CHIEF DATA OFFICER (CDO) AGENDA 2023

Prioritizing business value creation

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In partnership with MIT CDOIQ

Executive summary

Data is at the center of every application, process, and business decision. Nearly every organization is on a quest to become more data-driven to more quickly discover and act on insights. To accelerate this change, they are turning to chief data officers (CDOs) to ensure the organization is getting the most value out of its data. The CDO role is one of the newest C-level jobs, having first appeared at Capital One in 2002. Since then, many companies have created CDO positions—initially in financial services firms, then in some US federal agencies, and eventually across multiple industries. The role is relatively new, but it's changing—fast.

While CDOs have historically been tasked to play defense with data (i.e., data management, minimizing risks), the growing appetite for data-driven everything is forcing the role to evolve. They are now focused on creating demonstrable value for their businesses and prioritizing projects according to their impact. According to our research, 42 percent of chief data officers define success as achieving business objectives, and 36 percent believe focusing on a small set of key analytics or artificial intelligence (AI) projects can deliver the most value.

This shift in focus is likely to define the role for years to come and has raised several questions: How are CDOs shifting their strategic initiatives? What are the key challenges and opportunities in front of them? And how are CDOs approaching business value creation?

To find the answers, we surveyed more than 350 data professionals around the world and conducted 25 one-on-one interviews to uncover what's top of mind for CDOs, how they are defining success, and how they are creating business value with data.

Key learnings

1 CDOs are focused on business value creation

Forty-two percent of chief data officers define success as achieving business objectives. Even those CDOs with primarily technical backgrounds are about seven times more likely to define their success in terms of business or organizational objectives achieved than in terms of technical objectives achieved.

2 Data, analytics, and artificial intelligence initiatives are viewed as delivering the most value

Thirty-six percent believe that focusing on a small set of key analytics or AI projects can deliver the most value compared to other activities, such as data literacy training (31 percent) and data monetization (15 percent). A majority of CDOs (64 percent) also spend their time enabling new business initiatives based on data, analytics, or AI.

3 Data governance is the top priority

According to 44 percent of CDOs, data governance is the top priority, followed by adopting a data product approach (38 percent) and building and maintaining advanced analytics and AI projects (36 percent).

4 Creating a data-driven culture remains a top priority, as well as a challenge

A hefty number (69 percent) spend the majority of their time on data-driven culture initiatives, and 55 percent view the lack of a data-driven culture as a top challenge to meeting business objectives.

5 The primary responsibility for data is still divided

Only 41 percent reported they have primary data responsibility, while 30 percent have shared responsibility with other C levels.

6 The CDO role is poorly understood

A large portion (62 percent) of CDOs believe their role is less understood than other C-level roles, prompting the need to adopt a “more deployment, less R&D” approach and better internal communication tactics.

Survey respondents and methodology

This study was conducted in the summer of 2022 and is one of the largest CDO studies ever undertaken. It was sponsored by Amazon Web Services (AWS) and conducted in collaboration with the International MIT Chief Data Officer and Information Quality (MIT CDOIQ) Symposium. We conducted a global quantitative survey of 354 data professionals with 264 respondents in CDO or equivalent title and level positions. In addition, qualitative interviews were completed with 25 CDOs.

The quantitative research questions addressed CDOs' demographic information, number of and tenure in CDO jobs, professional backgrounds, key activities, challenges, perceptions of how successful they are in their jobs, and what they do to create value for their organizations. The qualitative interviews explored similar topics but went into greater detail on organizational structures and reporting relationships, key initiatives, and ways to create value as a CDO.

Overview

To understand how the role of CDO is evolving in today's business climate and what CDOs are doing to achieve success, we looked at three areas:

1 **Responsibilities and challenges**

What is the role of today's modern CDO? And what are their key challenges?

2 **Strategic priorities and initiatives**

How have CDO priorities shifted, and what are likely to be key initiatives for 2023?

3 **Approaches to value creation**

How are CDOs seeking to drive and prove business value creation?

