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Chief Data Officers' Perspectives on
How to Achieve Data Management Maturity

Interviews with Chief Data Officers (CDOs) reveal two emerging categories of CDOs and four attributes they use to gauge data management and data science maturity: trust, purpose, scale and measurement. Learn how CDOs in one category might borrow from the priorities of the other to help mature their organization's practice.

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Chief Data Officer Perspectives

Enterprise Chief Data Officers (CDOs) have come into their own amid growing reliance on data-driven insights ripe for extraction from an expanding universe of data. On their journeys to the dual role of digital transformation champion and data guardian, CDOs have earned their stripes leading others through disparate landscapes: IT, services, marketing and business development are typical examples. Their experiences are as varied as the expectations and priorities of their current roles. Despite these variations, CDOs' views of the attributes that define a mature data management and data science organization are remarkably similar.

Methodology

To understand what these attributes are, we began with a hypothesis that four attributes were required for mature practices in data management and data science, which we defined as the discipline of automated data modeling and analytics.

We identified CDOs who represented a diverse set of industries and who listed data analytics and artificial intelligence (AI) pursuits in their individual public profiles. We then conducted in-depth interviews with nine enterprise and commercial CDOs in the U.S., representing four segments: Finance, Insurance, Marketing & Advertising and Technology. Our interviews revealed two distinct CDO segments based on organizational priorities, and four attributes by which they gauge their progress in maturing their data management and data science practice.

Using non-leading questions, we asked CDOs to identify what they define as the "North Star" for data management and data science maturity. As a result of our interviews, we validated and adjusted our hypothesized attributes to reflect the collective thinking about how organizations achieve data-driven success.

Emerging CDO groupings

Among the nine CDOs we interviewed, we categorized five as "Innovation-focused CDOs" and four as "Regulation-focused CDOs."

Innovation-focused CDOs

Their primary drivers were pursuing alignment with sales to increase revenue. They viewed data science as providing significant company differentiation. They invested in training and tooling to upskill as many of their team members in data science as possible, and they created cross-functional teams combining business acumen with engineering acumen for higher-quality output. Some used tools to make data science more accessible to business-centric employees. Two of these CDOs were from digital-native advertising companies, where revenue is directly tied to their ability to create value from their internally created data in combination with external data sets. They indicated that they did not have formal processes or review boards. This group of CDOs referenced project timelines that were short-term, often with weekly or monthly release cycles.

Regulation-focused CDOs

These CDOs focused predominantly on security, compliance, governance, regulation, risk aversion and institutional processes (such as data governance councils). They referred to risk-avoidance as a primary objective of their organization. These CDOs invested in off-the-shelf algorithms and automated machine learning (AutoML) to handle the data pipeline process from raw data to AI model deployment. These organizations had formal review boards and processes in place to review projects and data management processes. Several referenced the prioritization of projects to match with one-year and three-year plans.

Innovation- focused CDOs	Regulation- focused CDOs
Revenue-driven Not highly regulated Informal processes	Compliance-driven Highly regulated Formal review board
CDOs from Marketing & Advertising Software Technology	CDOs from Finance Insurance

Figure 1. CDO groupings

Data Management Maturity Attributes

Our original four attributes for gauging data management and data science maturity among the CDOs we interviewed included:

- Organizational discipline – A systemic discipline and dedication to data-focus
- Single source of truth – The adoption of the technology to accurately and easily access data
- Data science – An ability to learn from data
- Business intelligence value extraction – The ability to realize increased earnings or savings from the data.

As our interviews progressed, we found that these attributes were useful starting points, but did not fully capture the forward-looking CDOs' perspectives.

Ultimately, the four attributes evolved to the following:

- Organizational trust – Stakeholder buy-in and participation in the discipline, leadership and value the CDO office brings to the business
- Data management fit for purpose – Data managed in a way that is meaningful for both how data is being used and will be used
- Data interpretation at scale – The widespread use of data science capabilities tied to the ability to create organizational transparency and cooperation
- Prioritization and measurement – Identifying areas to create success and measuring that success.

