants through an email campaign using the Data Education Month resources. Those who responded received links for the *2023 Trends in Data Management Survey*, and there was no time limit for answering the questions.

The 285 participants did not receive monetary compensation. Instead, they received the compiled preliminary results from the study. Please note that the survey's responses and comments represent only the views of these participants.

B. Principal Demographics

First, survey respondents answered a general question about their job title and country of origin. Then they replied to three main demographic questions regarding their job function, their industry, and how many employees work at their company. We include more details on these below.

1. Job Function

Most respondents in the 2023 survey (and previous surveys) held data-centric positions [Figure 1]:

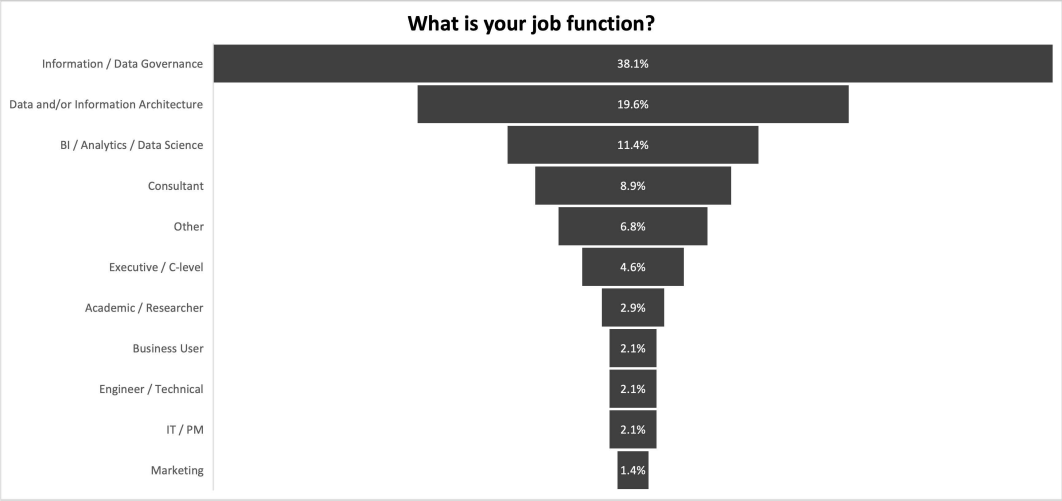

Figure 1: Job Function (2023)

By profession, the top three career groups responding in 2023 are:

- Information/Data Governance: 38.08%
- Data and/or Information Architecture: 19.57%
- BI/Analytics/Data Science: 11.39%

The high response rate for Information/Data Governance is not surprising, as more and more organizations look to implement Data Governance as the data-driven business comes to the forefront in the industry, and more software vendors are focusing their attention in this area. Notably, 88% of respondents to this survey have a Data Governance program in place with varying levels of maturity.

Data Architecture is another high-ranking role, which is again not surprising as Data Architecture is often the technical counterpart for Data Governance efforts, and for BI, Analytics and Data Science.

BI, Analytics, and Data Science as the third most popular title aligns with the growing goal of using data to drive decisions. This need for improved analytics also drives the need for Data Governance and Data Architecture as organizations look to build trusted data sets.

2. Industry Representation

The 2023 study represented a broad selection of industries, ranging from retail to healthcare to government. Survey participants came from over 25 industries. [Figure 2]:

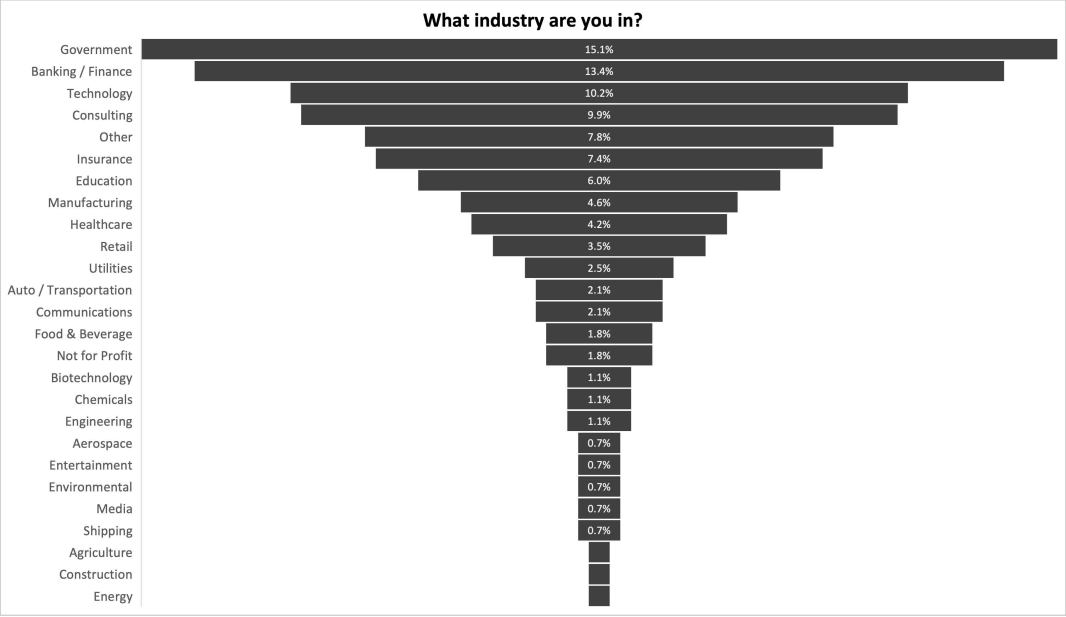

Figure 2: Industry (2023)

The Top 10 sectors are:

- Government: 15.14%
- Technology: 10.31%
- Consulting: 9.86%
- Other (please specify): 7.75%
- Insurance: 7.39%
- Finance: 7.04
- Banking: 6.34%
- Education: 5.99%
- Manufacturing: 4.58%
- Healthcare: 4.23%

Among those noted, participants in other industries included mining and cement, pharmaceuticals, an airport, and real estate.

A broad range of industries shows an increasing popularity in achieving data-driven goals. While past TDM studies show government, financial, and education sectors leading the pack, this margin has shrunk today, showing data-driven requirements in nearly every industry type and sector.

3. Company Size

Although businesses of many sizes participated in the survey, over 70% of the respondents came from companies with more than 1000 workers. [Figure 3]:

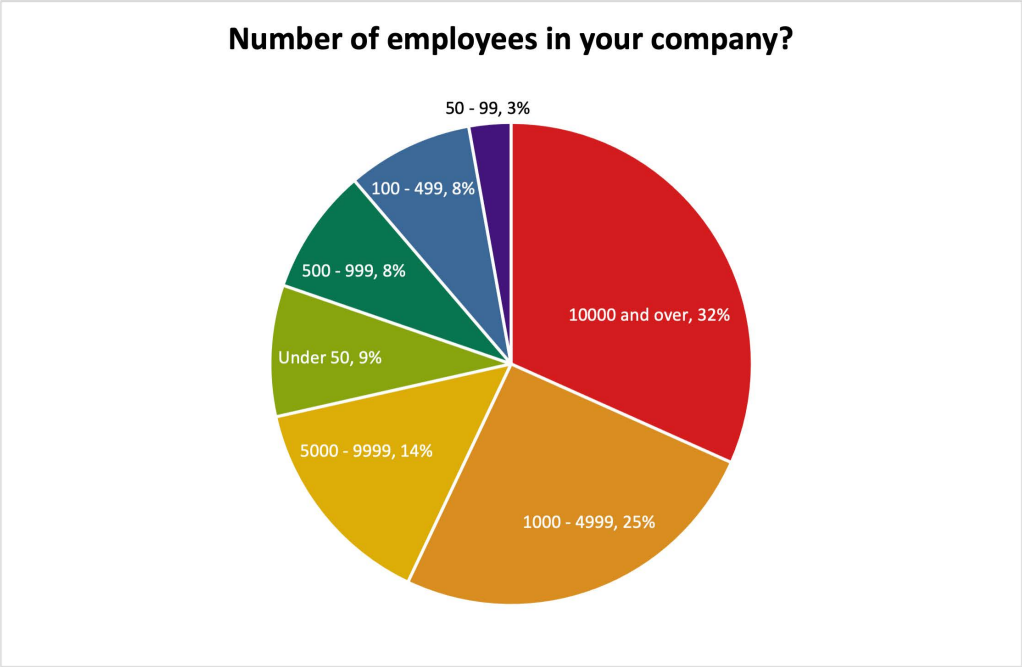

Figure 3: Number of Employees (2023)

The Top 3 segments consisted of the following:

- 10,000 and over: 31.69%
- 1000–4999: 25.35%
- 5000–9999: 14.44%

While large organizations showed the highest representation partly due to the complexity of their environments and higher budgets to support Data Management, there is clear representation from all organizational sizes.

3. THE CURRENT STATE OF DATA MANAGEMENT

DAMA International's Data Management Body of Knowledge (DAMA DMBoK) has the recognized industry-standard Data Management definition. It says:

"Data Management is the development, execution, and supervision of plans, policies, programs, and practices that deliver, control, protect, and enhance the value of data and information assets throughout their life cycles."

We affirm the authority of the DAMA-DMBoK as the definition used in this report. To gain a more holistic understanding of Data Management, DATAVERSITY asked six questions about organizational scope, roles, and plans. Some participants left additional comments in the space provided.

A. The Scope of Data Management

To understand how broadly Data Management impacts organizations, the survey asked [Figure 4]:

- **"What is the scope of Data Management in your organization?"**

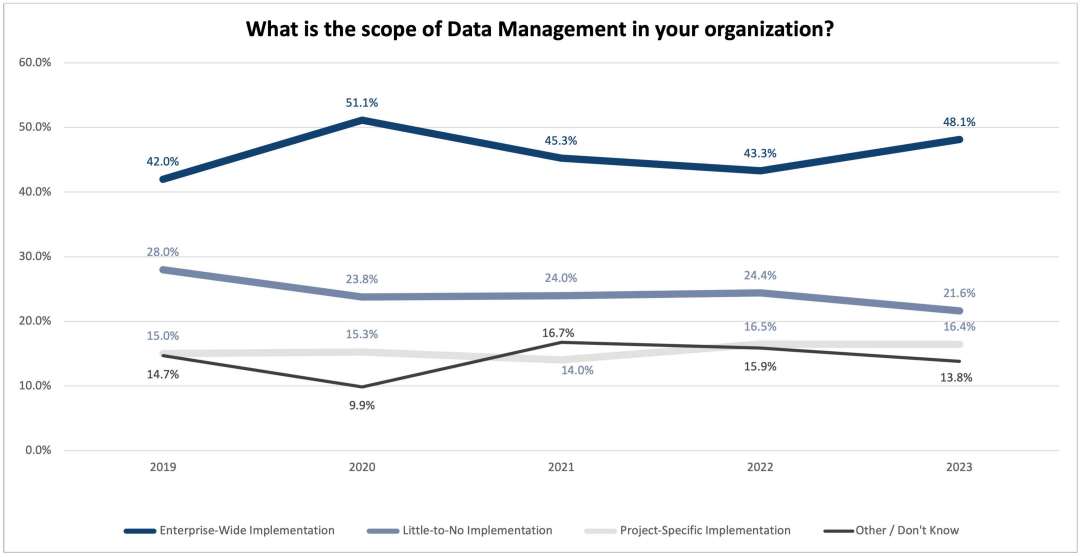

Figure 4: Scope of Data Management (2019 - 2023)

Survey results showed the following:

- We have an enterprise-wide effort: 48.13% (43.29% in 2022, 45.25% in 2021, 51.12% in 2020)
- We do not have robust Data Management practices in place: 21.64% (24.39% in 2022, 23.98% in 2021, 23.77% in 2020)
- We implement Data Management for individual projects only: 16.42% (16.46% in 2022, 14.03% in 2021, 15.25% in 2020)
- Other (please specify): 10.45% (16.46% in 2022, 14.03% in 2021, 15.25% in 2020)
- Don't Know: 3.36% (3.66% in 2022, 3.62% in 2021, 2.24% in 2020)

"We have the beginnings of an enterprise-wide effort. Previously, our Data Management was always project-based."

As in previous years, "we have an enterprise-wide effort" represented the top choice. At the same time, however, there is also a consistent percentage of respondents that do not yet have robust Data Management practices in place (21.64% in 2023, 24.39% in 2022, 23.98% in 2021, and 23.77% in 2020).

Additionally, some participants noted that they only implemented Data Management for individual projects (16.42% in 2023, 16.46% in 2022, 14.03% in 2021, and 15.25% in 2020). Likewise, the 3.36% of those surveyed in 2023 who answered "don't know" offered responses indicating that Data Management happens only in some parts of the organization. Comments included:

- "We have the beginnings of an enterprise-wide effort. Previously, our Data Management was always project-based."
- "We have an ecosystem of Data Management systems and are moving to an enterprise approach."
- "We implement DM practices for some projects, but it's up to the projects. We have no centralized practice in place. Consequently, our divisions have varying degrees of maturity."

We also asked the following [Figure 5]:

- **"Does your organization treat data as a corporate asset?"**

Figure 5: Data as a Corporate Asset (2023)

The survey question showed the following results:

- Yes: 62.92%
- No: 31.09%
- Don't know: 5.99%

Overwhelmingly, participants said that their organizations considered data as a corporate asset in 2023. Only a few surveyed responded with "no" or "don't know" when asked this question.

B. Goals and Drivers

Those surveyed responded to the following [Figure 6]:

- **"What are your main business goals and drivers for implementing Data Management in your organization?"**

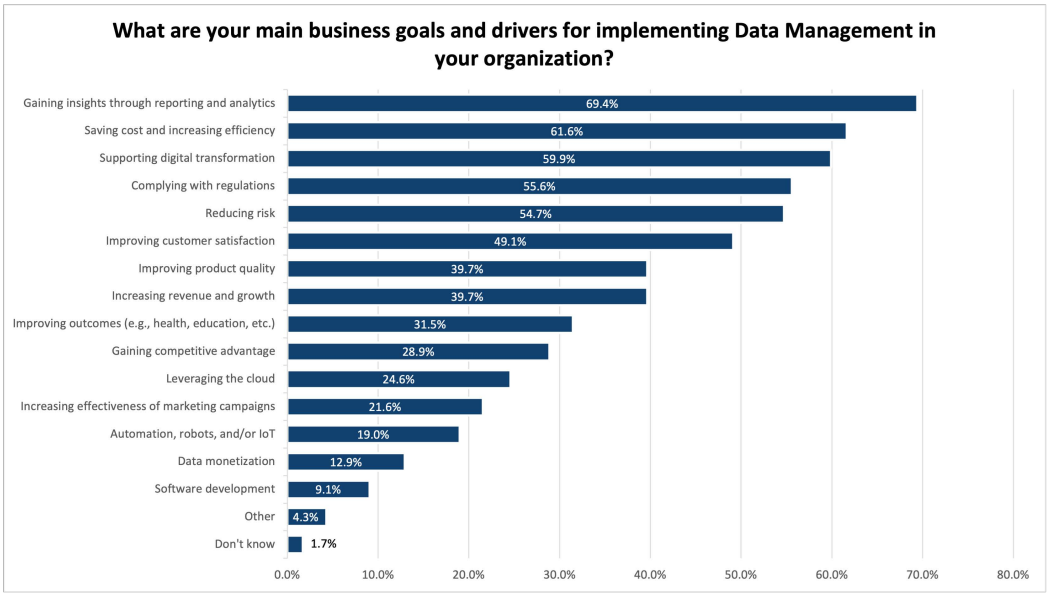

Figure 6: Business Goals and Drivers (2023)

The Top 5 goals and drivers in 2023 present as follows:

- Gaining insights through reporting & analytics: 69.40%
- Saving cost and increasing efficiency: 61.64%
- Supporting digital transformation: 59.91%
- Complying with regulations: 55.60%
- Reducing risk: 54.74%

"Gaining insights though reporting & analytics" continues to be the number one response year after year since the survey's inception in 2019. As organizations look to make data-driven decisions, reporting and analytics is key to success. Reporting and analytics is typically the "face" of data and what comes first to mind when business user think of data.

The benefits of better reporting and analytics are shown in the remaining Top 5 responses. Both the "carrot" or saving costs and increasing efficiency and supporting digital transformation

as well as the “stick” of complying with regulations and reducing risk. These have also been consistent priorities from previous years.