Figure 1: CDO Statistics

CDO demographics snapshot

Tenure

29%
have been in their role for more than six years

23%
have been in their role for one year

Reporting structure

23%
report to CEO

21%
report to CIO/CTO

22%
report to another C-level exec

Demographics

67%
are men

27%
are women

55%
were hired outside of their company

50%
say this was their first role as CD(A)O

SUCCESS AREA #1

Responsibilities and challenges

What is the responsibility of today's CDO? And what are their key challenges?

CDO dilemma: data defense vs. data offense

CDOs' activities can be largely categorized into two focus areas: data defense and data offense. Although data defense is still a critical part of the job, we see that data-offense activities are on the rise. Let's explore what's behind this shift. The original core CDO position, as it existed early on in banks and insurance companies, was, to a large degree, oriented to data defense (see sidebar). With the exception of data governance—still a major priority in our findings—many contemporary CDOs, finding it difficult to demonstrate value quickly with defensive initiatives, are adopting offensive activities.

"To sit at the C-level table you have to have offense," said Bill Groves, former CDAO of Walmart, Honeywell, and Dun & Bradstreet. In most cases, offense-oriented projects involve analytics and AI. Today, many CDOs are—in official title or actual responsibilities—chief data and analytics officers, or CDAOs. In interviewing many of them for this study, it became clear that while approaches to value creation are changing, data analytics and AI remain top of mind as CDOs view this as a potential enabler to innovation. Both CDOs and CDAOs will have to strike the right balance between these two activities to achieve success.

Data defense vs. data offense

Defense focus:

- Prevent major problems with data.
- Avoid cybersecurity breaches and hacks.
- Ensure regulatory compliance.

Offense focus:

- Increase revenues and profits through enhanced operations.
- Improve customer relationships and marketing.
- Enable new products and services, processes, business models, and strategies.

CDO role expands beyond data management responsibilities

CDOs today have different roles and responsibilities than many might expect. The job itself is not just "chief data officer"; the formal job titles of the 264 respondents in this survey included chief data officer (30 percent), de facto chief data officer/ most senior data leader (43 percent), chief data and analytics officer (21 percent), and chief analytics officer (6 percent). Several of the experienced CDOs commented in interviews that data management responsibilities alone do not make for a successful role, largely because it is too difficult to show value quickly in such roles. Many of them are officially or unofficially chief data and analytics officers.

"I am often approached for CDO jobs, but if analytics aren't included, I tell them I am not interested."

"The CDO job without analytics is a two-year job. If you are just dealing with data management it is too hard to show value. There may be some regulatory pressure to improve data, but that usually goes away in a couple of years."

CDOs face growing responsibilities and increasing expectations

Another insight we discovered in our survey is that CDOs have many responsibilities and expectations, perhaps too many. Figures 2 and 3 suggest a need for focus. CDOs are attempting to manage—in order of priority—data governance, data quality, building advanced analytics capabilities, business intelligence capabilities, improving data infrastructure, AI capabilities, and data monetization. This is a large set of responsibilities, and it's not surprising that 53 percent mentioned that they face the challenge of insufficient resources to accomplish goals.

The data indicates that to be successful, CDOs should narrow their focus and discuss with senior executives—ideally before starting their jobs—the most important responsibilities and initiatives they should address.

Figure 2

Which of the following responsibilities are included in your job?