These categories were universal across all CDOs, regardless of grouping, though the implementation and level of maturity varied.

Attribute #1: Organizational Trust

Four of the CDOs rated themselves as "Very Mature," four as "Somewhat Mature," and one as "Not Mature" in having the organizational jobs and processes in place to support an established data management and data science discipline.

Regardless of where they fell on the maturity spectrum, they all agreed that successfully implementing decision-making and data management as an organizational discipline required building trust. Seven of the CDOs directly indicated that when there is trust in the CDO office, the business invests in data-centric value generation.

Building this trust required that the CDO was able to clearly understand and articulate the IT requirements around data management and data science, as well as clearly articulate and understand the business, business challenges, and customer needs.

On the flip side, having a CDO who has not built trust did not make an enterprise mature, as one CDO stated:

"Even though my position exists, I would say it's really just a stake in the ground. It's a start."
– CDO, Large Financial Institution

And other CDOs stressed how easily trust could be lost:

"As soon as you lose trust or credibility, it's really hard to build it back. So to me, it starts with little things like data accuracy, so you know, no mistakes."
– CDO, Advertising Enterprise

"When a question is asked twice and the results returned are different, it erodes trust."
– CDO, Marketing Enterprise

How did the CDOs measure success in gaining organizational trust? CDOs who believed they had achieved organizational trust noted that teams outside of their direct reporting structure requested insight, projects and training from the CDO and their team, or have adopted the CDO practices locally.

Organizational Reporting Structure as an Early Method of Establishing Trust

CDOs indicated that reporting structure matters when establishing the CDO role. One reason this may be critical is in implied establishment of organizational trust based on reporting structure. In the early years of the role, the reporting structure influences the projects that are worked on by the team. For example:

- CDOs reporting into IT or the COO focused on operational programs
- CDOs reporting into CSO focused on governance/risk aversion
- CDOs reporting in sales or marketing focused on revenue generating aspects

However, organizational hierarchy only carries the CDO so far.
"The organizational hierarchy will be important the first one or two years of a CDO. Beyond that, it is the credibility and the acceptance [trust]… The only way to gain acceptance is through success and adding value." – CDO, Large Financial Institution

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Organizational trust

Seven of nine CDOs directly indicated that when there is trust in the CDO office, the business invests in data-centric value generation.

Attribute #2: Data Management Fit for Purpose

The CDOs we interviewed indicated a need to understand and manage data in a way that is meaningful for both how data is being used now and may be used in the future. Data, data sets and all aspects of data interaction can be used in numerous ways. To explain this attribute, we summarize our findings in three sections: Data tools, data context and data trust.

Data Tools

Data management and tools to support data management have been around for decades. These tools include data discovery, data lineage, security, governance, and orchestration, to name a few out of the dozens of tooling categories. All nine of the CDOs indicated that they are "Mature" or "Somewhat Mature" when considering their data management tools and processes.

For Regulation-focused CDOs and Innovation-focused CDOs, central data set access, catalog, extract transform and load functions, local and cloud data storage and security are basic data management requirements. The vision of "Mature" data management extended tooling to include lineage, the ability for people in their organization to find and access data they need, data context and data trust.

Data Context

Two of the Regulation-focused CDOs described data context as the need to ensure that data, security, management and all related items are "fit for purpose." Purpose changes over time; data can be used for more than one purpose; and you may have to identify purpose retroactively.

We distilled from these conversations that Regulation-focused CDOs are not just required to deal with data in a single way. As the way in which data is used changes, the rules around data also changes. Innovation-focused CDOs also indicated that data must be treated differently based on how it will be used. For both groups of CDOs, data must be understood, accessed and managed in a way that supports and is based on the ways it is used. Both CDO groups indicated that there are legal ramifications regarding managing data in a way that is fit for how the data will be used.