C. Roles Driving Data Management

Responsibilities in developing a Data Management program span a wide range of job descriptions. To gain an understanding of who is guiding and developing Data Management, we asked [Figure 7]:

- **“Who is driving Data Management in your organization?”**

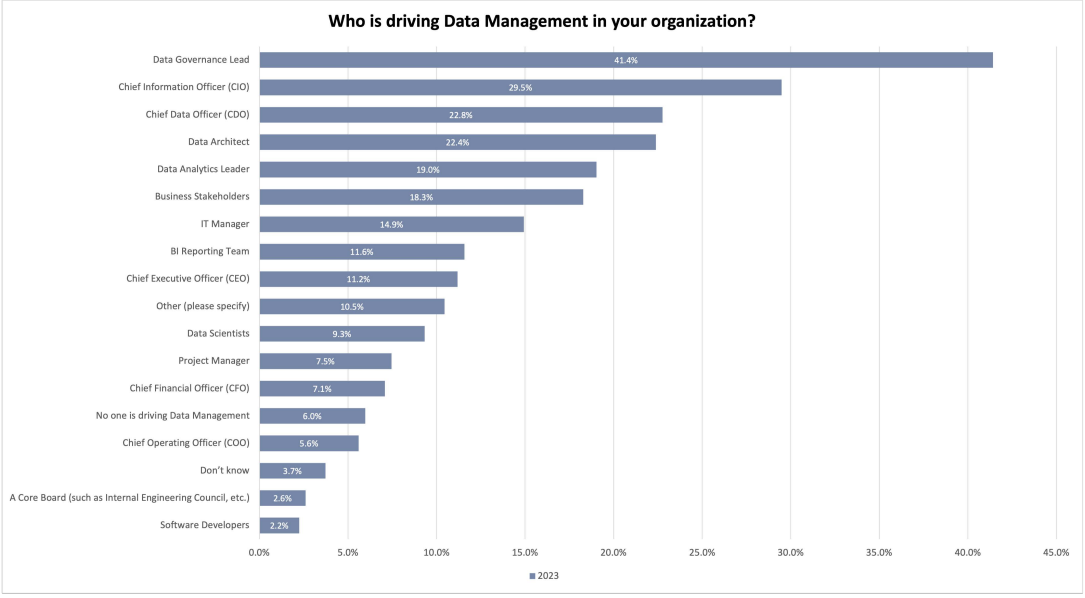

Figure 7a: Who is Driving Data Management? (2023)

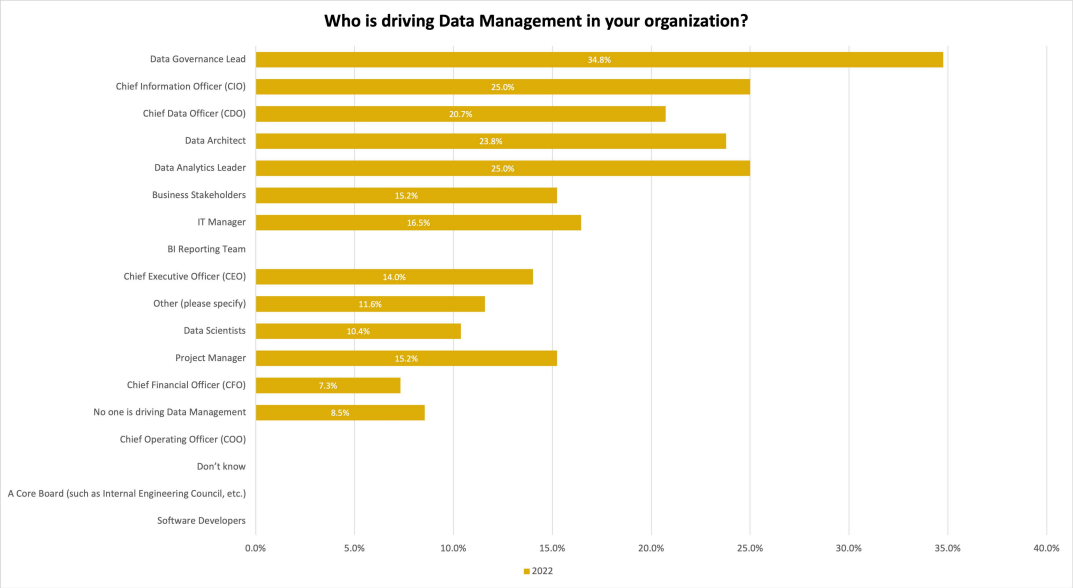

Figure 7b: Who is Driving Data Management? (2022)

The Top 5 responses in 2023 include:

- Data Governance Lead: 41.42% (34.76% in 2022)
- Chief Information Officer (CIO): 29.48% (25.00% in 2022)
- Chief Data Officer (CDO): 22.76% (20.73% in 2022)
- Data Architect: 22.39% (23.78% in 2022)
- Data Analytics Leader: 19.03% (25.00% in 2022)

The growth of the Data Governance Lead role shows that organizations see Data Management as an enterprise effort supporting data as a corporate asset of prime importance.

Data Governance Leads continue to have a strong, increasing presence in driving Data Management. Since 2022, this role has increased by 6.66%, while Project Manager dropped simultaneously at 7.78%, from 15.24% in 2022 to 7.46% in 2023.

The growth of the Data Governance Lead role shows that organizations see Data Management as an enterprise effort supporting data as a corporate asset of prime importance shown earlier in section 3A. As a result of their more holistic and program-based approach, Data Governance Leads increasingly drive more Data Management initiatives compared to Project Managers, who typically have a more tactical, narrow project view.

With a growing Data Governance Lead impact, we see more business users involved in leading Data Management efforts, an increase of 3.04%, from 15.24% in 2022 to 18.28% in 2023. These numbers show a positive trend as Data Governance represents a business-led and business-aligned activity.

While data is a business asset, it also remains a core technical activity. Survey responses in 2023 support this analysis as the CIO role takes second place, an increase of 4.48%, from 25.00% in 2022 to 29.48% in 2023.

D. Components of Data Management

Data Management spans people, processes, and technology. We wanted to know which Data Management components organizations use today and plan for in the future. First, we asked [Figure 8]:

- **"Which of the following have you already implemented in your organization?"**

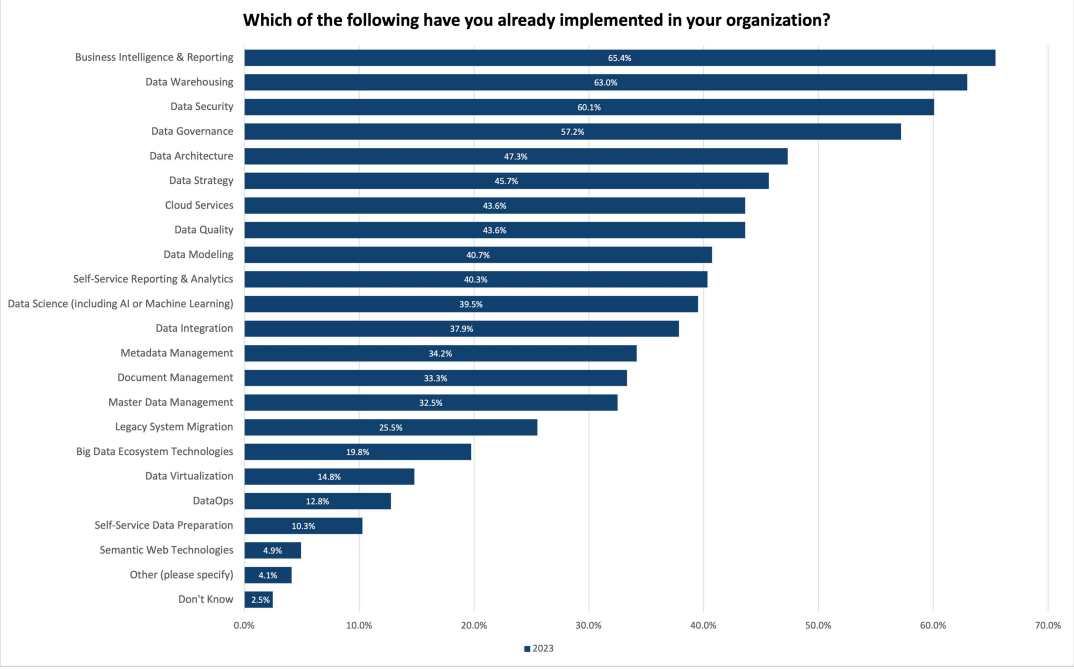

Figure 8a: Current Implementation of Data Management (2023)

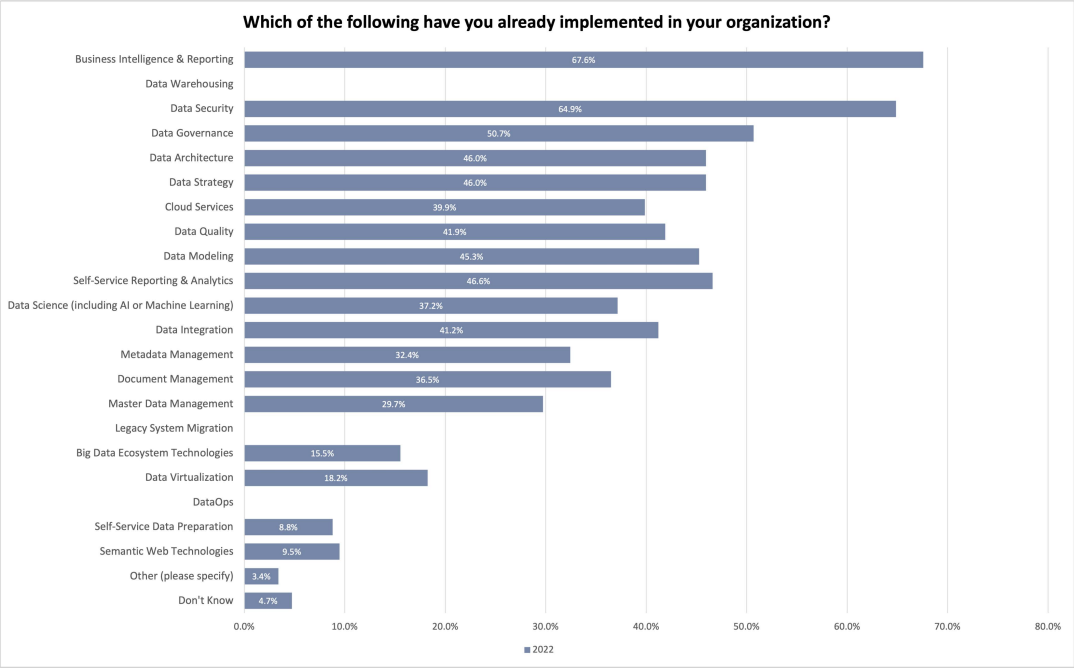

Figure 8b: Current Implementation of Data Management (2022)

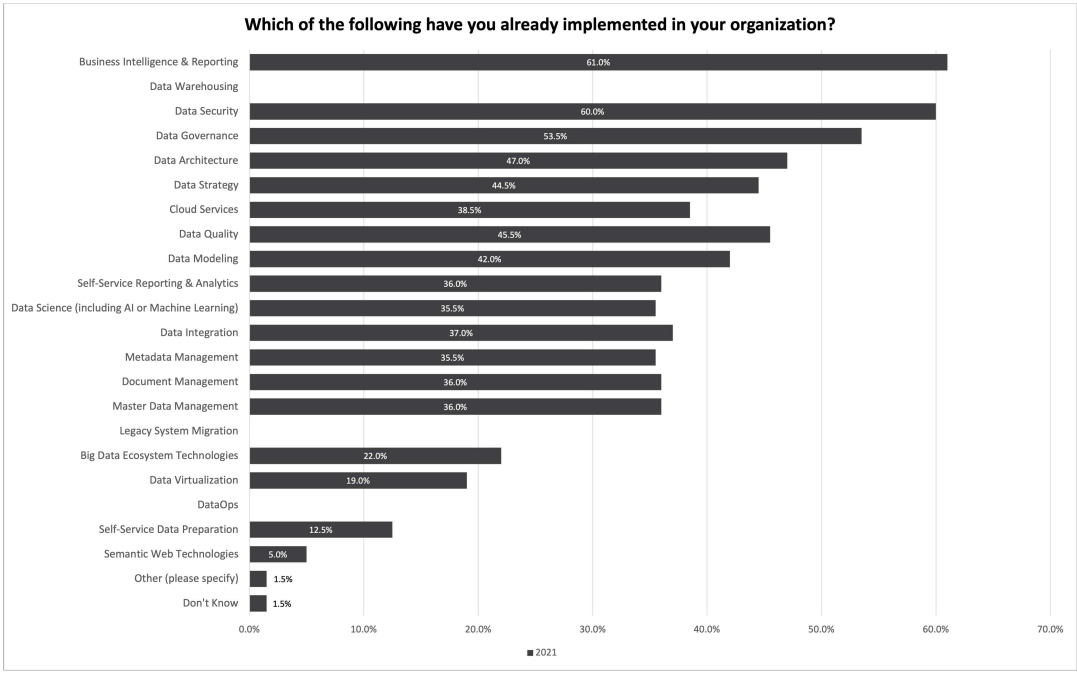

Figure 8c: Current Implementation of Data Management (2021)

Implementation of the Top 5 practices in 2023 rank as follows:

- Business Intelligence and Reporting: 65.43% (67.57% in 2022, 61.00% in 2021)
- Data Warehouse: 62.96% (64.19% in 2022, 62.00% in 2021)
- Data Security: 60.08% (64.86% in 2022, 60.00% in 2021)
- Data Governance: 57.20% (50.68% in 2022, 53.50% in 2021)
- Data Architecture: 47.33% (45.95% in 2022, 47.00% in 2021)

"We have not 'implemented.' Instead, we have committed to strategies that include transitioning to a data literate culture that will require the installation of new systems. We have carried out this plan in the early stages."

Respondents used the following the least:

- DataOps: 12.76% (new answer in 2023)
- Self-Service Data Preparation: 10.29% (8.78% in 2022, 12.50% in 2021)
- Semantic Web Technologies: 4.94 % (9.46% in 2022, 5.00% in 2021)

"Business intelligence and reporting" and "data warehouse" continue to lead the Top 5 areas year after year, which aligns with the top business driver of "gaining insights though reporting & analytics." Organizations are consistently looking to obtain data-driven insights to improve their organization's operations. "Security, Governance, and Architecture" are other consistent top responses since these support trusted data sets for reporting and insights. One area that has dropped from the Top 5 since 2022 is self-service reporting. A likely cause is that as more users begin creating their own reports, they are hampered by Data Quality and the lack of trusted data sets, which explains the high priority of Data Governance and Architecture.

We note that core Data Management fundamentals must be integrated into the organization's ongoing culture and business-as-usual activities rather than "implemented" as a short-term project. In this light, a respondent made this important distinction, commenting:

> "We have not 'implemented.' Instead, we have committed to strategies that include transitioning to a data literate culture that will require the installation of new systems. We have carried out this plan in the early stages."

The survey followed up with participants about their plans for improvements in the future [Figure 9]:

- **"Which of the following are you planning on implementing in the next 1–2 years in your organization?"**

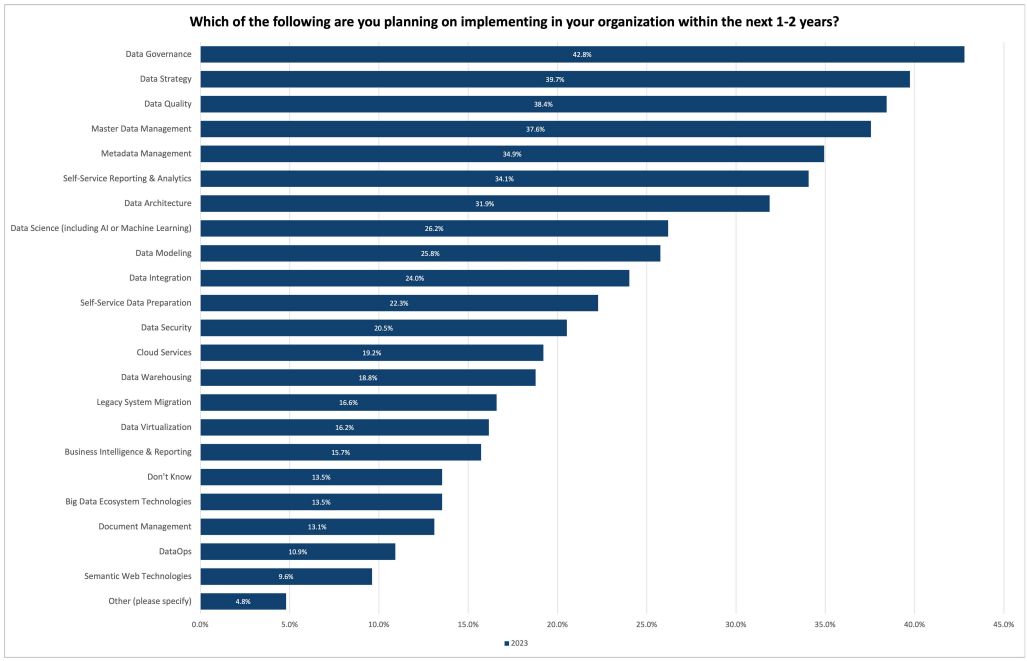

Figure 9a: Future Implementation of Data Management (2023)