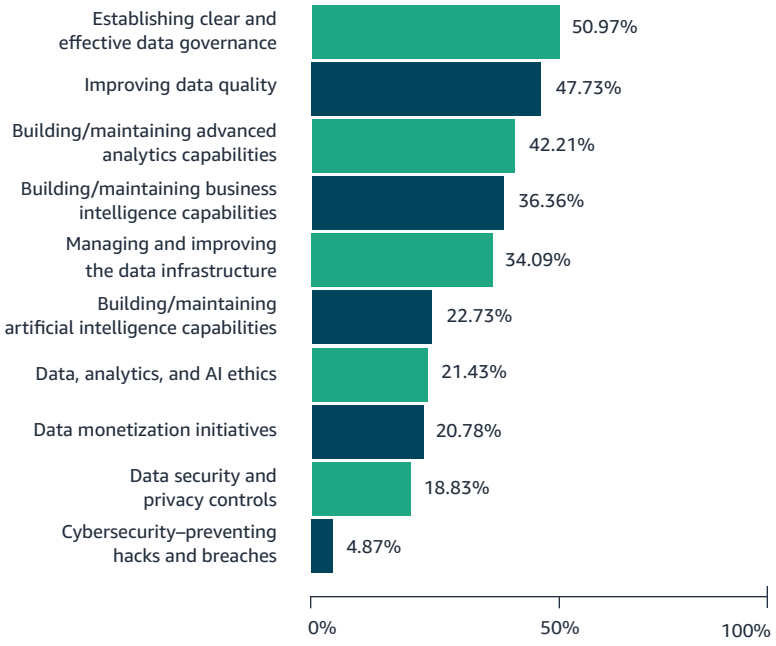
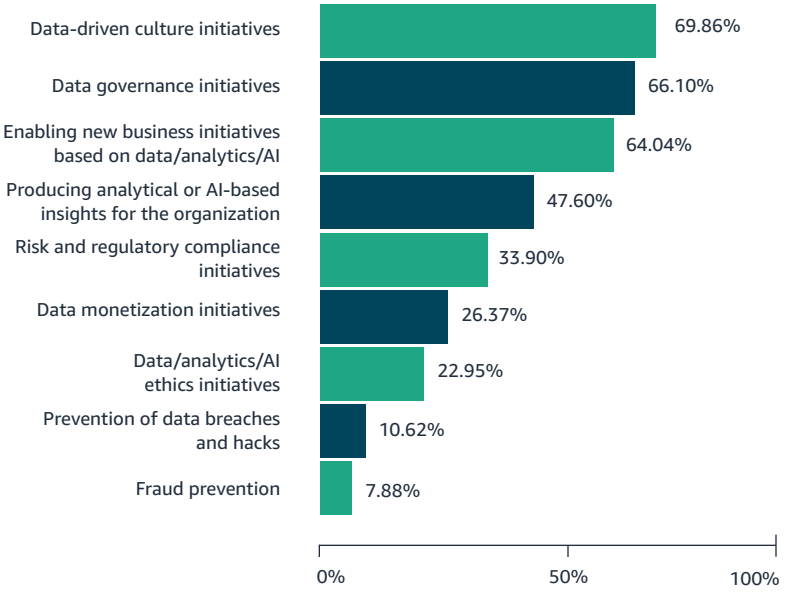


Figure 3

To which of the following activities have you devoted 20% or more of your attention? (Select all that apply, but not more than five.)



The primary responsibility for data is still divided

It's natural to think that chief data officers would have the primary responsibility for the data in their companies, but an issue with CDOs in many organizations is that they often do not (Figure 4). Only 41 percent reported that they are primarily responsible for data management in their companies, 30 percent answered that they share responsibility with other execs, and 29 percent said that data responsibilities are a mix of centralized and decentralized. Those who did report having primary responsibility for data are about 10 percent more likely than those who share it to feel that they are highly successful in their roles as CDOs.

Figure 4

How much responsibility do you feel you have for overall data management and use within your organization?

41%

reported that they are primarily responsible for data management in their companies

In interviews, CDOs reported that data responsibilities are often divided organizationally, with some decentralized units and functions managing their own data. This was a cause of frustration to some. Other CDOs are content to focus their data management efforts where they are most needed and appreciated. One said:

"We have two primary businesses. I did a listening tour when I first took the job as CDO. There were many complaints about data—they can't find it, it's low quality, we can't build products fast enough, and so forth. But the head of our most well-established business told me, 'Our systems are old and creaky, but they still work and get the job done.' So I decided to focus on the other key business and help them create more growth opportunities. Since then I have confirmed that the people in the established business love Excel and their tedious workflows, and it isn't worth the effort to convince them to modernize. Getting them to adopt anything new is really hard, so I put in a new data and analytics platform for the growth-oriented business."