Data Isn't Just "Data"

Another aspect of the "data management fit for purpose" attribute is that the very definition of "data" must be expanded. One prior way of thinking was that files are data; records are data; transactions are data.

CDOs recognize that "data" encompasses details about data. This can include aspects that have previously been referred to as metadata, including the intent of how you are using data, the phase of the data use lifecycle, and the processes and pipelines by which data is discovered, curated and activated.

Data Trust

Having confidence that the data being used is suited for the purpose for which it is being used is a baseline way to look at data trust in this context.

For Innovation-focused CDOs and Regulation-focused CDOs alike, data trust was consistently linked to knowing the origin of the data, as well as the owner. Several Regulation-focused CDOs indicated that data which they created in-house was inherently trustworthy. However, all respondents indicated that they use external data and purchase external data sets as part of model and report generation for decision-making. Two CDOs stated unprompted that they did not consider data purchased externally to be inherently trustworthy and, therefore, believed it must be handled differently. For this reason, it is critical to understand where data came from when making decisions based on data.

Data management

It is critical to manage data in a way that is meaningful for both how data is being used and will be used.

Regulation-focused CDOs had built-in systems that helped establish trust. However, one Regulation-focused CDO indicated the need to establish "certified data sets" as a way of establishing trust. In this instance, the CDO indicated that his organization would supply the certification that the data met their baseline standards:

"I think the classic problem of it is that we may build large, complex data warehouses. Those warehouses don't keep up with the pace of the business change. And so they're outdated too quickly. … The concept of a certified data set and trusted data would be where we can assert to the end user that it's been reconciled to their requirements, whatever those are."
– CDO, Financial Enterprise

A secondary factor discussed by several Innovation-focused CDOs was knowing whether the data is "clean."
"'Clean' means the accuracy of data … making sure that it's in a format that can be processed, that we feel comfortable with the accuracy in terms of how it's processed. It takes our analysts a bunch of time to coordinate that."
– CDO, Advertising Enterprise

Another Innovation-focused CDO measured the ability to trust the data sets based on the ability to achieve the client's required ROI:
"When anyone talks about [an] advanced [project], that's the first thing - do we trust the data? Does it work? I think the nice thing about [data] is it's accountable because you're measuring it based on a business outcome on the back end.... I trust whatever data set is going to drive value for a specific client against an outcome." – CDO, Software Technology Enterprise

Attribute #3: Data Interpretation at Scale

We defined data science as the ability to analyze data and automate decisions based on the output of the analysis. When asked to consider the people, tools and processes that their company has for performing data analytics and data science, six of the respondents rated themselves as "Somewhat Mature" or "Mature." This self-assessment reflected the fact that all the CDOs had employees who were highly capable in AI/ML modeling and analysis.

Both Innovation-focused CDOs and Regulation-focused CDOs referred to the "democratization" of data science capabilities. One Regulation-focused CDO indicated that the AI/ML data science skillset will become a commodity, and one indicated that one goal is adopting AutoML (automation of the process of applying machine learning to enterprise problems) to enable all senior members of the team to become data scientists.

"We were doing this kind of stuff years before it was commonplace... machine learning and data science are basically becoming commodities." – CDO, Software Technology Enterprise

"New technology is making it so we don't necessarily need R programmers anymore."
– CDO, Financial Enterprise

CDOs who saw their organizations as "Mature" viewed skills-to-project matching (right people, right jobs) as a distinct advantage, along with repeatable processes and tooling used across multiple projects. These CDOs also discussed best practices around multiple types of projects with different levels of discipline needed, depending on the desired outcome. One CDO indicated that maturity in data interpretation is demonstrated by training junior data analysts to become proficient and support data science projects which have already been deployed. One CDO indicated that maturity must include planning for employee turnover so that their projects, processes, and data are not put at risk.

Data science

Most of the CDOs proactively mentioned that it is only possible to provide value when data science exists in the context of understanding the needs of the business. For this reason, success of this discipline is directly tied to their ability to create organizational transparency and cooperation.