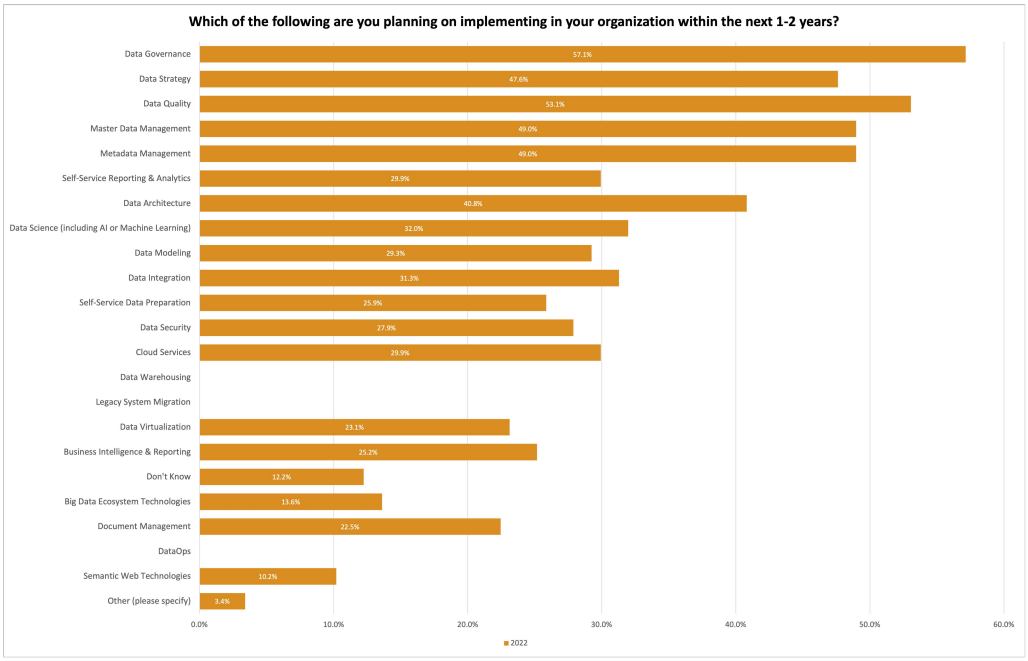

Figure 9b: Future Implementation of Data Management (2022)

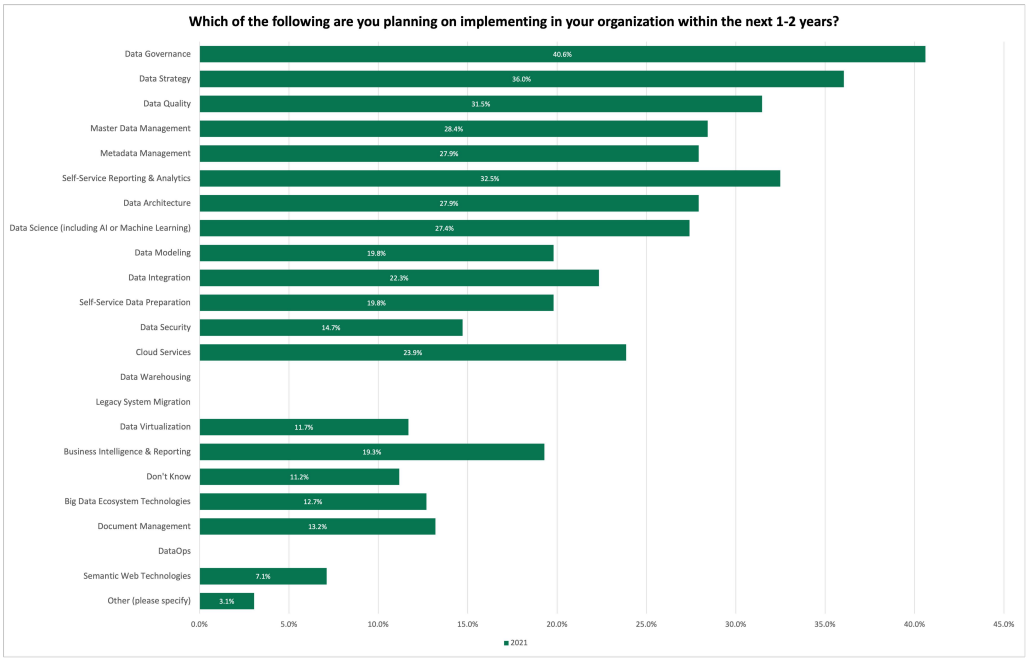

Figure 9c: Future Implementation of Data Management (2021)

Between 2023 and 2025, businesses plan to implement the following Top 5 areas:

- Data Governance: 42.79% (57.14% in 2022, 40.61% in 2021)
- Data Strategy: 39.74% (47.62% in 2022, 36.04% in 2021)
- Data Quality: 38.43% (53.06% in 2022, 31.47% in 2021)
- Master Data Management: 37.55% (48.98% in 2022, 28.43% in 2021)
- Data Architecture: 31.88% (40.82% in 2022, 27.92% in 2021)

"We are shifting from a culture of our data being siloed to thinking enterprise-wide and combining our data to provide better analytics and models."

Organizations plan to implement the least between 2023 and 2025:

- Document Management: 13:10% (22.45% in 2022, 13.20% in 2021)
- DataOps: 10.92% (new answer in 2023)
- Semantic Web Technologies: 9.61% (10.20% in 2022, 7.11% in 2021)

Results show that organizations highly emphasize trusted data sets to support data-driven decisions through reporting and analytics. While firms currently support Business Intelligence and Reporting, future trends lean toward Data Governance, Data Strategy, Data Quality, Master Data Management (MDM), and Data Architecture, all domains supporting Data Quality.

E. Concluding Comments

Organizations currently focus on reporting and analytics as priorities while planning to concentrate on Data Management fundamentals in the future, such as Data Governance, Data Architecture, and Data Quality. This outcome makes sense as companies need quality, trusted, secure data sets to support data-driven decision-making from reports and analytics.

Notable comments include:

- "We are shifting from a culture of our data being siloed to thinking enterprise-wide and combining our data to provide better analytics and models."
- "We have been modernizing Data Management over the past three years and have started to focus heavily on Data Governance over the past six months. We expect to continue these activities."
- "We are growing awareness of Data Governance's and Data Management's importance."

4. GOALS, PRIORITIES, AND TRAINING

The previous section's survey questions and answers shaped current Data Management practices and planned future implementations. This section focuses on the needs of organizations to become data-driven, with four questions.

Participants were asked about their organization's challenges, priorities, and training. Additionally, some participants left comments at the end of this section in the space provided.

A. Challenges and Drivers

Everyone surveyed faced difficulties in achieving Data Management goals. To gain a better understanding of what these are, we asked [Figure 10]:

- **"What are the biggest Data Management challenges faced by your organization?"**

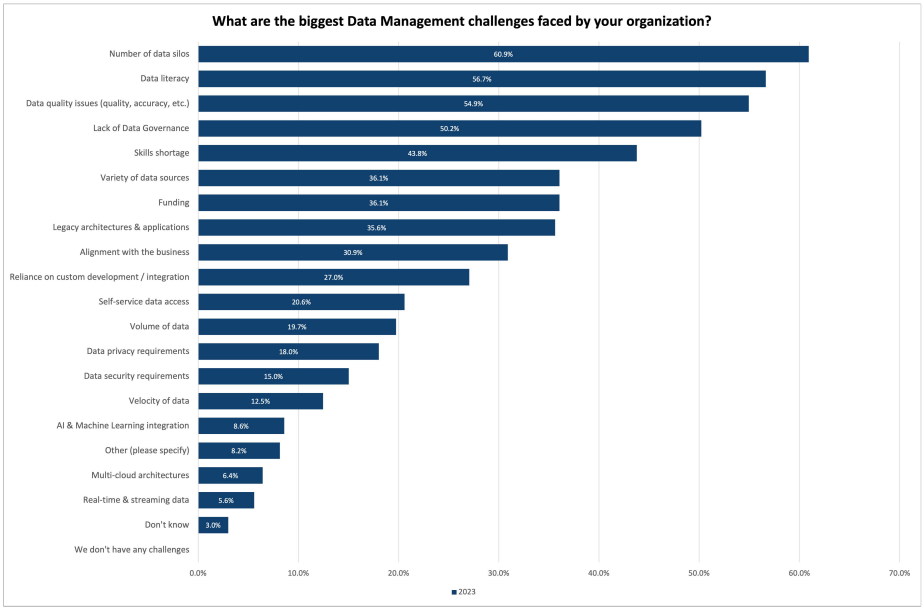

Figure 10a: Data Management Challenges (2023)

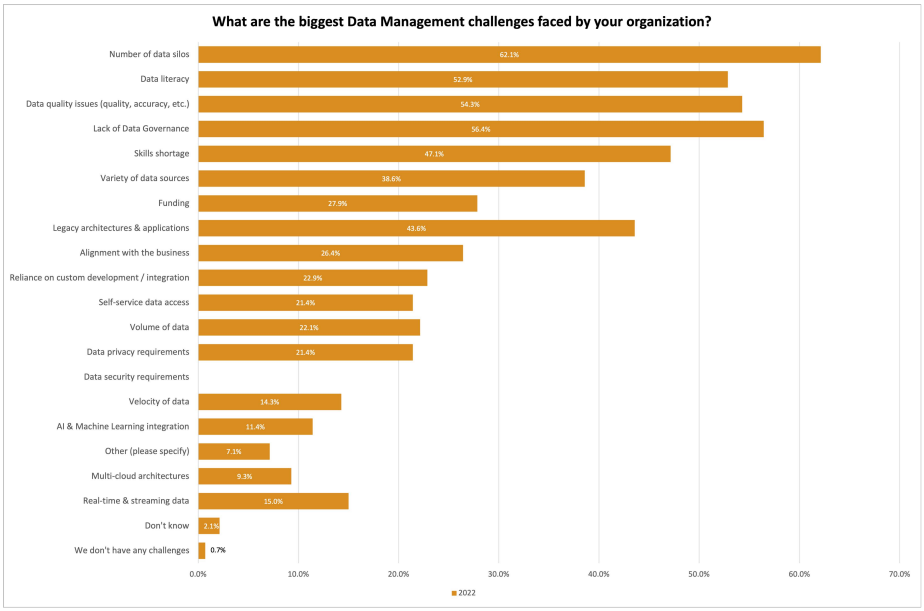

Figure 10b: Data Management Challenges (2022)

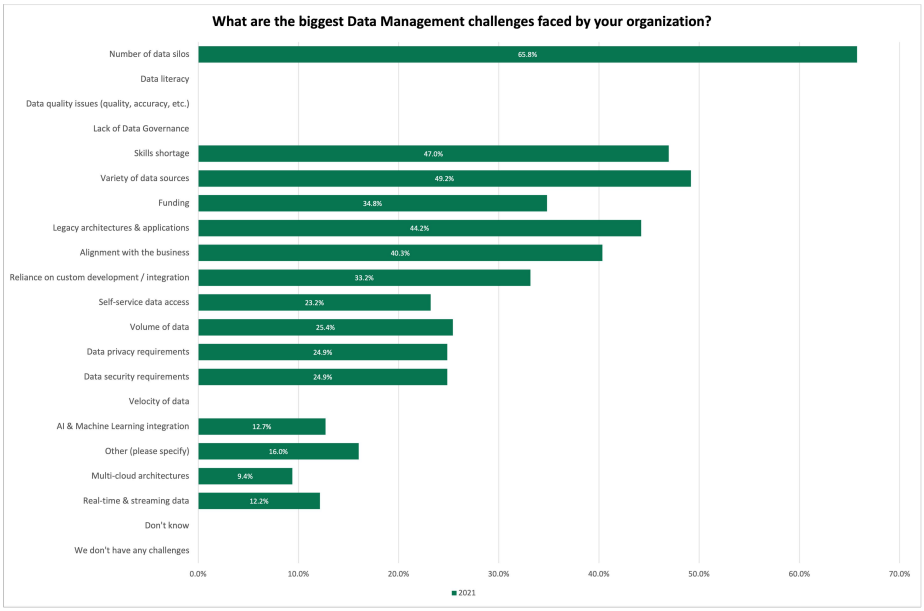

Figure 10c: Data Management Challenges (2021)

Participants chose the following Top 5 challenges for 2023:

- Number of Data Silos: 60.94% (62.14% in 2022, 65.75% in 2021)
- Data Literacy: 56.65% (52.86% in 2022, new answer in 2022)
- Data Quality Issues: 54.94% (54.29% in 2022, new answer in 2022)
- Lack of Data Governance: 50.21% (54.63% in 2022, new answer in 2022)
- Skills Shortage: 43.78% (47.14% in 2022, 46.96% in 2021)

More organizations need data literate team members to interpret key metrics and drive them with Data Management, especially as companies rely on making decisions from reporting and analytics.

Organizations want more trusted data sets to drive their success, as shown by the consistency of the Top 5 challenges in 2023 and past TDM studies. "Number of data silos" has ranked as the first challenge since 2021. Also, Data Quality and Data Governance remain high, aligning with other survey results.

We find that "Data Literacy" and "Skills Shortage" continue to rank in the Top 5 list each year. Notably, "Data Literacy" increased by 3.79 % from 52.86% in 2022 to 56.65% in 2023. That participants in the 2023 questionnaire chose Data Literacy as a top difficulty does not surprise us. More organizations need data literate team members to interpret key metrics and drive them with Data Management, especially as companies rely on making decisions from reporting and analytics.

B. Priorities and Goals

We followed up with an open-ended question about organizations' priorities and goals for Data Management in 2022-2023.

- **"What are your top 2–3 Data Management priorities/goals for 2022–2023?"**

"Our top goals include recalibrating the existing Data Strategy into an actionable one and modernizing our Data Architecture to support API and federated services. Also, we want to leverage algorithms in our Data Governance."

Priorities and goals matched closely with our results in the previous questions. Data Governance, Data Quality, and Data Architecture continue to be priorities to drive trusted data for decision-making.

Organizations are looking to implement data-driven strategies to use data for strategic advantage. Several respondents mentioned looking toward newer technologies such as artificial intelligence (AI) and machine learning (ML). Participant comments included:

- "We want to expand our Data Governance practice into various company business areas. Additionally, we prioritize working more closely with our Enterprise Analytics team. Finally, we see influencing senior management to invest in Data Management and having them mandate it as a top goal."
- "Our top goals include recalibrating the existing Data Strategy into an actionable one and modernizing our Data Architecture to support API and federated services. Also, we want to leverage algorithms in our Data Governance."
- "We want to establish a better Data Quality program and an enterprise-wide data ontology framework."

C. Tools and Technology

How has technology impacted Data Management decisions? We asked [Figure 11]:

- **"How much has the selection and purchase of software tools impacted your Data Management implementation?"**

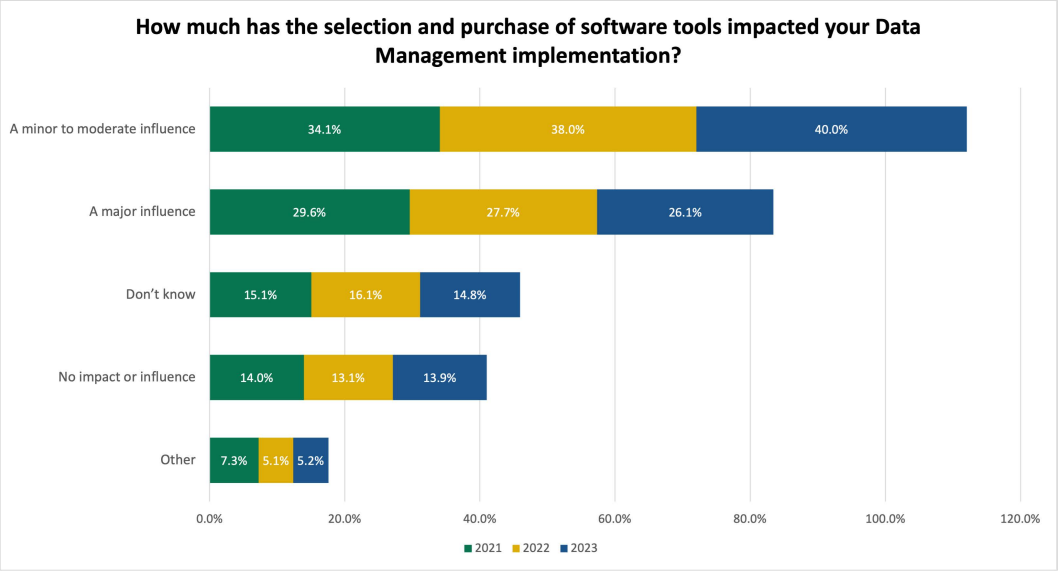

Figure 11: Software Tool Impact on Data Management Implementation (2021-2023)

The responses strongly suggest that the choices of software tools and their purchase have an impact in 2023:

- A minor to moderate influence: 40.00% (37.96% in 2022, 34.08% in 2021)
- A major influence: 26.09% (27.74% in 2022, 29.61% in 2021)
- Don't know: 14.78% (16.06% in 2022, 15.08% in 2021)
- No impact or influence 13.92% (13.14% in 2022, 13.97% in 2021)
- Other: 5.22% (5.11% in 2022, 7.26% in 2021)

As in past TDM surveys, the highest number of respondents said tools have a minor to moderate influence on their Data Management projects in 2023. Notably, this response shows a 5.92 % increase from 34.08% in 2021 to 40.00% in 2023.