CDOs struggle with communicating their role and value

In our survey, 62 percent of respondents stated that they feel that the CDO role is less understood than other C-level roles in their companies. Even those CDOs from financial services firms where the role was first established are not more likely to feel that their jobs are well understood. Experience does help: Those CDOs who have been in their jobs for six years or more said the CDO role is better understood in their companies than those with less experience on the job.

CDOs need to define and evangelize their role to be successful in such a poorly understood job. Several of those we interviewed say that they have hired communications specialists to work in their organization.

More deployment, less R&D

Manav Misra, chief analytics and data officer at Regions Bank, ensures that each of the "data products" his team develops is successfully deployed and the value to the company carefully measured. For each data product, they have quarterly steering committee meetings at which the business team does the reporting, and Misra's team attends the meeting. At a recent senior leaders meeting, his organization was invited to set up a booth outside the meeting where all the data products were displayed with their data product partners describing them. According to Misra, it generated a high level of excitement and demand for the group's work.

SUCCESS AREA #2

Strategic priorities and initiatives

Discover the shift in CDO priorities and what will be key initiatives for 2023

"Like many companies, as we have progressed on our data governance maturity, and we are increasing our focus on being consumption-oriented. We have an initiative underway to make it easy for people to consume data, and governance is built in by design. The mottos for the team became 'Make it easy for data consumers' and 'drive reuse of data assets.' To drive reuse, our vision is to create an internal data market with reusable internal and external data. The market metadata will describe who is using it for what purpose and apply machine learning to use cases to identify the most likely data for them. We are trying to bring the digital experience to our data consumers by making the experience simpler and easier."

Tony Cyriac, CDAO, Charles Schwab

Data governance is the top priority for CDOs

Our research revealed that data governance is the highest priority for CDOs. When asked what the top three responsibilities are in the CDO job, the highest percentage, 44 percent, mentioned "establishing clear and effective data governance." When asked to list the tasks the CDOs spent at least 20 percent of their time on, data governance initiatives were second highest.

In our view, data governance initiatives require a more strategic focus across the organization, as governance is a shared responsibility and a difficult way to add value as a CDO. Governance involves changing the behavior of data users and getting business functions and units to take more responsibility for data management. "Governance" is also not an appealing word to business data users; one CDO said she banned the use of the term at her company.

Some leading CDOs are emphasizing "governance by design" and improving the ease of data consumption rather than the typical exhortation approaches to change user behavior. We agree that this is the best path forward for CDOs to make an impact with their data governance efforts.

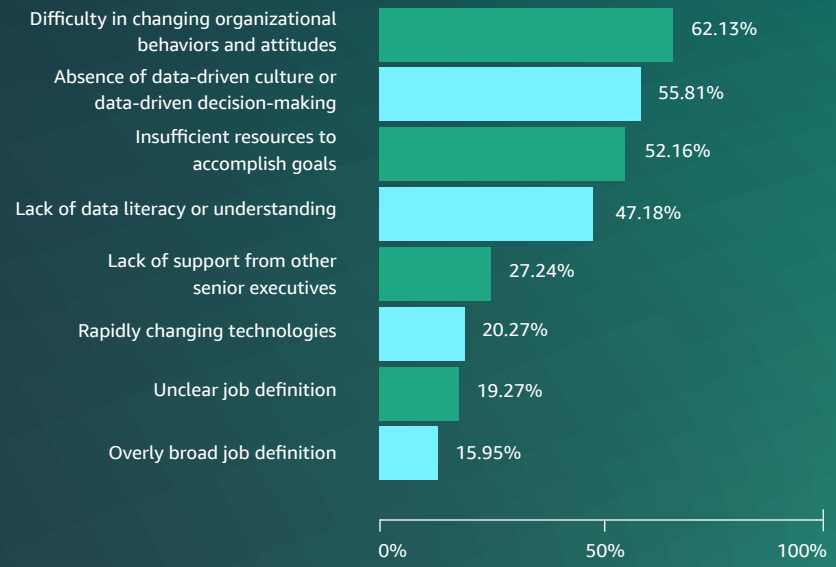
Creating a data-driven culture remains one of the top initiatives for CDOs

Changing organizational cultures to be more data-driven is clearly a focus of the CDOs we surveyed. When asked which initiatives CDOs devote their time to, the highest percentage selected "data-driven culture initiatives." In terms of the challenges CDOs face in their jobs, they commonly mentioned cultural issues (Figure 5). Sixty-two percent cited "Difficulty in changing organizational behaviors and attitudes" as a challenge. Fifty-six percent checked "Absence of data-driven culture or data-driven decision-making." Forty-nine percent are challenged by a "lack of data literacy or understanding."