All solutions in this area must allow for the growth of organizations and the handling of future regulation and use cases that do not yet exist.

Team Composition Enabling Data Interpretation at Scale

The ability to perform data science tasks does not indicate the existence of organizational maturity. Most of the CDOs proactively mentioned that it is only possible to provide value when data science exists in the context of understanding the needs of the business. Seven of the CDOs noted the need for a 'translation role' in this process to ensure that the data organization (data analysts, data scientists and quantitative analysts) had a clear understanding of the business problem being solved. This translation layer was typically comprised of product managers and business analysts.

Six CDOs indicated that their data science and data analytics projects are actively using "scrum teams" for rapid iteration of project phases. Even more interesting was that one software technology organization CDO indicated that they were able upskill an entire team of 20 business analysts to perform AI/ML analytics alongside their data scientists through this tight teamwork.

For this reason, success of this discipline is directly tied to a CDOs' ability to create organizational transparency and cooperation. The methods CDOs used to achieve these results varied:

- **Having cross-functional scrum teams** that pair "business interpreters" with engineers (such as data analysts, data scientists or quantitative analysts)

- **Hiring data scientists who understand the business** (or putting them to work on areas with which they are familiar)

- **Helping people help themselves** by supporting business users with data engineers or data scientists through interactive projects. Examples are creating dashboards or enabling simple access to data models.

Attribute #4: Prioritization and Measurement

Success begets success. Regardless of grouping, the CDOs who viewed themselves as "Mature" clearly articulated different types of projects and how they measured project outcomes. Regulation-focused CDOs were more likely to review the expected return on projects before approving them. They also indicated that they prioritized projects based on committee review and long-term company goals. By comparison, Innovation-focused CDOs were more likely to initiate customer-focused projects and then determine revenue or operational savings after a project was completed. They also indicated that they used these measurements to justify additional headcount. One Innovation-focused CDO in technology indicated that they achieve value by reusing, discovering and expanding projects that can be leveraged multiple times across customers and teams.

CDOs in both segments who view their organizations as "Mature" in prioritization and measurement have built the ability to understand the ROI of their projects across the business and measure areas such as:

- **Mitigated risk level** – Preventing downtime, asset exposure, or other loss event

- **Operational savings** – Reducing full-time equivalent (FTE) effort

- **Improved business results** – Increasing sales/revenue, etc.

Achieving maturity in prioritization and measurement continues to be a challenge for many of the CDOs. Where revenue generation and operations savings may seem straightforward, there are larger strategic areas to consider.

"We've just started to develop the playbook …defining what we want our key performance indicators to be in individual line of businesses and how they align with our strategic objectives from an organizational perspective, and then tie all the way down to tactical efforts."
– CDO, Large Financial institution

Conclusions

As organizations advance their data management and data science practices, it may be useful for them to consider mature organizational attributes. CDOs should also consider their primary objective.

If objectives are closer to the Innovation-focused CDO paradigm, consider focus on "prioritization and measurement" and "data Interpretation at scale" are distinctive competencies.

Where data science provided enterprise differentiation, Innovation-focused CDOs were investing in training and tooling to upskill as many of their team members as possible. They created cross-functional teams combining business skills with engineering-skills for higher-quality output. Also critical were reusability and the repeated generation of value from data sets, data, algorithms and projects across the organization and across multiple customers.

If objectives are closer to those of a Regulatory-focused CDO, "data management fit for purpose" and "organizational trust" are recommended areas of focus. Enterprises must manage data in a way that is meaningful for both how data is being used and will be used, and not just what the data is. By building organizational trust through transparency, consistency, and value-delivery, organizations increase investment in data management and data science.

Summary

Our conversations with CDOs indicate that data management and data science practices are rapidly moving forward. Solutions addressing requirements in these areas must be flexible enough to handle rapidly changing regulations, enable process and program transparency, support the widespread use of data science, simplify merging business savvy with analysis, support the ever-changing way in which enterprises use and acquire data, and allow for the expansion of the very definition of data.

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