While acknowledging that software tools have some influence on Data Management implementations, those surveyed strongly expressed that tools and vendors should not drive

Data Management. Instead, Data Strategy and Data Management fundamentals should become the central focus. Key comments include:

- "Tools make no difference without Data Strategy, design, executive support, and socialization."
- "It's about people, process, and then technology. Data Management defines a continuous process that automation enhances and always will."
- "Tools impacted Data Management in a major way and negatively. Tools were bought too early without confirmed business requirements, wasting time."

"It's about people, process, and then technology. Data Management defines a continuous process that automation enhances and always will."

D. Training

As organizations demand Data Literacy skills, training has and will continue to grow in importance. To investigate further, we surveyed participants on their learning experiences with Data Management [Figure 12]:

- **"What type(s) of training have you received in Data Management?"**

As organizations demand Data Literacy skills, training has and will continue to grow in importance.

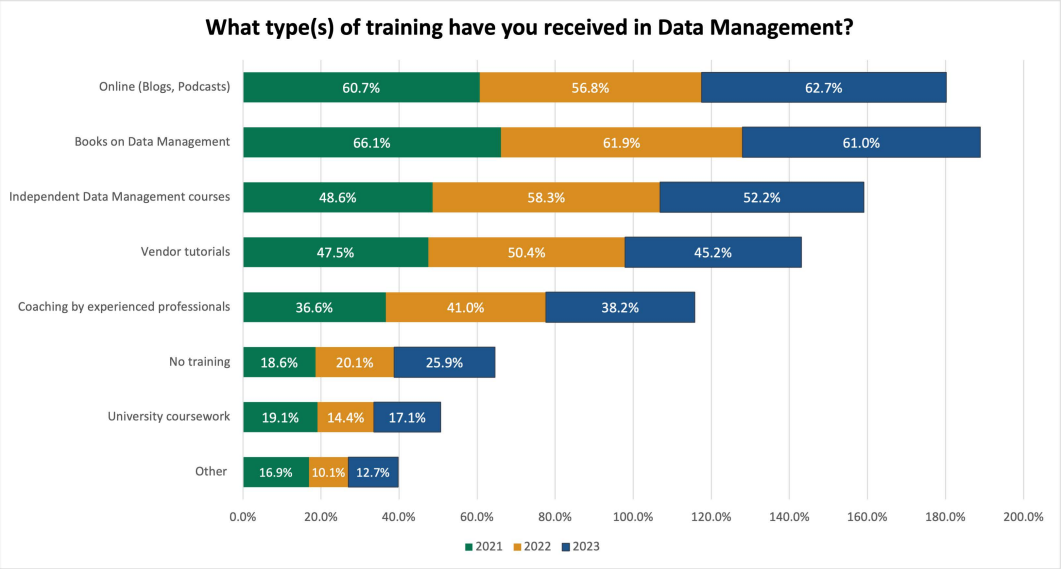

Figure 12: Training in Data Management (2021-2023)

Finding the time for training is difficult, and many learn on the fly. Top formats from 2021to 2023 include:

- Blogs, screencasts, and various sources from the Web, not from a particular vendor: 62.72% (56.83% in 2022, 60.66% in 2021)
- Books on Data Management: 60.96% (61.87% in 2022, 66.12% in 2021)
- Data Management courses outside of university work: 52.19% (58.27% in 2022, 48.63% in 2021)
- Tutorials and other materials from a vendor: 45.18% (50.36% in 2022, 47.54% in 2021)

Sources of training from the “other (please specify)” section included:

- DATAVERSITY courses
- Participation in DAMA
- Conference presentations
- Hands-on work/Experience

E. Concluding Comments

Drivers and challenges show a consistent theme. Organizations use data for reporting and analytics to drive decision-making.

Consequently, businesses prioritize Data Management fundamentals that drive trusted data sets, including Data Governance, Data Architecture, and Data Quality Management.

5. DATA GOVERNANCE AND METADATA MANAGEMENT

This section asks two questions, one about the organizations' state of Data Governance and the other on the use of Metadata Management.

A. Data Governance

To better understand the extent of Data Governance within the organizations surveyed, they were asked [Figure 13]:

- **"Which of the following best represents your company's state of Data Governance?"**

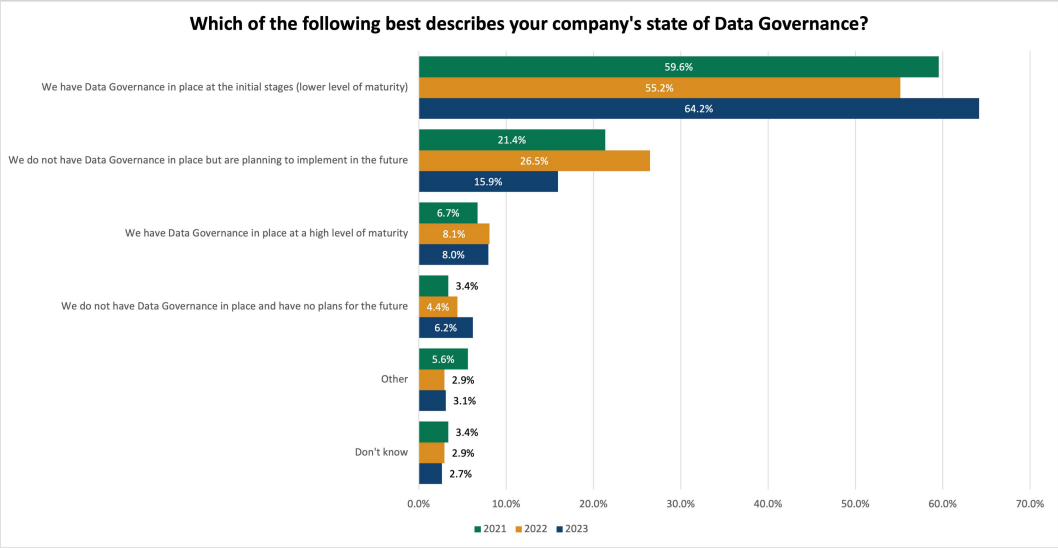

Figure 13: State of Data Governance (2021 – 2023)

Organizations continue to support Data Governance programs but at low maturity levels. Participants in the 2023 survey responded as follows.

- Data Governance is in place at the initial stages (lower level of maturity): 64.16% (55.15% in 2022, 59.55% in 2021)
- No Data Governance in place but plan to implement it in the future: 15.93% (26.47% in 2022, 21.35% in 2021)
- Data Governance at a high level of maturity: 7.96 % (8.09% in 2022, 6.74% in 2021)

- No Data Governance program in place, nor any plans for the future: 6.19% (4.41% in 2022, 3.37% in 2021)
- Two responses tied for fifth place: Don't know and Other (please specify). Don't know rated (2.65%) and Other rated (3.10%) in 2023.

From these responses and in this survey, it is clear that Data Governance is a hot topic in 2023, with 88.05% of organizations having some Data Governance in place at varying maturity levels.

This result is consistent with the increasing prominence of a Data Governance Lead, shown in Figure 1, and organizational Data Management implementations, shown in Figures 8a–8c. It also aligns with Data Governance as a Data Management challenge. See Figures 10a–10c.

B. Metadata Management

Metadata, or data in context, supports Data Governance and other Data Management processes. DATAVERSITY wanted to learn about Metadata Management use cases in 2023, and asked: [Figure 14]:

► **"What are your current main use cases for Metadata Management?"**

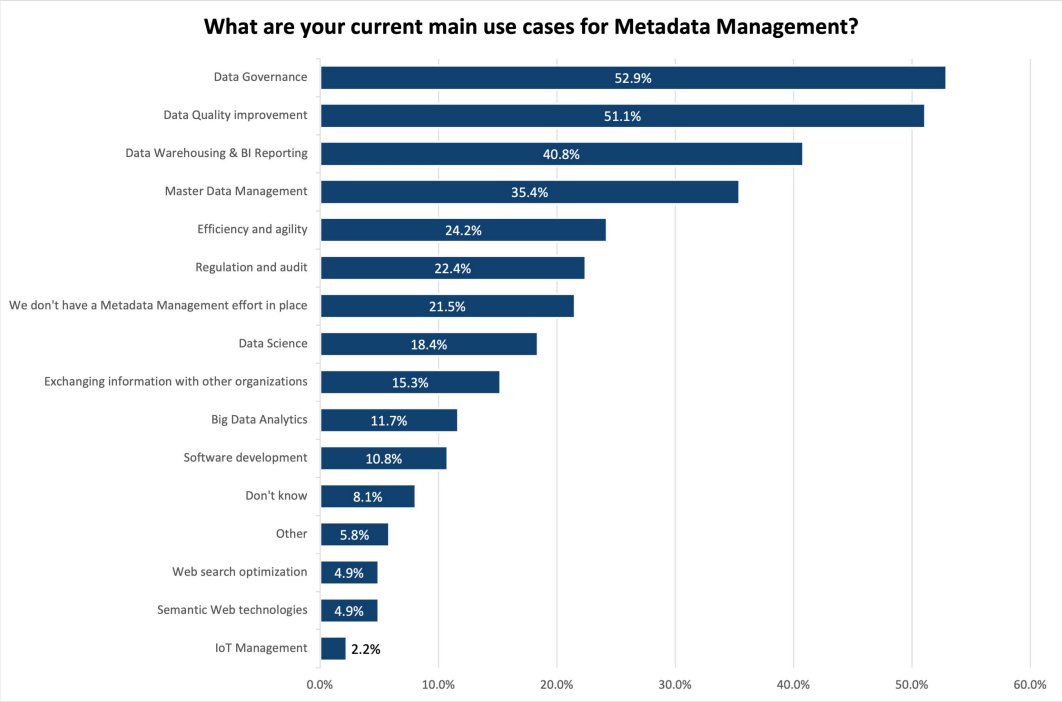

Figure 14: Metadata Management Use Cases (2023)

The Top 5 Metadata Management use cases for 2023 read as follows:

- Data Governance: 52.91%
- Data Quality Improvement: 51.12%
- Data Warehousing and BI reporting: 40.81%
- Master Data Management: 35.43%
- Efficiency and Agility: 24.22%

Participants chose "Data Governance" and "Data Quality Improvement" the most for Metadata Management use cases. Following these selections came "Data Warehousing and BI reporting," "Master Data Management," and "Efficiency and Agility."

These responses align with the most prominent selections in the past TDM reports, including 2022 and show the continued need for Data Governance and trusted data.

"We are trying to build Data Governance and Metadata Management from the ground up. However, we need the full support of executive managers (VP and C level) for success."

C. Additional Comments

Data Governance remains a key priority for organizations in 2023 and beyond. Some of those surveyed shared the following:

- "We wish to implement full Data Governance and Metadata Management once we have funding."
- "Robust metadata is the foundation of it all."
- "We are trying to build Data Governance and Metadata Management from the ground up. However, we need the full support of executive managers (VP and C level) for success."

6. DATA ARCHITECTURE

Data Architecture, as described by the DAMA DMBoK,

> "Defines the blueprint for managing data assets by aligning with organizational strategy to establish strategic data requirements and designs to meet these requirements."

Data Architecture, a pillar of digital transformation, produces the models and artifacts that connect business strategy and technical execution. Data Architecture plays a crucial role in Data Management and its data circulation throughout the enterprise.

We wanted to know if organizations had a Data Architecture supporting their Data Management initiative, and especially how data lakes and warehouses fit into this picture. This section has three questions and an area for additional comments.

A. State of Data Architecture Within Data Management

We asked the following about Data Architecture in Data Management [Figure 15]:

- **"How has a defined Data Architecture helped your organization?"**

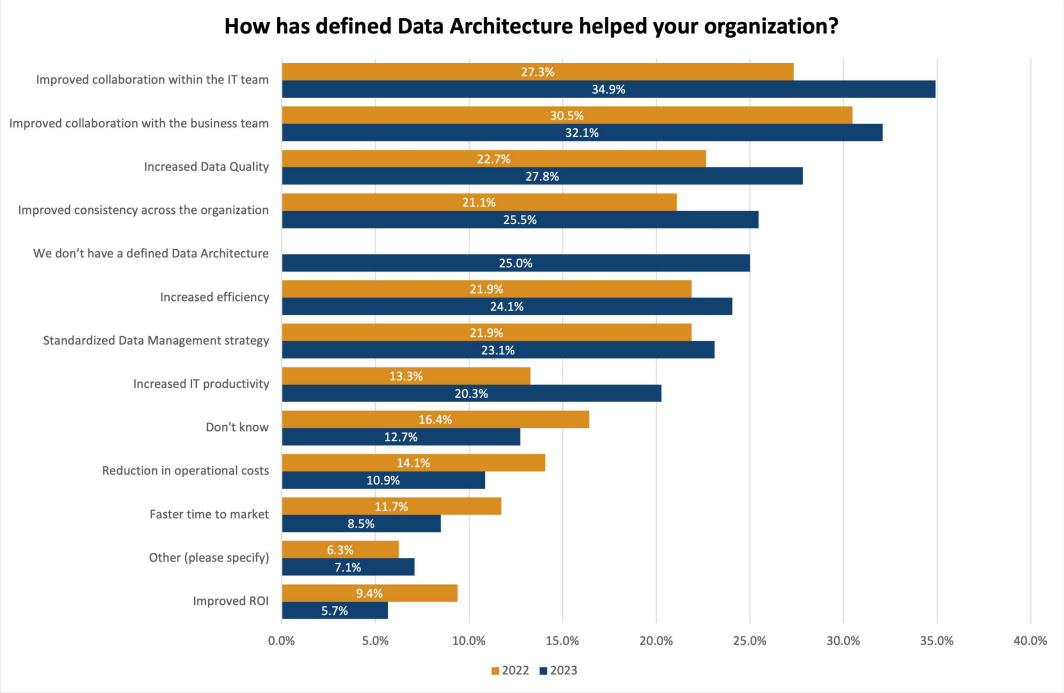

Figure 15: Data Architecture Advantages (2022 – 2023)

Those surveyed in 2023 chose the following Top 5 benefits of Data Architecture:

- Improved collaboration within the IT team: 34.91% (27.34% in 2022)
- Improved collaboration with the business team: 32.08% (30.47% in 2022)
- Increased Data Quality: 27.83% (22.66% in 2022)
- Improved consistency across the organization: 25.47% (21.09% in 2022)
- We don't have a defined Data Architecture: 25.00% (30.47% in 2022)

"At a regional level, Data Architecture has helped improve our overall Data Management. Consequently, we treat data as an asset at varying levels. We continue work on a Data Architecture at the national level."

"Collaboration" tops survey respondents' choices to use a defined Data Architecture for business and IT users. Both business and IT had similar percentages chosen, 32.08% and 34.91%, respectively, showing the benefits of collaboration. Notably, improvement in IT collaboration saw a more significant increase, 7.57%, from 27.34% in 2022 to 34.91% in 2023.

We found it disheartening that 25% of organizations still do not have a structured Data Architecture. But this percentage has decreased by 5.47%, from 30.47% in 2022 to 25.00%. We saw this result as a positive increase in interest and execution for Data Architecture capabilities.

Notable comments included:

- "At a regional level, Data Architecture has helped improve our overall Data Management. Consequently, we treat data as an asset at varying levels. We continue work on a Data Architecture at the national level."
- "We are in the progress of having a defined Data Architecture."
- "We are at the initial stages of a Data Architecture."

B. Use of Data Lakes

A data lake is a storage platform for structured, unstructured, and semi-structured data at any scale. Typically, this type of storage supports Data Analytics. Data is gathered and stored in its original format in data lakes, with no format transformations, indexing, or prep work required.