Data-driven cultural attributes and change are, of course, difficult to measure, but most of the CDOs in both our survey and interviews felt the need to address it anyway. Some pointed out the need to move beyond "check the box" data literacy programs. As Heidi Lanford, CDO of Fitch Group, put it, "It's not how many people attend the data literacy programs, it's whether the ones who do change their mindset, language, and behavior." Some CDOs had more extensive culture change initiatives.

Figure 5

What has been your greatest challenge in achieving your objectives? (Select the top 3.)



For an example of the latter, Vipin Gopal, CDAO of Eli Lilly & Company, described his multifaceted approach to changing the culture relative to data and analytics:

"Over time I have become increasingly passionate about the importance of culture. Value creation and execution with data and analytics depends upon the culture that exists in any given part of the company. We recently created the Lilly Data & Analytics Institute with the goal of upskilling everybody in the company in relevant data analytics areas. We have a basic course for everyone, and then we have function-specific programs in areas like marketing or R&D for the second step. In the third step we turn people loose on some self-service capabilities. The bottom line is enabling people to think in a data-driven way. Then we try to measure how the culture is changing over time, which is admittedly anecdotal. We try to observe whether people in meetings ask, 'What does the data tell us? Do you have data to support that hypothesis?' People will respond to questions like that, and it provides the motivation to be prepared the next time. Within my analytics organization, we measure whether we are getting more questions coming our way. Are the questions good? Are we having more data-related discussions in the company? Are more questions that were answered with gut feel in the past driven by data and analysis? We are seeing that begin to happen."

Vipin Gopal, CDAO, Eli Lilly & Company

42%

define success in terms of business objectives achieved

"The CDO function is not a service organization; it's a transformation organization."

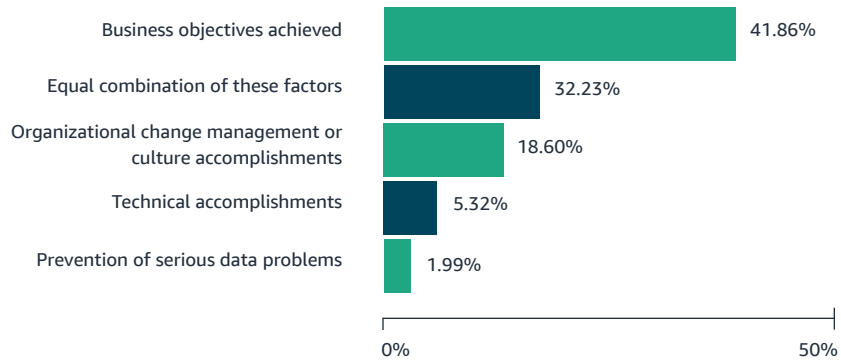
Bill Groves, one of the most experienced CDOs across several industries, former CDO of Walmart, Honeywell, & Dun & Bradstreet

Successful CDOs define their success in terms of business objectives instead of technical achievements

Our survey and interview responses clearly show that CDOs are primarily focused on achieving business objectives rather than purely technical ones (Figure 6). Only 5 percent of the CDOs in the survey defined their success in terms of technical objectives achieved and only 2 percent in preventing serious data problems. Instead, 42 percent define success in terms of business objectives achieved, 19 percent consider success to be organizational change management or culture accomplishments, and 32 percent view success as a combination of the achievement factors. Even those CDOs with primarily technical backgrounds are about seven times more likely to define their success in terms of business or organizational objectives achieved than in terms of technical objectives achieved.