To determine the general usage of data lakes, we asked [Figure 16]:

- **"Are you currently implementing a data lake?"**

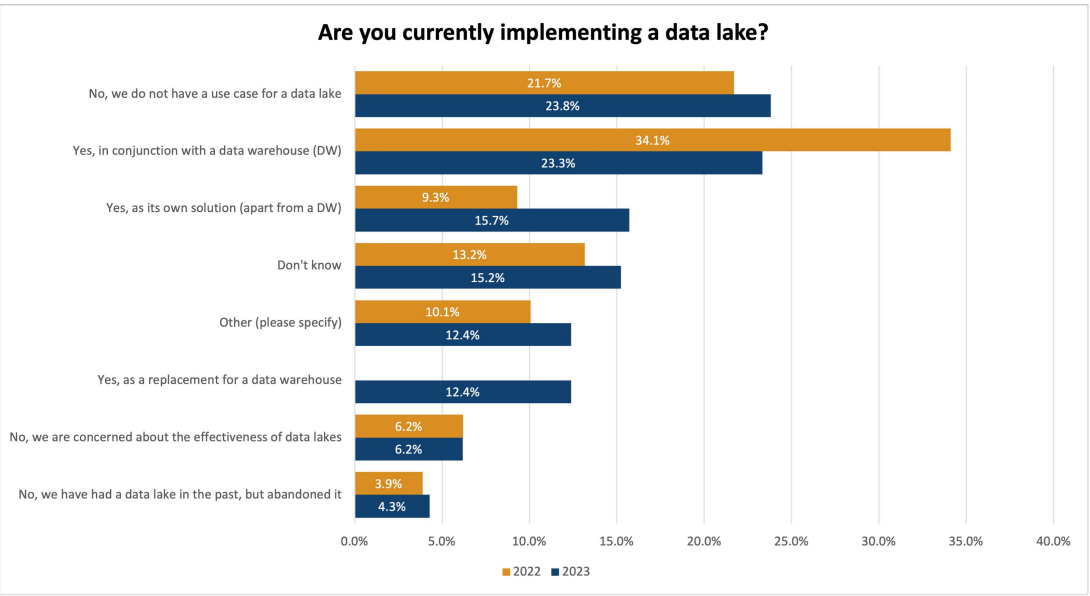

Figure 16: Data Lake Implementation (2022 - 2023)

The Top 5 selections for implementing a data lake for 2023 are as follows:

- No, we do not have a use case for a data lake: 23.81 % (21.71% in 2022)
- Yes, in conjunction with a data warehouse (DW): 23.33% (34.11% in 2022)
- Yes, as its own solution (apart from a DW): 15.71% (9.30% in 2022)
- Don't know: 15.24% (13.18% in 2022)
- Two tied for fifth place: Yes, as a replacement for a data warehouse: 12.38% (6.20% in 2022); and Other (please specify): 12.38% (10.08% in 2022)

There is an interesting downward trend from using a lake in conjunction with a data warehouse (decrease of 10.78%) while use of a standalone lake or as a replacement for a data warehouse have increased by 6.41% and 6.19% respectively. This may be due in part to the increased focus on Data Analytics and large data sets for analytic use cases.

C. The Challenges of Data Warehouses and Data Lakes

In contrast to a data lake, a data warehouse stores relational data in a structured format to analyze historical trends from operational databases, business applications, and transactional systems for business insight. Many organizations implement at least one or the other. To discover significant data warehouse/data lake challenges businesses are facing, we asked [Figure 17]:

- **"What are the major challenges that you are facing with respect to data warehousing/ data lake?"**

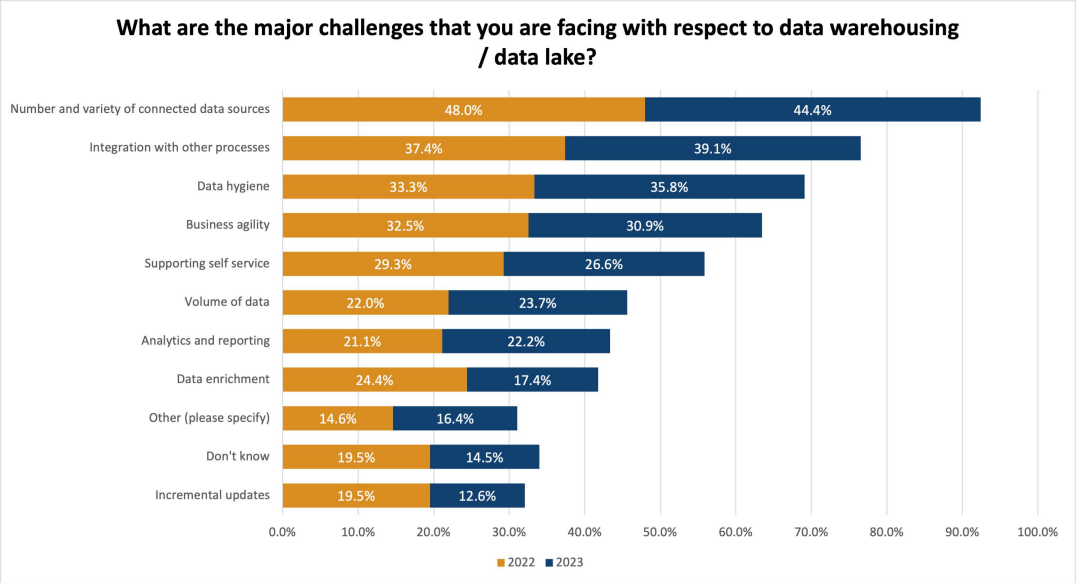

Figure 17: Data Warehouse and Data Lake Challenges (2022 – 2023)

Survey participants chose the Top 5 challenges, in 2023, as the following:

- Number and variety of connected data sources: 44.44% (47.97% in 2022)
- Integration with other processes: 39.13% (37.40% in 2022)
- Data Hygiene: 35.75% (33.33% in 2022)
- Business Agility: 30.92% (32.52% in 2022)
- Supporting Self-service: 26.57% (29.27% in 2022)

The Top 5 challenges show consistency from 2022 to 2023, indicating organizations struggle to integrate data from various disparate sources flexibly and in an agile way. Additionally, businesses find it difficult to ensure that this data is of high quality and to enable self-service analytics.

Comments by those who chose "other (please specify)" indicated skills and costs as significant difficulties. Notable comments are:

- "People select source data who do not understand it."
- "We lack sponsorship commitment, limiting subject matter expert (SME) availabilities."
- "We have limited skilled resources in-house to manage, maintain and perform work on a data warehouse environment. Therefore, we currently use all contracted developers with advanced SQL skills."

7. DATA MODELING

Data Modeling, as described by the DAMA DMBoK:

> "Is the process of discovering, analyzing, and scoping data requirements, and then representing and communicating these data requirements in a precise form called the data model."

Data Modeling is critical in Data Management to describe core business rules and definitions around data. To find out more, we posed three questions about these activities and included a space for additional comments. From there, our survey offered insights into Data Management, Data Modeling, and business alignment.

A. State of Data Modeling Within Data Management

We asked [Figure 18]:

- **"Is your organization actively using Data Modeling?"**

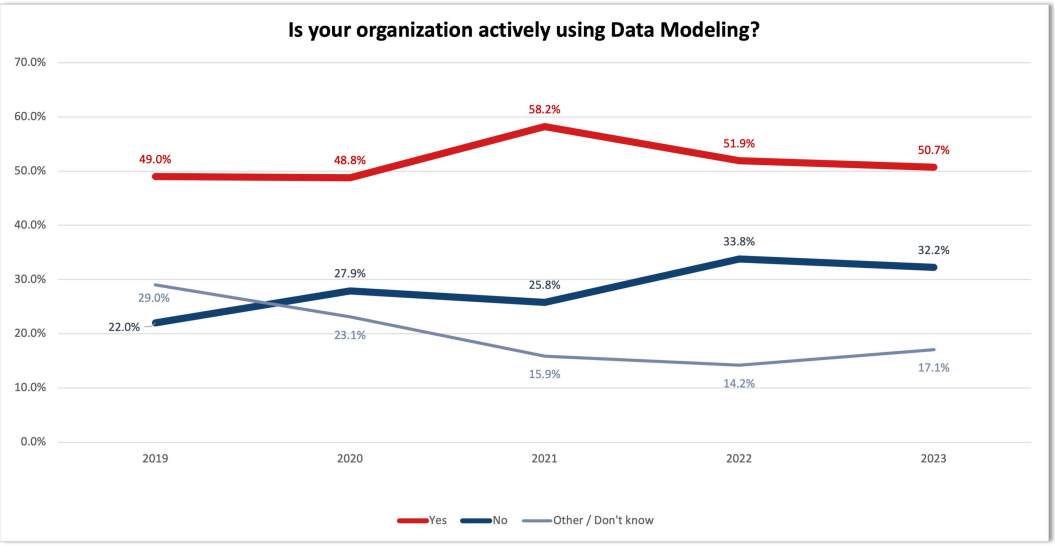

Figure 18: State of Data Modeling (2019 – 2023)

Responses in 2023 appear as follows:

- Yes: 50.71% (51.97% in 2022, 58.24% in 2021, 48.84% in 2020, 48.84% in 2019)
- No: 32.33% (33.86% in 2022, 25.88% in 2021, 27.91% in 2020, 21.71% in 2019)
- Don't know: 17.06% (14.17% in 2022, 15.88% in 2021, 10.47% in 2020, 13.18% in 2019)

Data Modeling usage continues to remain strong year after year. This result makes sense as data models support Data Architecture, an essential foundation component for trusted data to gain analytic insights.

Organizations using data models consistently show a trend from 2019 to 2023 in approximately half of the respondents surveyed. We note 1.87 growth from 2019, at 48.84%, to 2023, at 50.71%. Data model usage peaked in 2021 at 58.24%, a 9.4% increase from 2019.

Data Modeling usage continues to remain strong year after year. This result makes sense as data models support Data Architecture, an essential foundation component for trusted data to gain analytic insights.

Also, data models typically assist with collaboration between business and IT, a benefit cited in the question about how Data Architecture helps organizations. See section 6A.

B. Data Modeling Methods

For organizations that said they were using data models, this study wanted to know their methods and model types. Therefore, survey participants answered [Figure 19]:

- **"What methods of Data Modeling do you use in your organization?"**

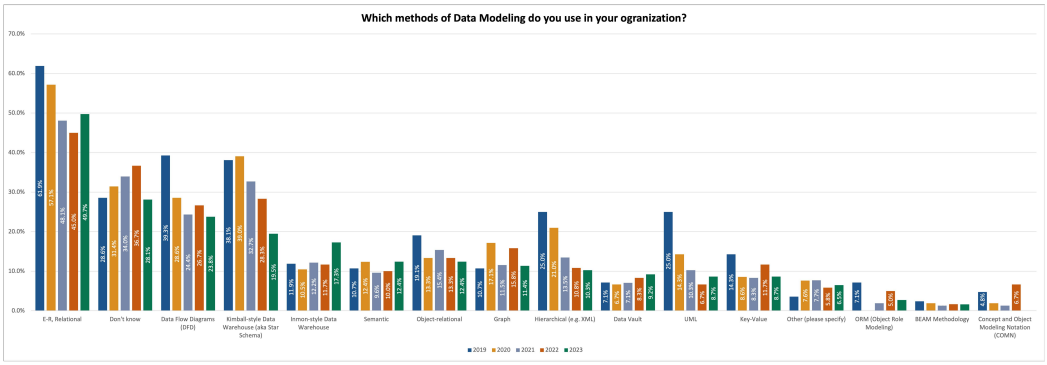

Figure 19: Data Modeling Methods (2019 – 2023)

Survey participants preferred the following Top 5 style in 2023:

- E-R, Relational: 49.73% (45.00% in 2022, 48.08% in 2021, 57.14% in 2020, 61.90% in 2019)
- Don't know: 28.11% (36.67% in 2022, 33.97% in 2021, 39.05% in 2020, 38.10% in 2019)
- Data Flow Diagrams (DFD): 23.78% (26.67% in 2022, 24.36% in 2021, 28.57% in 2020, 39.29% in 2019)
- Kimball-style Data Warehouse (aka Star Schema): 19.46% (28.33% in 2022, 32.69% in 2021, 39.05% in 2020, 38.10%
  in 2019)
- Inmon-style Data Warehouse: 17.30% (11.67% in 2022, 12.18% in 2021, 10.48% in 2020, 11.90% in 2019)

ER (Entity-Relationship) modeling continues to be the preferred Data Modeling method through all surveys since the first in 2019. This result supports the organization's drive toward Data Quality and Data Governance, as the relational model strongly supports governed data sets and referential integrity.

Another popular option, Data Flow Diagrams (DFDs), also aligns with business desires for trusted data sets through Data Quality and the need for governed data integration. Data Flow Diagrams show how data moves throughout the organization to support business needs.

ER (Entity-Relationship) modeling continues to be the preferred Data Modeling method through all surveys since the first in 2019. This result supports the organization's drive toward Data Quality and Data Governance, as the relational model strongly supports governed data sets and referential integrity.

Data Modeling to support data warehousing and reporting continues to be a priority from all surveys since 2019. While the Kimball Style (star schema) has been consistently in the Top 5, the Inmon-style has fluctuated. This year's inclusion also aligns with the need for a governed entity-relationship-style model to support Data Quality. Many organizations also use both models together for both enterprise quality and ease of reporting with slice/dice capabilities.

C. Types of Models and Diagrams

DATAVERSITY wanted to understand better how organizations use models and diagrams. So, we asked [Figure 20]:

- **"What types of models and diagrams do you use in your Data/ Enterprise Architecture?"**

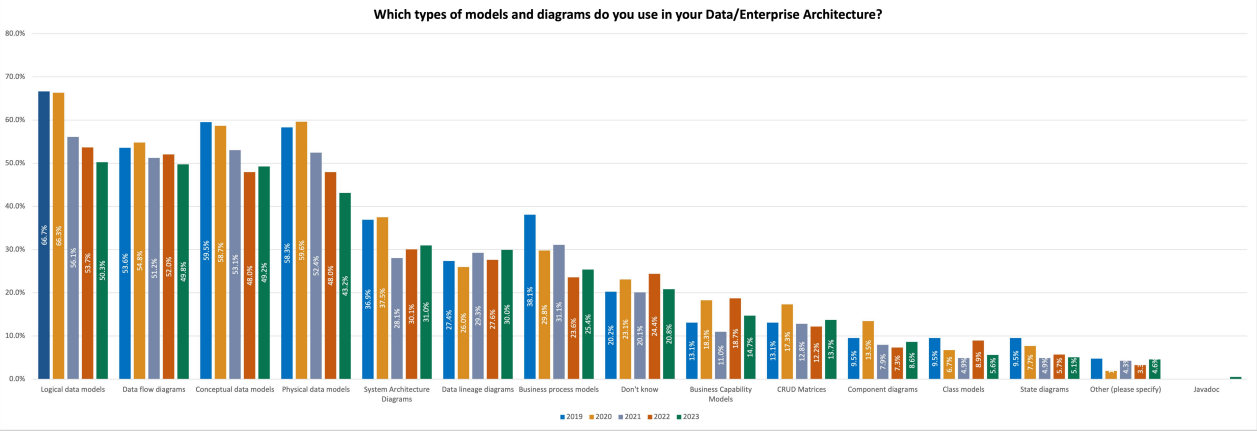

Figure 20: Data Models and Diagrams (2019 – 2023)

Survey participants chose the Top 5 models for 2023:

- Logical Data Models: 50.25% (53.66% in 2022, 56.10% in 2021, 66.35% in 2020, 66.67% in 2019)
- Data Flow Diagrams: 49.75% (52.03% in 2022, 51.22% in 2021, 54.81% in 2020, 53.57% in 2019)
- Conceptual Data Models: 49.24% (47.97% in 2022, 53.05% in 2021, 58.65% in 2020, 59.52% in 2019)
- Physical Data Models: 43.15% (47.97% in 2022, 52.44%in 2021, 59.62% in 2020, 58.33% in 2019)
- System architecture diagrams: 30.96% (30.08% in 2022, 28.05% in 2021, 37.50% in 2020, 36.90% in 2019)

Logical and conceptual models remain strong choices and among the top three in every TDM survey from 2019. The prominence of these selections aligns with an organizational desire to bridge IT and business stakeholders' communications.

Logical and conceptual models remain strong choices and among the top three in every TDM survey from 2019. The prominence of these selections aligns with an organizational desire to bridge IT and business stakeholders' communications.

Also, logical and conceptual models correspond with improved collaboration between the two groups.

In the 2023 TDM, participants chose Data Flow Diagrams as the second most popular model type, with system architecture diagrams and physical data models in the Top 5. Using one of these, or a combination, allows organizations to tackle data siloes, the biggest challenge to Data Management, as noted in Figures 10a–10c.

The Top 5 model and diagram selections support Data Governance and Data Quality. Emphasis on these two components is noted throughout this survey and is critical to trusted data sets.

8. DATA PLATFORMS AND STORAGE

We wanted to know about the storage and data platforms used by the survey respondents, and their plans. To understand more, we asked four questions with the opportunity to make additional comments.

We centered the first two questions around data sources or platforms across organizations and about organizational plans for the next one to two years. The second two asked those with cloud technologies about the reasons and concerns for moving to the cloud. Participants could add additional comments after the fourth question was presented.