Figure 6

How do you primarily define success in your role?



As more CDOs shift to focusing on business objectives, the central question becomes: What's the best approach to create value for the business?

SUCCESS AREA #3

Approaches to value creation

Learn how CDOs are seeking to drive and prove business value

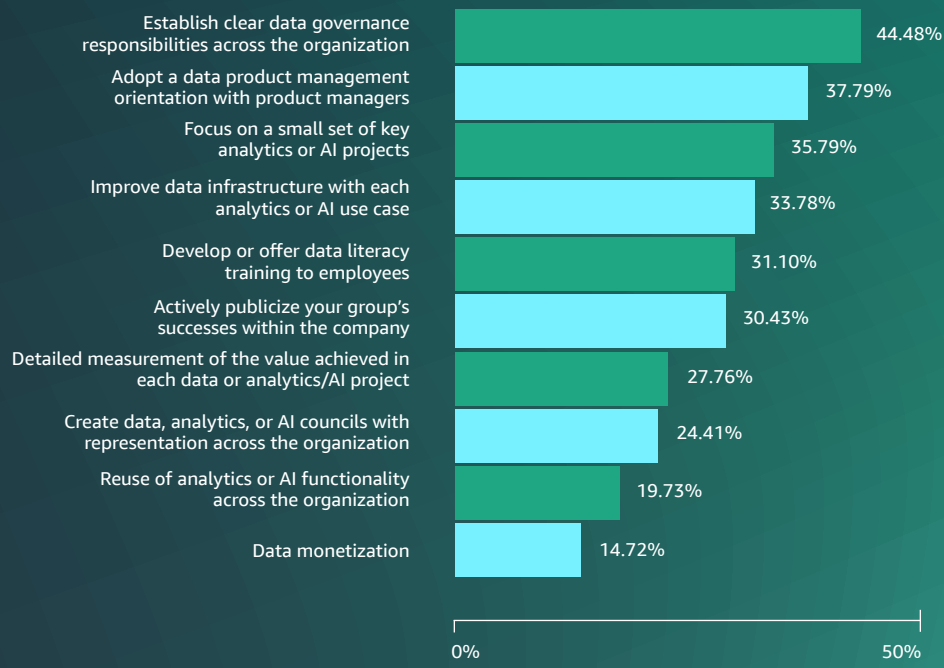
Many CDOs are heavily focused on creating value for the organization

As the role continues to evolve, the biggest shift our research revealed is that many CDOs are obsessed with creating—and in some cases measuring—value for their companies. When we asked CDOs which initiatives they are pursuing to bring more value to the organization, most viewed the primary value creation mechanism as analytics and AI (Figure 7).

Many emphasized the targeting of a few important analytics or AI projects that, when successfully completed, would make a substantial difference in the performance of their companies. Thirty-six percent said they "focus on a small set of key analytics or AI projects" in order to achieve value. Several are focusing their data management and modernization in areas where they are developing analytics and AI use cases.

Figure 7

Which of the following initiatives are you pursuing to bring more value to your organization as CD(A)O? (Select the top 3.)



CDOs focus on analytics, AI, and ML projects to create business value

Some CDOs in relatively advanced analytics and AI companies also emphasize that completing key projects alone is not enough. They feel that CDOs eventually need to build an infrastructure to accelerate the use of data, analytics, and AI throughout the company. Todd James, who leads data and AI for 84.51°, the data science subsidiary of the Kroger Co., said that:

"A set of strategic use cases is not enough. That creates a set of point solutions. You've got to be able to scale by having a set of reusable analytical capabilities. We are starting to head there. We're trying to create a composable [built from modular components] set of analytics and AI applications that are accessed through APIs."

Similarly, one leading bank's head of enterprise data and machine learning (ML) is focused heavily on scale and infrastructure development for ML. He noted in an interview:

"With ML, we are moving toward platforms that everybody can take advantage of, with both standardization and automation. We want to root out arbitrary uniqueness, and get rid of temporary ML platforms. We are also building a feature platform on which we are spending a lot of time. It is a feature store to which everyone can contribute. As machine learning features get more and more complicated with real-time analysis, we store how they were created and make them an on-demand component of the ecosystem."

Adopt a data product mindset and tactics

Increasing numbers of CDOs are employing a “data product” approach in order to help achieve value. Thirty-nine percent reported that they “adopt a data product management orientation with product managers.” Data product managers help to ensure that all aspects of an analytics or AI initiative, from conception to deployment and ongoing maintenance, are effectively managed. The product focus ensures that data scientists, data engineers, and other members of a data product team don’t just create algorithms but rather collaborate in deploying entire business-critical applications. Manav Misra at Regions Bank believes strongly in the product focus and applies the following key disciplines to data products at Regions Bank:

- Make sure that the data product addresses a critical business priority for business partners and solves their problem.
- Pull together data scientists, data managers, data visualization experts, user interface designers, and platform and infrastructure people to build something robust—never half-baked.
- Apply product management and software engineering disciplines to data science (many statisticians don’t know how to build software).
- Always think about the end user and develop a product that is most likely to be adopted and engaging for them.
- Measure everything, including baseline performance, the impact of the product, revenue generation, and internal savings.
- Publicize successful product results to build demand.

While data monetization is a clear approach to achieving value, several CDOs interviewed find data monetization particularly difficult to do at scale. Only 22 percent of CDOs surveyed indicated that monetization is one of their top three responsibilities, and only 14 percent said it is a primary approach to achieving value. One interviewed CDO was let go because he couldn’t generate hundreds of millions in incremental revenue for the company quickly enough; another resigned from a previous CDO job with impossible-to-meet monetization objectives.

Measuring value and economic return

According to our research, CDOs are also focused on measuring business value. They insist that key projects or data products are measured in terms of their impact on the business. In the survey, 29 percent of CDOs reported that they employ "detailed measurement of the value achieved in each data or analytics/AI project."

Several CDOs described their measurement approaches in interviews, as well. At Regions Bank, for example, CDAO Manav Misra created a new role called "data products partners," who are assigned to work with particular business units and support functions at the bank. The data products partners measure everything about the data product, including the baseline performance before it is implemented, the overall impact of the product, and any results or revenue generation or internal savings. They are also encouraged to promote their results to the business, and Misra's organization publishes an internal quarterly newsletter that is circulated across the bank—to help build awareness and drive demand for their partnership. Regions Bank has been employing the product orientation for three and a half years. It has been quite successful, with more than 10 revenue-generating and cost-saving products (with incremental impact in eight figures) and several more for internal support functions.

Some CDOs even get their CFO or finance organization to certify it. Sebastian Klapdor, CDO of marketing and design service company Vista, is also a strong advocate of data products and ensures that all of Vista's data products have impact by assessing them quarterly with a sign-off on any monetary benefits from the finance organization. In only two years, his CDO organization has documented $90 million in incremental profits—with a large share of this recurring on an annual basis—which is an impressive number for a company with $1.5 billion in 2021 revenue.

10 keys to succeeding as a CDO

1. Add analytics and AI to your portfolio of responsibilities.
2. Adopt a “data product” and “analytics/AI” product orientation.
3. Show success early by building and successfully deploying a few high-value use cases.
4. Don’t boil the ocean: Modernize the data environment to support key use cases, including building analytics and AI solutions.
5. Drive more value from data governance initiatives by focusing on easing data consumption and access rather than walled gardens.
6. Build allies within function and line of business owners.
7. Develop more extensive and varied initiatives to move toward a data-driven culture.
8. Focus on creating tangible business value for your organization at all times.
9. Measure the value and impact of data initiatives and communicate them widely.
10. Over time, focus on building reusable datasets, data markets, analytics/AI models, and feature stores.

A NEW CDO MANDATE

Delivering business value with data, analytics, and artificial intelligence

Today, CDOs are at a crossroads with a choice between focusing on modernizing and improving data infrastructure and governance or delivering business value through analytics and AI. Our research findings reflect the evolution of the role and confirm that more are prioritizing activities that have a direct and rapid impact on the business.