A. Data Platforms

We wanted to get a clearer understanding of platforms and storage applications and asked [Figure 21]:

- **"Which of the following data sources or platforms are you currently using?"**

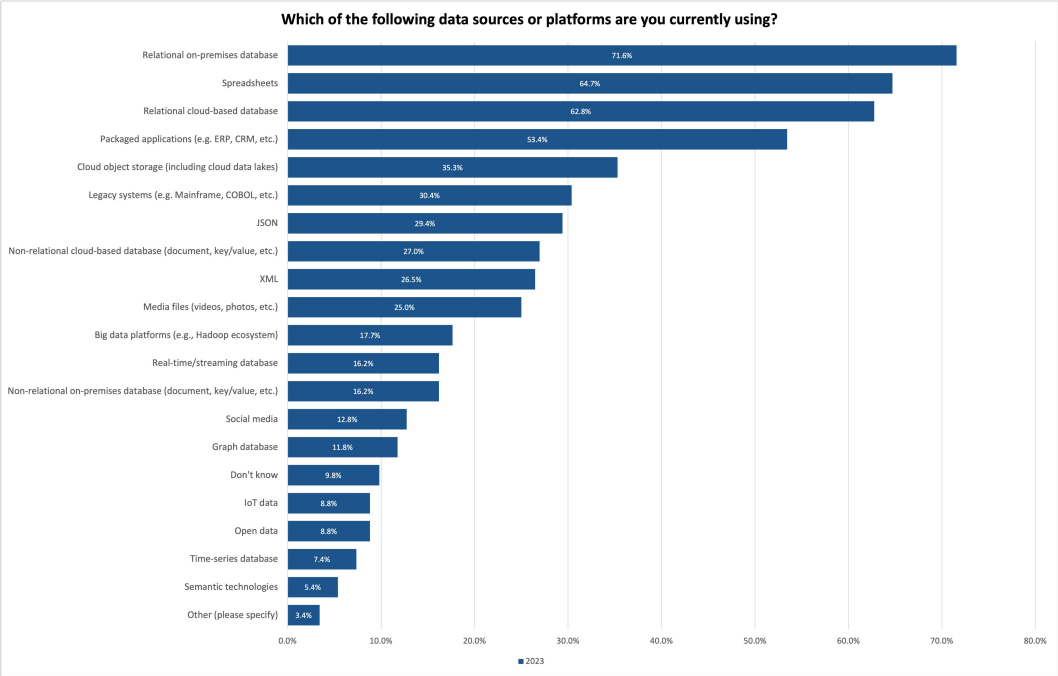

Figure 21a: Data Sources or Platforms (2023)

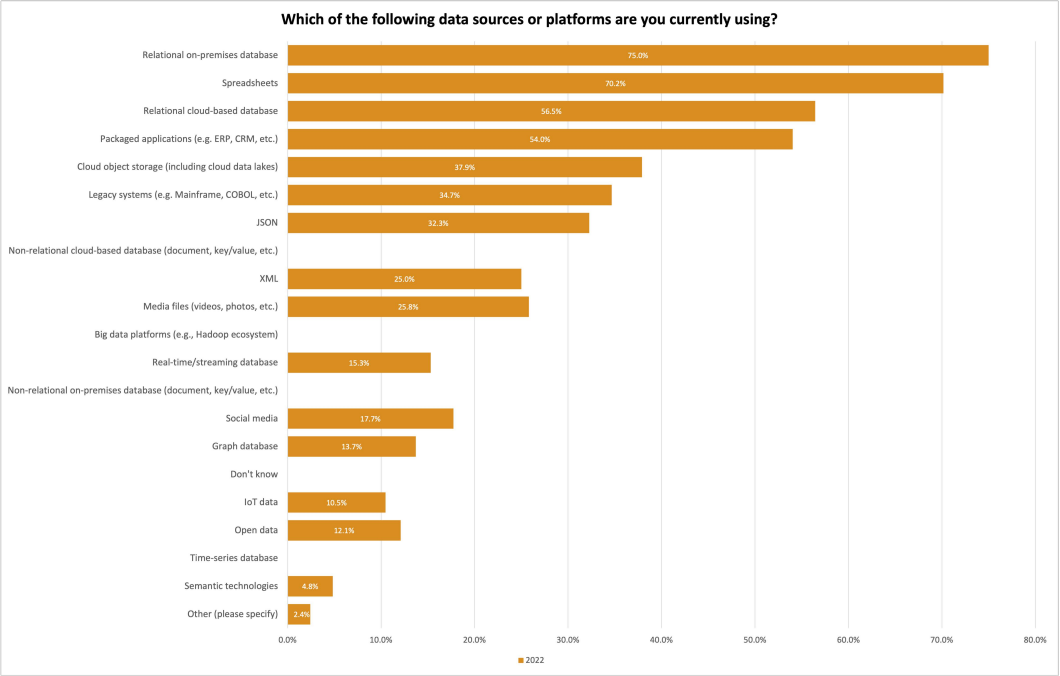

Figure 21b: Data Sources or Platforms (2022)

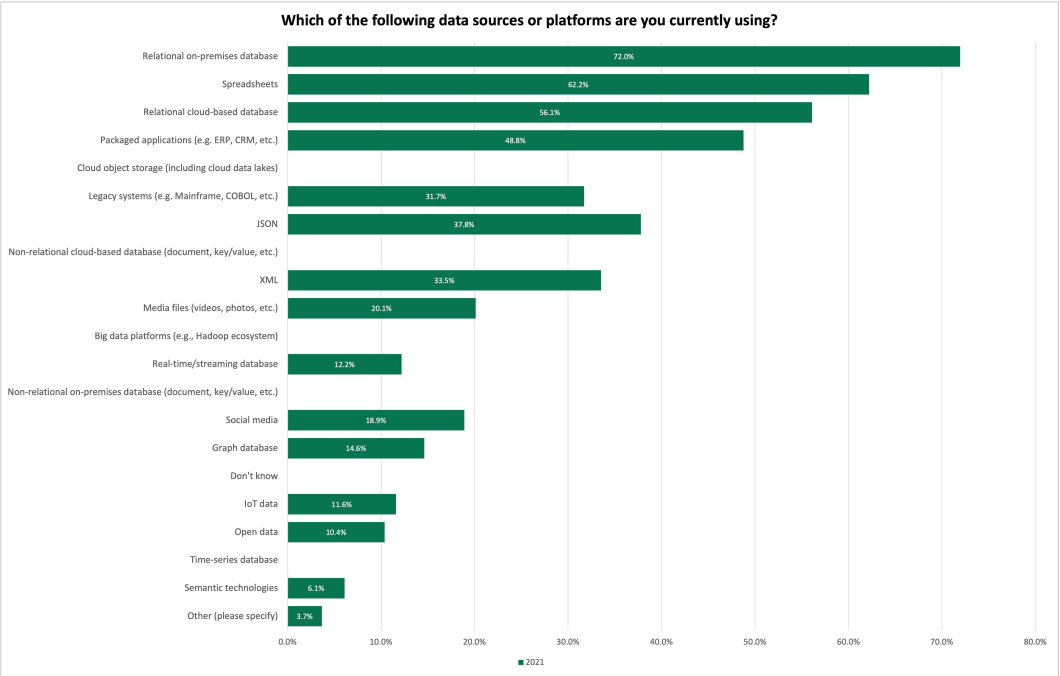

Figure 21c: Data Sources or Platforms (2021)

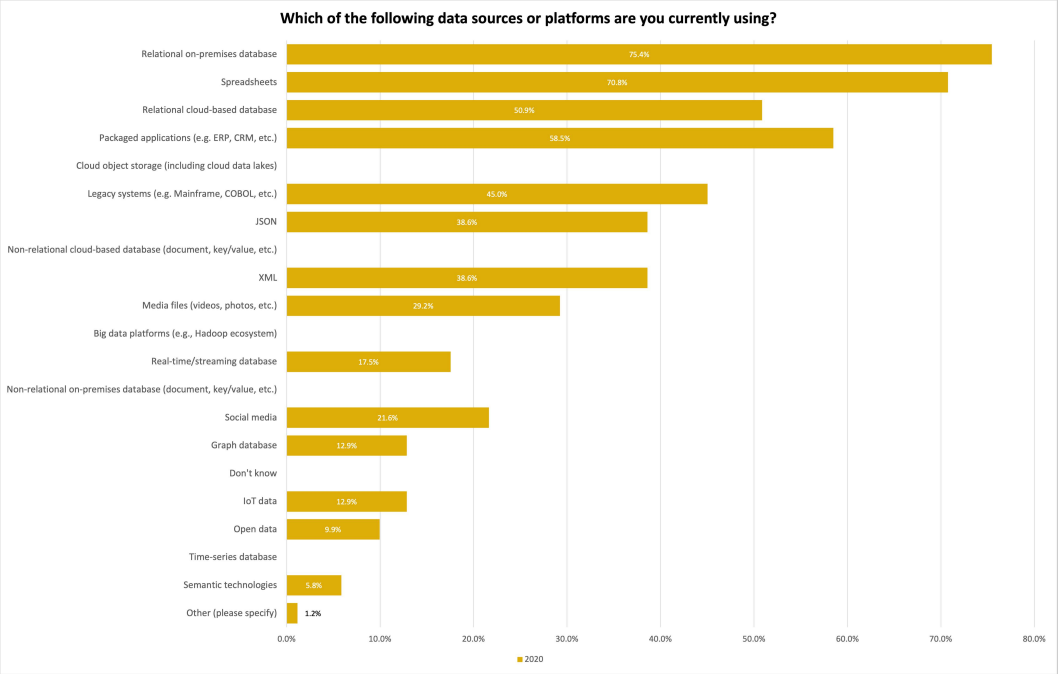

Figure 21d: Data Sources or Platforms (2020)

Those surveyed chose the following Top 5 sources in 2023:

- Relational On-premises Database: 71.57% (75.00% in 2022, 71.95% in 2021, 75.44% in 2020, 80.95% in 2019)
- Spreadsheets: 64.71%: (70.16% in 2022, 62.20% in 2021, 70.76% in 2020, 70.63% in 2019)
- Relational Cloud-based Database: 62.75% (56.45% in 2022, 56.10% in 2021, 50.88% in 2020, 49.21% in 2019)
- Packaged Applications (e.g., ERP, CRM, etc.): 53.43% (54.03% in 2022, 48.78% in 2021, 58.48% in 2020, 55.56% in 2019)
- Cloud Object Storage (including cloud data lakes): 35.29% (37.90% in 2022, the first time the answer was introduced)

The least used technologies in 2023 read as follows:

- Two selections tied for third least-used technologies: Open data: 8.82% (12.10% in 2022, 10.37% in 2021, 9.94% in 2020, 15.87% in 2019) and IoT data: 8.82% (10.48% in 2022, 11.59% in 2021, 12.87 % in 2020, 14.29% in 2019)
- Time-series Database: 7.35% (8.87% in 2022, 9.15% in 2021, 12.28% in 2020, 6.35% in 2019)
- Semantic Technologies: 5.39% (4.84% in 2022, 6.10% in 2021, 5.85% in 2020, 7.94% in 2019)

Relational databases, whether on-premises or in the cloud, have remained the most popular database format from the first TDM in 2019. Additionally, cloud-based hosting has risen 13.54% from 49.21% in 2019 to 62.75% in 2023.

We are disheartened that many participants use spreadsheets to manage enterprise data, due to their ease of use. Unfortunately, this result indicates, for the fifth year in a row, that organizations often struggle with general Data Literacy and Data Management fundamentals.

Also notable, IoT data has experienced a 5.47% decrease from 14.29% in 2019 to 8.82% in 2023. This result suggests that managing IoT data requires stronger Data Governance and Data Architecture foundations to access data more efficiently from many sensors.

One respondent commented that their organization is in the middle of an inventory, which has uncovered many silos and systems. That the enterprise has yet to find out what is in use matches the top Data Management frustration expressed in Figures 9a–9c.

B. Future Plans for Data Platforms and Storage

Participants responded about their future platform and storage plans [Figure 22]:

- **"Which of the following data platforms/data storage technologies do you plan to use in the next 1–2 years?"**

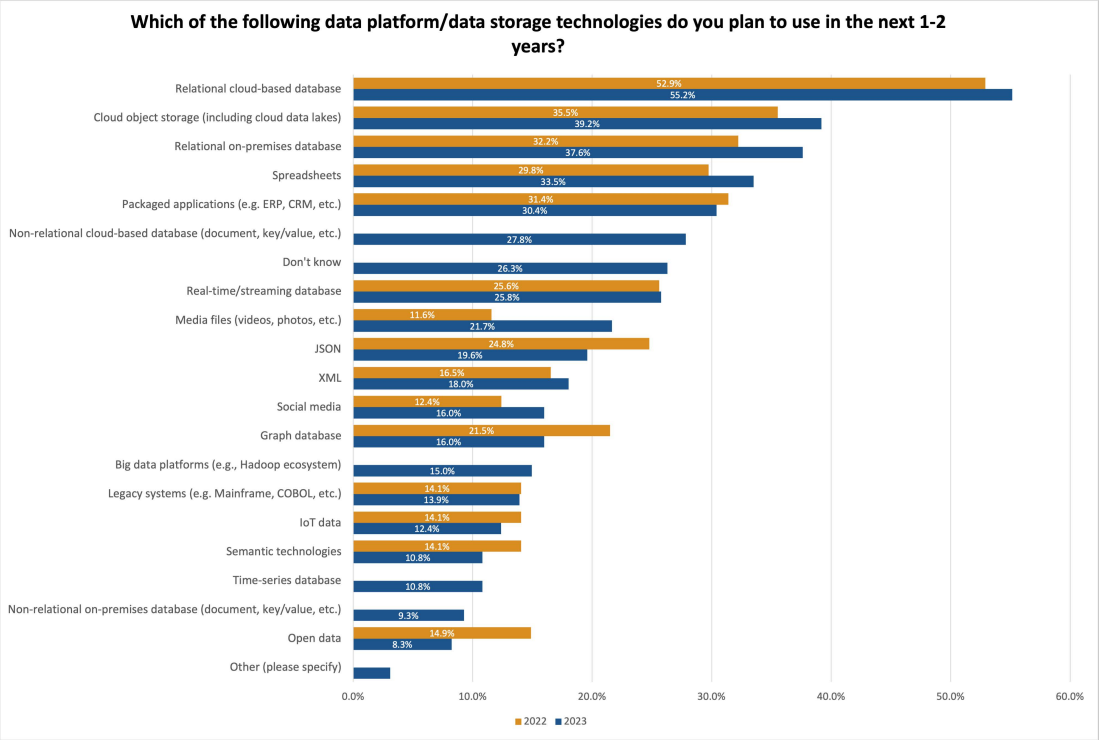

Figure 22: Data Sources or Platforms Plans in the Next 1–2 Years (2022 – 2023)

Those surveyed chose the Top 5 responses as follows:

- Relational Cloud-based Database: 55.15% (52.89% in 2022)
- Cloud Object Storage (including cloud data lakes): 39.18% (35.54% in 2022)
- Relational On-premises Database: 37.63% (32.23% in 2022)
- Spreadsheets: 33.51% (29.75% in 2022)
- Packaged Applications (e.g., ERP, CRM, etc.): 30.41% (31.40% in 2022)

The least popular choices occur as follows:

- Two selections tied for third least-planned technologies: Semantic Technologies: 10.82% (14.05% in 2022) and Time-series Database: 10.82% (11.57% in 2022)
- Non-relational On-premises Database (document, key/value, etc.): 9.28% (8.26% in 2022)
- Open data: 8.25% (14.88%)

Future plans continue to put relational databases in the lead. Participants preferred to host these database types in the cloud (55.15; 52.89% in 2022) compared to on-premises (37.63; 32.23% in 2022).

Cloud object storage increased by 3.64% from 35.54% in 2022 to 39.18% in 2023. This result aligns with the data lake responses in section 6B, where more participants implemented a standalone data lake or one in conjunction with a data warehouse.

We find it disappointing that participants plan to use spreadsheets for enterprise Data Management. This result corresponds with a significant Data Management challenge, Data Literacy, as noted in Figures 10a–10c.

A participant expressed concerns about gaining the expertise needed to handle unstructured data.

C. The Cloud

Over the last decade, the cloud has increasingly offered many businesses computation or storage benefits. As a result, as a set of services, it has become an essential part of business processes and planning.

We wanted to find out whether and how organizations use the cloud. Respondents answered two questions about the reasons and concerns for moving to cloud technologies.

We first asked [Figure 23]:

- **"What are/were your reasons for moving to the cloud?"**

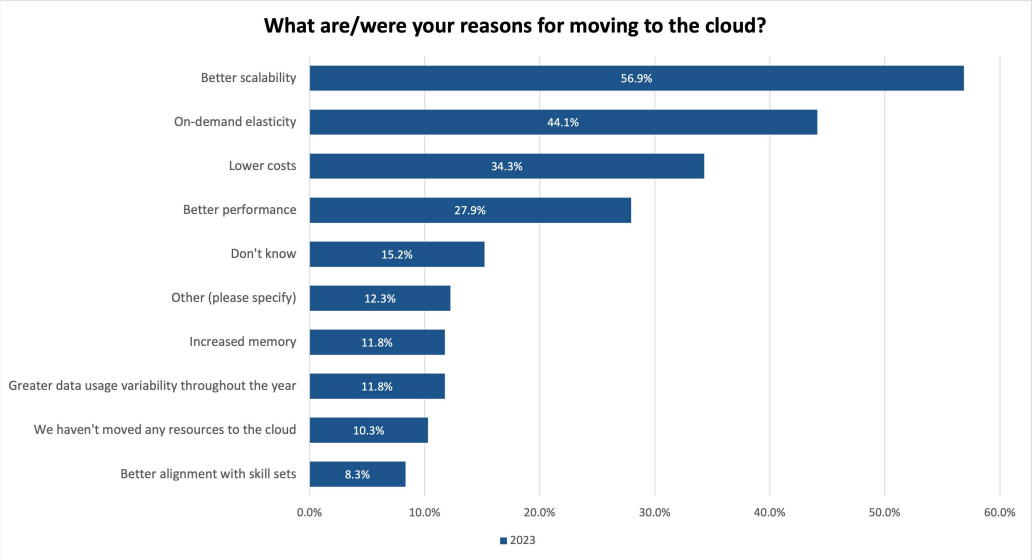

Figure 23a: Reasons to Move to the Cloud (2023)

“The government has mandated us to move to the cloud.”