Increasing numbers of CDOs are focusing on analytics and AI projects to deliver and prove value. They are also addressing data infrastructure and governance but in the context of analytics and AI use cases. This approach to the job is likely to persist in the future. There is simply too much data to be managed and consumed, and organizational data is becoming too valuable a business asset for a senior executive not to be in charge of data and how it is applied to business problems and opportunities.

Many CDOs have realized that the job is somewhat abstract without a major emphasis on activities that lead to clear value for their organizations. By focusing on analytics and AI projects and selective improvements in data infrastructure, CDOs ensure that they stand out and that organizations see substantial returns on their data strategy investments. The opportunity for transformational impact is there, and CDOs should seize the moment.

About Thomas H. Davenport

Thomas H. Davenport is the President's Distinguished Professor of Information Technology and Management at Babson College, a Visiting Professor at Oxford University's Saïd Business School, a Fellow of the MIT Initiative on the Digital Economy, and a Senior Advisor to Deloitte's AI practice. He pioneered the concept of "competing on analytics" with his best-selling 2006 *Harvard Business Review* article (and his 2007 book by the same name). In 2022, he will publish three books on AI, including *Working with AI* (The MIT Press) and *All in on AI* (Harvard Business Review Press). He has published more than 20 books and more than 300 articles for *Harvard Business Review*, *MIT Sloan Management Review*, and many other publications. He writes columns for *Forbes*, *MIT Sloan Management Review*, and the *Wall Street Journal*. He has been named one of the world's "Top 25 Consultants" by *Consulting* magazine, one of the top three business/technology analysts in the world by *Optimize* magazine, one of the 100 most influential people in the IT industry by Ziff Davis, and one of the world's top 50 business school professors by *Fortune* magazine. He's also been a LinkedIn Top Voice for both the education and tech sectors.

About Amazon Web Services

For over 15 years, Amazon Web Services (AWS) has been the world's most comprehensive and broadly adopted cloud offering. AWS has been continually expanding its services to support virtually any cloud workload, and it now has more than 200 fully featured services for compute, storage, databases, networking, analytics, machine learning (ML) and artificial intelligence (AI), Internet of Things (IoT), mobile, security, hybrid, virtual and augmented reality (VR and AR), media, and application development, deployment, and management from 87 Availability Zones within 27 geographic regions, with announced plans for 21 more Availability Zones and seven more AWS Regions in Australia, Canada, India, Israel, New Zealand, Spain, and Switzerland. Millions of customers—including the fastest-growing startups, largest enterprises, and leading government agencies—trust AWS to power their infrastructure, become more agile, and lower costs.

Every organization has different data sources, different analytics needs, and different governance requirements. And these are dynamic and change over time. To help, you need to implement a modern data strategy that can handle the enormous growth in data and meet your use cases now and in the future. AWS provides the most comprehensive set of services for the entire end-to-end data journey for all workloads, all types of data, and all desired business outcomes. With purpose-built services, infrastructure and tooling, and implementation support via professional services and partners, AWS is the best place to unlock the value of your data and turn it into insight. To learn more about how AWS helps organizations build their modern data strategy, visit **aws.amazon.com/data**.

About MIT CDOIQ

The Chief Data Officer & Information Quality (CDOIQ) Symposium has attracted thousands of CDOs, data leaders, and C-suite officers to share and exchange cutting-edge ideas and content over the last 16 years. It is the premier venue to accelerate the adoption of the CDO role in all industries globally. CDOIQ's is to facilitate CDO appointments with a budget, authority, and resources in every enterprise, improve data culture for the big-data and data-driven era, and drive high-quality data to support data scientists. The program is working toward its vision by improving data culture globally as well as conducting high-quality research with continuous feedback from data producers, custodians, and consumers. CDOIQ provides the very important feedback loop to make advanced data leadership processes and designs better and identify research opportunities through the help of the stakeholders. Additionally, the CDOIQ hosts a variety of educational events and training programs for CDOs, data leaders, and senior executives globally. These events aim to equip them with the proper knowledge and tools provided by thought leaders and practitioners in the field of data quality.