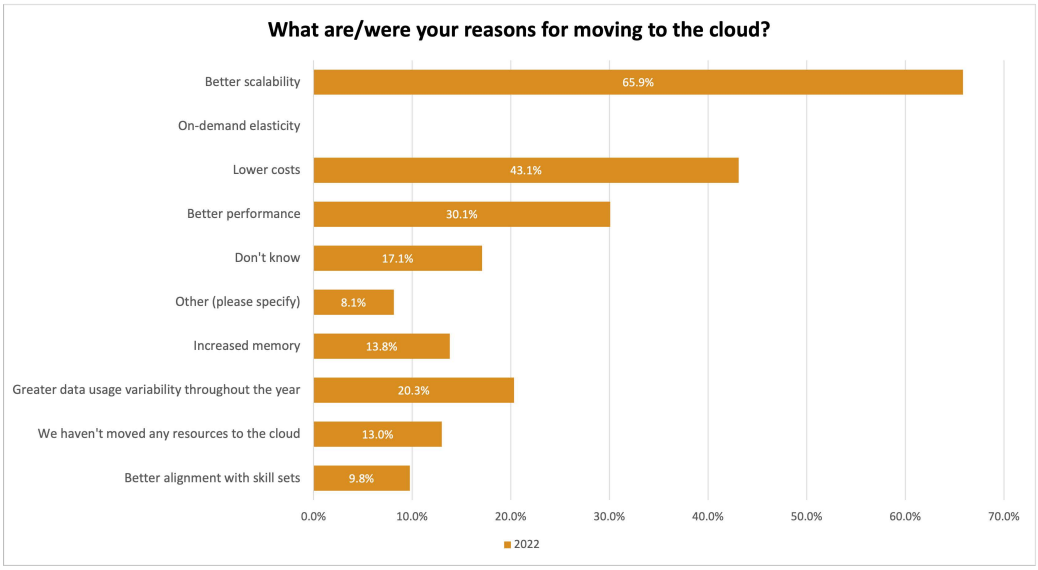

Figure 23b: Reasons to Move to the Cloud (2022)

Respondents chose the following, in 2023, as the Top 5 reasons for moving to the cloud:

- Better Scalability: 56.86% (65.85% in 2022)
- On-demand Elasticity: 44.12% (new answer in 2023)
- Lower Costs: 34.31% (43.09% in 2022)
- Better Performance: 27.94% (30.08% in 2022)
- Don’t Know: 15.20% (17.07% in 2022)

Several participants mentioned that their organizations mandated cloud usage and its ease of maintenance costs. Comments include:

- “The government has mandated us to move to the cloud.”
- “The cloud has lower system maintenance.”

Then we asked about their concerns about moving data to the cloud [Figure 24]:

- **"What are your concerns regarding moving data to the cloud?"**

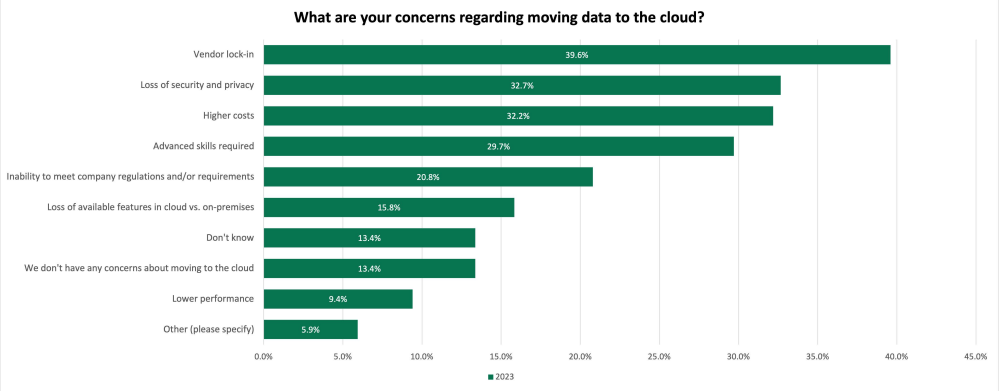

Figure 24a: Concerns About Moving to the Cloud (2023)

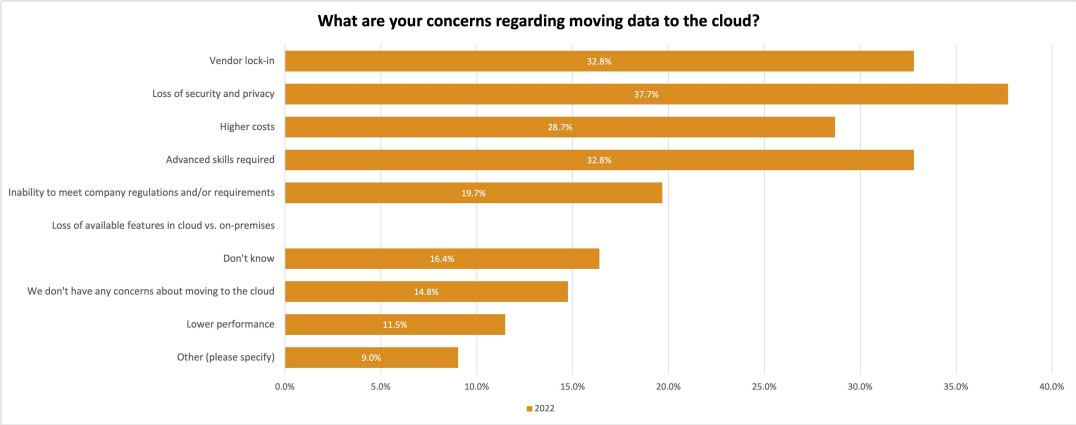

Figure 24b: Concerns About Moving to the Cloud (2022)

In 2023, the Top 5 concerns emerged as follows:

- Vendor Lock-in: 39.60% (32.79% in 2022)
- Loss of Security and Privacy: 32.67% (37.70% in 2022)
- Higher Costs: 32.18% (28.69% in 2022)
- Advanced Skills Required: 29.70% (32.79% in 2022)
- Inability to meet company regulations and/or requirements: 20.79% (19.67% in 2022)

Vendor lock-in grew by 6.81%, from 32.79% in 2022 to 39.60% in 2023, representing a growing concern. Additionally, higher costs saw a significant 3.49% increase as a concern, from 28.69% in 2022 to 32.18% in 2023.

The 5.94% of survey respondents who listed “Other (please specify)” noted that they worry about:

- Data sovereignty
- Loss of control or lack of Data Governance
- Increase in data silos or lack of integration
- Reliability

These reactions highlight that Data Governance has emerged as a primary concern in moving data to the cloud.

9. NEW TECHNOLOGIES AND TRENDS

This part of the survey explores the trends taking place with newer technologies. First, we asked two questions about where organizations have or plan to implement new technologies. Then we followed up with one question about emerging technology trends that could significantly transform Data Management.

A. New Technologies

The first question asked was [Figure 25]:

- **"Which of the following is your organization currently leveraging?"**

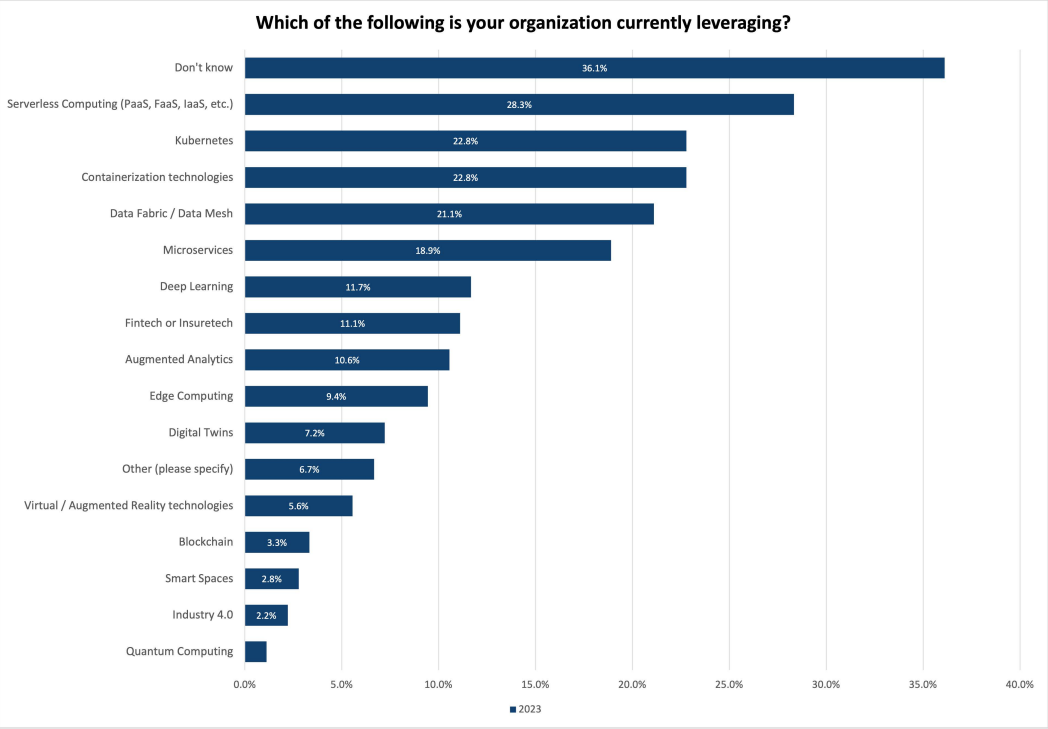

Figure 25a: New Technologies Leveraged (2023)

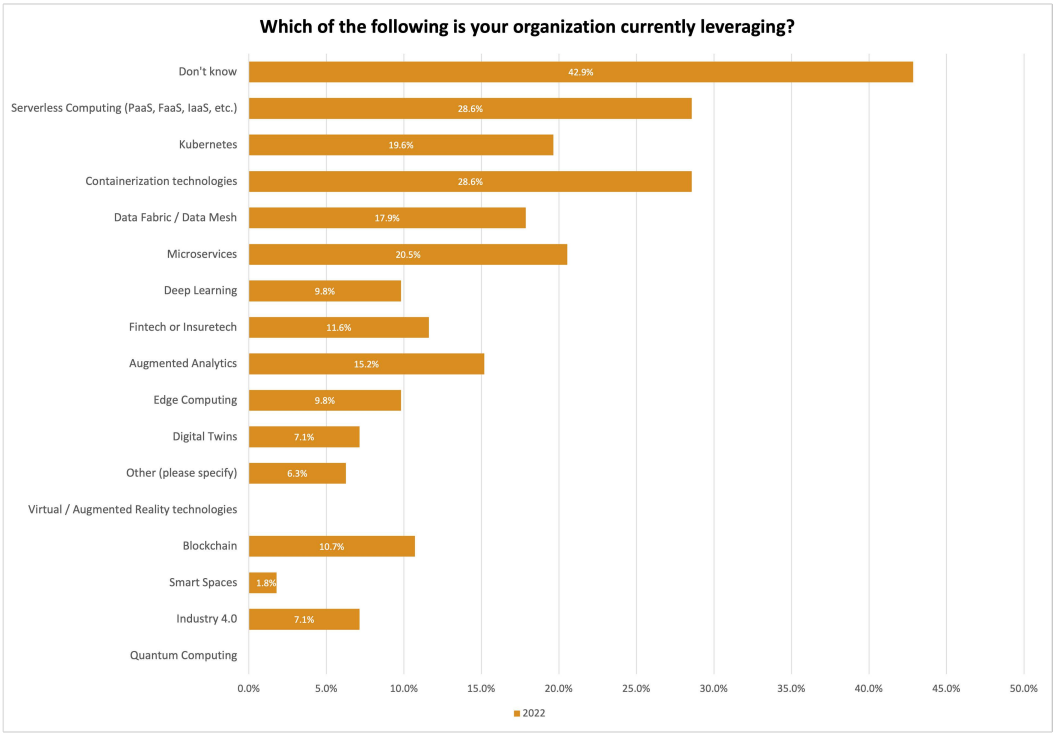

Figure 25b: New Technologies Leveraged (2022)

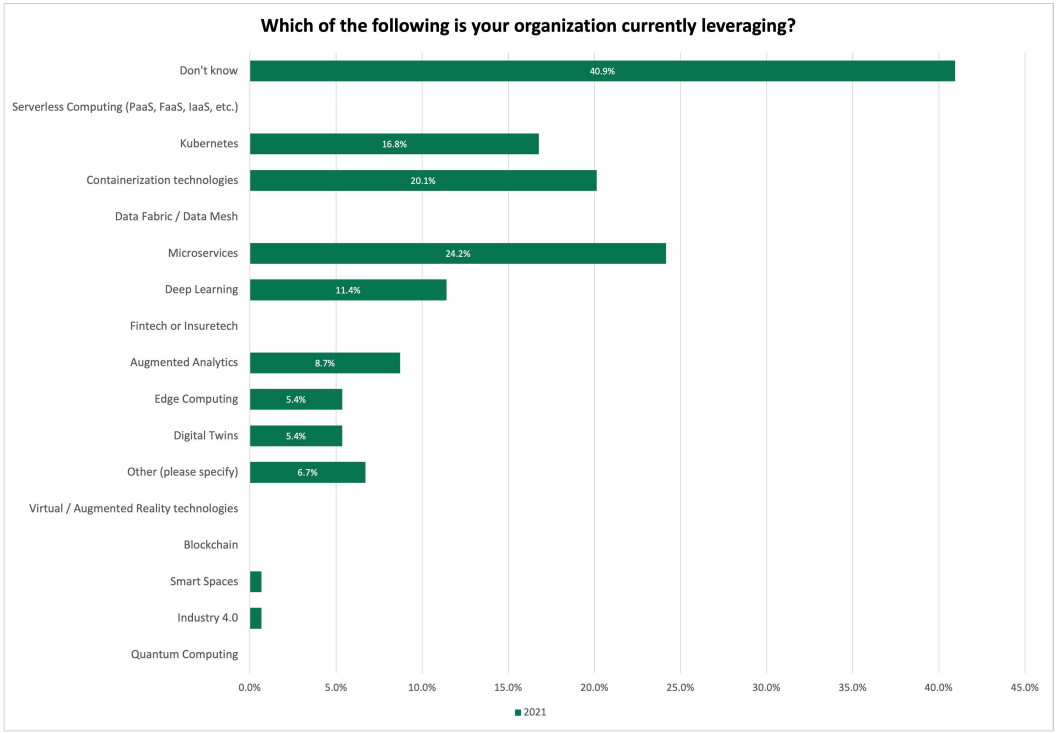

Figure 25c: New Technologies Leveraged (2021)

The "don't know" response received the highest replies, at 36.11%. Many of those surveyed had great uncertainty when given the many possibilities available.

Many of these technologies qualify as unknown territory by many of the survey's respondents. While most participants have probably heard or read a little about the new technologies listed, a lack of understanding and familiarity can make new technologies confusing.

Serverless computing, containerized technologies, and Kubernetes remain strongly implemented. Combining one or more of these three choices lets software coders write algorithms more efficiently and eliminate extra administration needed during development.

Additionally, as organizations inventory what they have, as mentioned in the analysis under Figure 21, respondents are unsure what is being leveraged. After the "Don't know" response, the top remaining answers for 2023 read as follows:

- Serverless Computing (PaaS, FaaS, IaaS, etc.) 28.33% (28.57% in 2022, 14.77% in 2021)
- Containerization Technologies: 28.33% (28.57% in 2022, 20.13% in 2021)
- Kubernetes: 22.78% (19.64% in 2022, 16.78% in 2021)
- Data Fabric/Data Mesh 21.11% (17.86% in 2022)
- Microservices: 18.89% (20.54% in 2022, 24.16% in 2021)

Participants selected the following new technologies the least:

- Virtual/Augmented Reality technologies: 5.56% (7.14% in 2022, 2.86% in 2021)
- Blockchain: 3.33% (10.71% in 2022)
- Smart Spaces: 2.78% (1.79% in 2022, 0.67% in 2021)
- Industry 4.0: 2.22% (7.14% in 2022, 0.67% in 2021)
- Quantum Computing: 1.11% (new answer in 2023)

Serverless computing, containerized technologies, and Kubernetes remain strongly implemented. Combining one or more of these three choices lets software coders write algorithms more efficiently and eliminate extra administration needed during development.

Serverless computing provides on-demand services for administrative operations and set-up through the cloud. Consequently, developers can set up their environments on demand and manage containerization.

Container technologies provide fast set-up and deployment of a "software package" into another computing environment. Kubernetes, or K8s for short, is an open-source system for automating, deploying, scaling, and managing containerized applications.

Data fabric/data mesh" newly appeared in 2023's Top 5. Where respondents indicated a top Data Management challenge with data silos in section 4A, it is unsurprising that organizations have implemented data fabric/data mesh to facilitate integration. These approaches can offer

decentralized, domain-based Data Management and Data Governance, providing visibility in shared internal products or services.

The components selected least included:

- Virtual/Augmented Reality Technologies: This component describes computer simulations of real-world situations and contexts AI creates from the datasets it consumes and calculates.
- Blockchain: This component describes distributed databases and storage devices used as a ledger to verify transactions.
- Smart Spaces: This component describes physical locations and the Internet of Things (IoT), a network of smart physical objects.
- Industry 4.0: This component describes a revolutionary business model driving decentralized distribution and production with data.

One person mentioned implementing Generative AI/ChatGPT in their organization. As Generative AI/ChatGPT options grow in 2023, this will be an interesting trend to follow in future reports.

The survey followed up with a question about their future direction [Figure 26]:

► **"Which of the following is your organization planning to implement within 1–2 years?"**

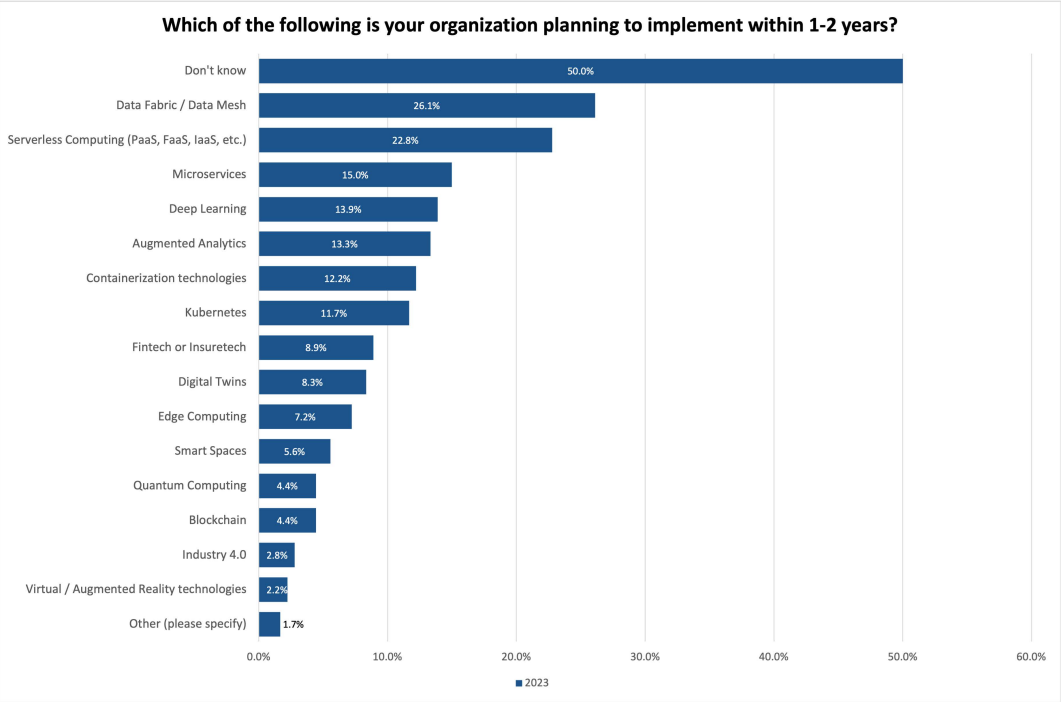

Figure 26a: New Technologies Planned to Implement (2023)

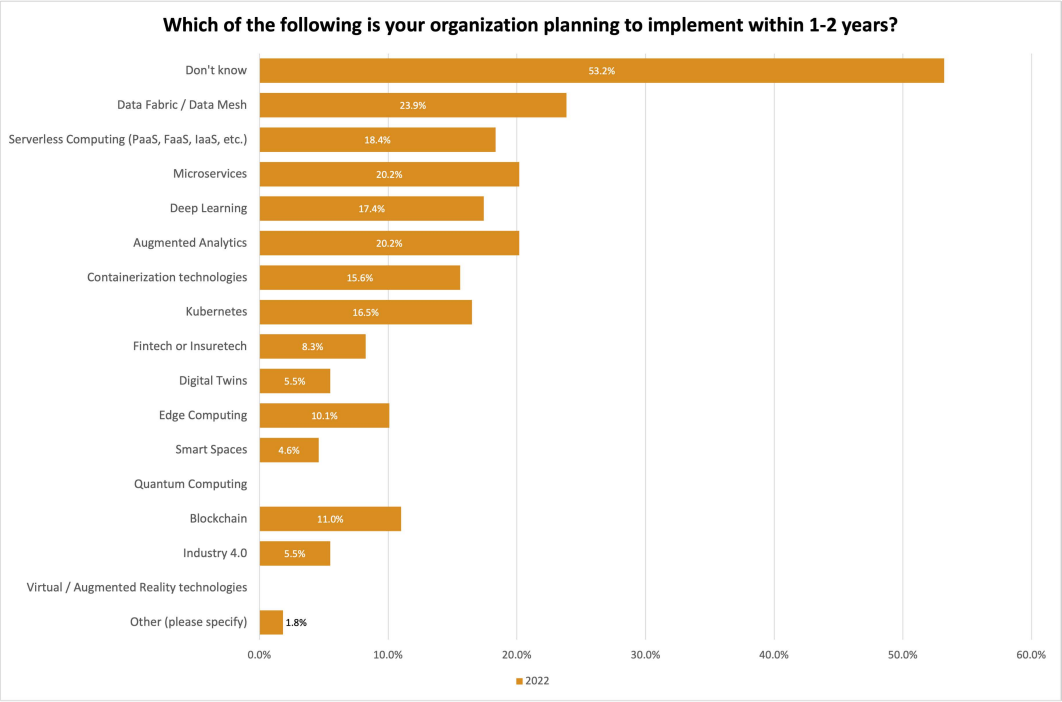

Figure 26b: New Technologies Planned to Implement (2022)

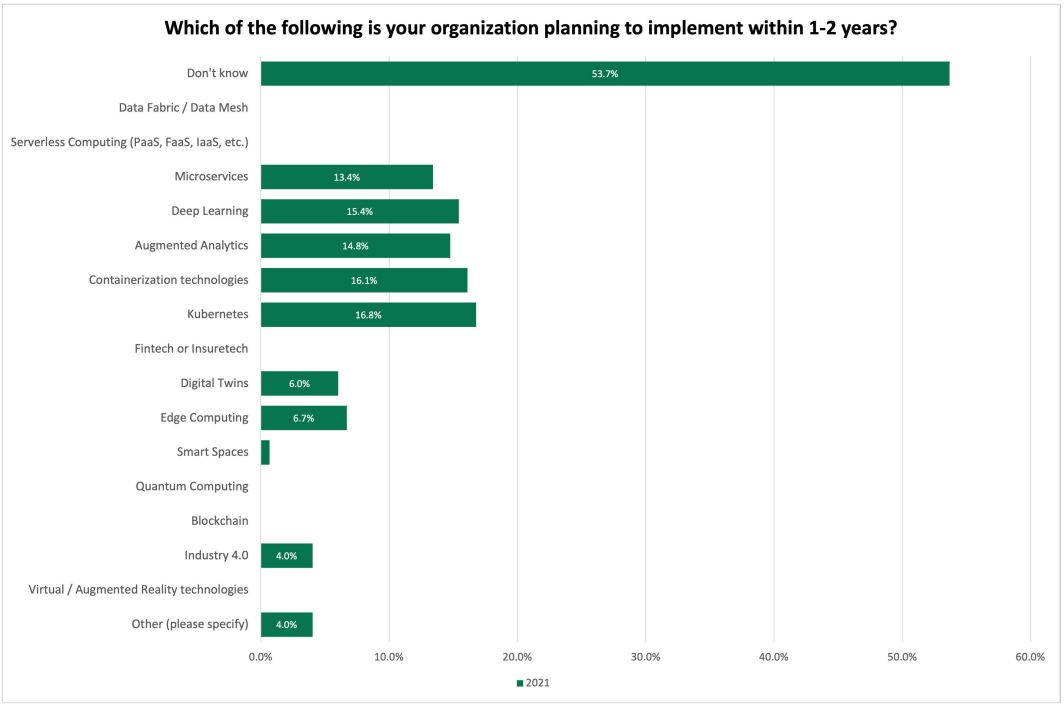

Figure 26c: New Technologies Planned to Implement (2021)

Once again, the "don't know" response received the highest score (50.00%). So, this response is appropriate when the participants are dealing with an unknown economy and ever-changing technology options.

Participants showed a surge in interest in data fabric/data mesh architectures, which was the top choice for future implementation.

After "don't know," the remaining four remaining top new technologies are:

- Data Fabric/Data Mesh: 26.11% (23.85% in 2022)
- Serverless Computing (PaaS, FaaS, IaaS, etc.): 22.78% (18.35% in 2022, 16.78% in 2021)
- Microservices: 15.00% (20.18% in 2022, 13.42% in 2021)
- Deep Learning: 13.89% (17.43% in 2022, 15.44% in 2021)

The least popular technologies for planned implementation include:

- Edge Computing: 7.22%
- Smart Spaces 5.56%
- Two responses tied for the third least-implemented technology: blockchain and quantum computing at 4.44%
- Industry 4.0: 2.78%
- Virtual/Augmented Reality Technologies: 2.22%

Participants showed a surge in interest in data fabric/data mesh architectures, which was the top choice for future implementation. This response aligns with its appearance in the Top 5 technologies that organizations already leverage. See Figure 25a–25c.

Blockchain technology contains distributed databases and storage devices used as a ledger to verify transactions. However, this option remains unpopular as organizations struggle to find practical use cases.

"Organizations demand Data Quality for AI and machine learning, process automation, and decisions. As a result, they will increase focus on Metadata Management to fast-track the development of data products."

B. Future Trends

To finish the survey, participants were asked the following open-ended question:

- **What do you see as the next top three emerging trends in Data Management that will cause the most profound changes in the industry?**

Survey participants chose a combination of data fundamentals and exciting innovations to cause the most profound changes in Data Management. Foundational elements included data literacy and culture, handling expanding regulations, and active Data Governance and data cataloging.

Many businesses are enthusiastic about data mesh, AI/ML, and ChatGPT possibilities. However, they face data literacy challenges and limited budgets.

Survey participants wrote:

- "With frequent staff turnover, Data Management will face challenges in quickly sorting out how to increase Data Literacy knowledge among teams."
- "Organizations demand Data Quality for AI and machine learning, process automation, and decisions. As a result, they will increase focus on Metadata Management to fast-track the development of data products."
- "As the cadence of industries changes due to Data Management, slower organizations will be left behind. For example, data mesh requires a minimum of mature DevOps. Yet, many businesses struggle to start or mature their DevOps practice."

10. CONCLUSION

Data continues to be a priority for organizations that are looking to expand their capabilities and growth through data-driven analytics and reporting. The benefits of improved efficiency, collaboration, and risk reduction have been common themes year after year throughout the many EDM papers, as has the promise of digital transformation fueled by data.

While organizations are excited about the possibilities that data can bring, they are hampered by lack of Data Quality, data siloes, and limited skills as literacy in data capabilities. As a result, the drive toward expanded Data Governance and Data Management fundamentals such as Data Architecture, Data Quality, Master Data Management, and more continue to expand, and we see consistent trends in these areas year after year in this survey. This trend toward getting a solid data framework has remained consistent throughout all the TDM surveys—the race to get good enough business data to stay competitive continues.

11. PRODUCERS

DATAVERSITY Education, LLC is a producer of educational resources for business and Information Technology (IT) professionals on the uses and management of data. Our team strives to provide high-quality content to our worldwide community of practitioners, experts, and developers who participate in and benefit from face-to-face hosted conferences, free online events, live webinars, white papers, online training, daily news, articles and blogs, and much more.

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Our services and training offerings include:

- Data Strategy
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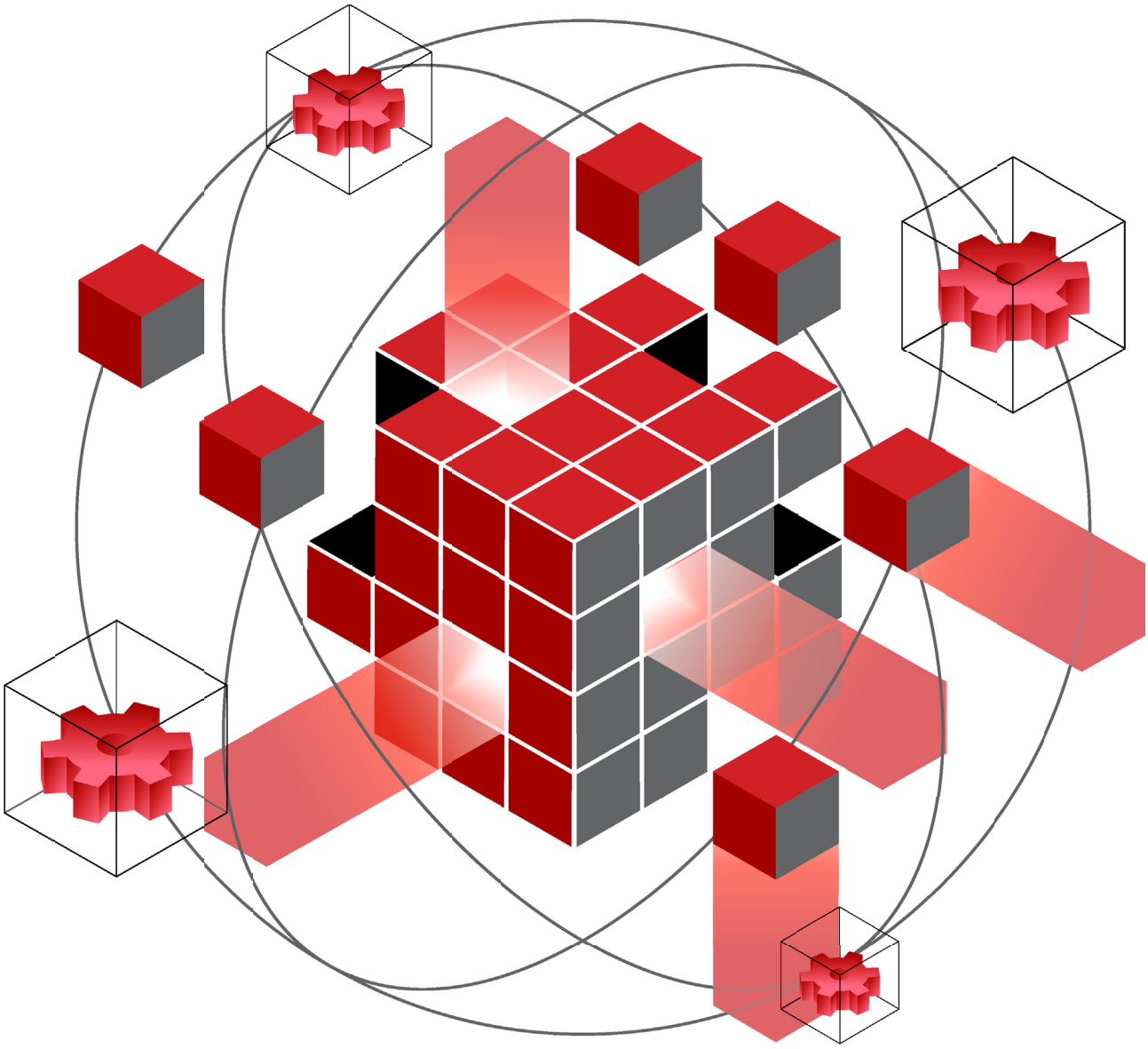
12. ABOUT THE AUTHORS

DONNA BURBANK is a recognized industry expert in Data Management with over 25 years of experience helping organizations enrich their business opportunities through data and information. She is currently the Managing Director of Global Data Strategy Ltd., where she assists organizations around the globe in driving value from their data. She has worked with dozens of Fortune 500 companies worldwide in the Americas, Europe, Asia, and Africa and regularly speaks at industry conferences. She has co-authored several books on Data Management and is a regular contributor to industry publications.

She can be reached at donna.burbank@globaldatastrategy.com.

MICHELLE KNIGHT is a technical writer who writes content about Data Management, especially around Data Governance, Data Quality, and Data Strategy. She is the author of a wide range of DATAVERSITY articles and ones for DZone, RTInsights, ITChronicles, and the World Financial Review. She wrote about big data applications at Apple for 13 months, experiencing Data Management firsthand. Michelle is a Smith College alumna who enjoys walking her husky-mixed dog and doing crosswords in her spare time.

She can be reached at michelleknight953@protonmail.com.
(Photo by Photo Yoshin.)



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